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EMNRD-OCD ARTESIA

COG Operating LLC

Eddy County, NM (NAD27 NME)

Myox 6 State Com

510H

ST01 / 65026

Design: Surveys (Ensign 155)

Standard Survey Report

03 September, 2019





Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

Project	Eddy County, NM (NAD27 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	Myox 6 State Com		
Site Position:		Northing:	392,266.10 usft
From:	Map	Easting:	563,486.50 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 4' 41.841669 N
		Longitude:	104° 7' 42.097797 W
		Grid Convergence:	0.11 °

Well	510H		
Well Position	+N-S	0.00 usft	Northing:
	+E-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	
			usft
		Latitude:	32° 4' 37.070875 N
		Longitude:	104° 7' 55.279387 W
		Ground Level:	3,079.00 usft

Wellbore	ST01 / 65026				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	8/18/2019	7.00	59.72	47,822.41412313

Design	Surveys (Ensign 155)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	8,445.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)	
	0.00	0.00	0.00	357.23	

Survey Program	Date	9/3/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	7,511.00	Scientific Gyro Surveys (OH / 65026)	Keeper	Keeper Standard Rate Gyro	
7,511.00	8,445.00	Phoenix MWD Surveys (OH / 65026)	MWD+HRGM	OWSG MWD + HRGM	
8,505.00	19,042.00	Phoenix MWD Surveys (ST01 / 65026)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction	

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	0.79	52.91	100.00	0.42	0.55	0.39	0.79	0.79	0.00
125.00	0.86	53.92	124.99	0.63	0.84	0.59	0.29	0.28	4.04
150.00	1.05	58.44	149.99	0.86	1.19	0.80	0.82	0.76	18.08
175.00	1.21	61.44	174.99	1.11	1.61	1.03	0.68	0.64	12.00
200.00	1.33	66.65	199.98	1.35	2.11	1.24	0.67	0.48	20.84
225.00	1.39	70.98	224.97	1.56	2.66	1.43	0.48	0.24	17.32
250.00	1.40	68.20	249.97	1.77	3.23	1.62	0.27	0.04	-11.12
275.00	1.44	70.50	274.96	1.99	3.81	1.81	0.28	0.16	9.20



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Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)
300.00	1.43	71.49	299.95	2.20	4.41	1.98	0.11	-0.04	3.96
325.00	1.39	72.88	324.94	2.38	4.99	2.14	0.21	-0.16	5.56
350.00	1.35	74.96	349.94	2.55	5.57	2.28	0.26	-0.16	8.32
375.00	1.33	74.20	374.93	2.71	6.13	2.41	0.11	-0.08	-3.04
400.00	1.40	72.95	399.92	2.87	6.70	2.55	0.30	0.28	-5.00
425.00	1.45	71.47	424.91	3.06	7.29	2.71	0.25	0.20	-5.92
450.00	1.56	70.50	449.90	3.28	7.91	2.89	0.45	0.44	-3.88
475.00	1.65	69.71	474.89	3.52	8.57	3.10	0.37	0.36	-3.16
500.00	1.71	67.65	499.88	3.78	9.25	3.33	0.34	0.24	-8.24
525.00	1.84	67.19	524.87	4.08	9.97	3.59	0.52	0.52	-1.84
550.00	1.96	49.79	549.86	4.51	10.67	3.99	2.35	0.48	-69.60
575.00	2.21	33.82	574.84	5.19	11.26	4.64	2.52	1.00	-63.88
600.00	2.26	28.65	599.82	6.02	11.76	5.45	0.83	0.20	-20.68
625.00	2.28	22.62	624.80	6.91	12.19	6.32	0.96	0.08	-24.12
650.00	2.29	17.16	649.78	7.85	12.53	7.24	0.87	0.04	-21.84
675.00	2.34	10.01	674.76	8.83	12.77	8.20	1.17	0.20	-28.60
700.00	2.18	358.86	699.74	9.81	12.85	9.18	1.87	-0.64	-44.60
725.00	2.13	341.11	724.73	10.72	12.69	10.10	2.67	-0.20	-71.00
750.00	2.24	322.55	749.71	11.55	12.24	10.95	2.85	0.44	-74.24
775.00	2.44	306.11	774.69	12.25	11.51	11.68	2.79	0.80	-65.76
800.00	2.53	300.97	799.66	12.85	10.61	12.32	0.96	0.36	-20.56
825.00	2.58	299.72	824.64	13.41	9.65	12.93	0.30	0.20	-5.00
850.00	2.63	300.87	849.61	13.99	8.67	13.55	0.29	0.20	4.60
875.00	2.60	300.82	874.59	14.57	7.69	14.18	0.12	-0.12	-0.20
900.00	2.58	301.04	899.56	15.15	6.72	14.81	0.09	-0.08	0.88
925.00	2.57	300.56	924.54	15.73	5.75	15.43	0.10	-0.04	-1.92
950.00	2.56	301.04	949.51	16.30	4.79	16.05	0.09	-0.04	1.92
975.00	2.56	299.83	974.49	16.86	3.83	16.66	0.22	0.00	-4.84
1,000.00	2.59	299.09	999.46	17.42	2.85	17.26	0.18	0.12	-2.96
1,025.00	2.54	301.11	1,024.44	17.98	1.88	17.87	0.41	-0.20	8.08
1,050.00	2.50	300.12	1,049.41	18.54	0.94	18.47	0.24	-0.16	-3.96
1,075.00	2.48	299.56	1,074.39	19.08	0.00	19.06	0.13	-0.08	-2.24
1,100.00	2.51	298.98	1,099.37	19.61	-0.95	19.63	0.16	0.12	-2.32
1,125.00	2.67	300.24	1,124.34	20.17	-1.94	20.24	0.68	0.64	5.04
1,150.00	2.61	298.86	1,149.31	20.74	-2.94	20.85	0.35	-0.24	-5.52
1,175.00	2.60	299.67	1,174.29	21.29	-3.93	21.46	0.15	-0.04	3.24
1,200.00	2.47	299.69	1,199.26	21.84	-4.89	22.05	0.52	-0.52	0.08
1,225.00	2.60	298.82	1,224.24	22.38	-5.85	22.64	0.54	0.52	-3.48
1,250.00	2.68	302.06	1,249.21	22.96	-6.85	23.27	0.68	0.32	12.96
1,275.00	2.57	306.00	1,274.19	23.60	-7.79	23.95	0.85	-0.44	15.76
1,300.00	2.25	311.20	1,299.16	24.26	-8.62	24.64	1.55	-1.28	20.80
1,325.00	2.27	315.56	1,324.14	24.93	-9.33	25.35	0.69	0.08	17.44
1,350.00	2.11	320.77	1,349.13	25.64	-9.97	26.09	1.02	-0.64	20.84

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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)
1,375.00	2.07	319.13	1,374.11	26.34	-10.56	26.82	0.29	-0.16	-6.56
1,400.00	2.07	319.92	1,399.09	27.03	-11.14	27.53	0.11	0.00	3.16
1,425.00	2.02	319.80	1,424.08	27.71	-11.72	28.24	0.20	-0.20	-0.48
1,450.00	2.14	320.04	1,449.06	28.40	-12.30	28.96	0.48	0.48	0.96
1,475.00	2.10	320.13	1,474.04	29.11	-12.90	29.70	0.16	-0.16	0.36
1,500.00	2.02	319.73	1,499.03	29.80	-13.48	30.42	0.33	-0.32	-1.60
1,525.00	2.01	320.43	1,524.01	30.47	-14.04	31.12	0.11	-0.04	2.80
1,550.00	1.85	321.18	1,549.00	31.13	-14.57	31.79	0.65	-0.64	3.00
1,575.00	1.68	323.44	1,573.99	31.74	-15.04	32.43	0.73	-0.68	9.04
1,600.00	1.63	325.29	1,598.98	32.32	-15.46	33.03	0.29	-0.20	7.40
1,625.00	1.43	326.40	1,623.97	32.87	-15.84	33.60	0.81	-0.80	4.44
1,650.00	1.37	328.74	1,648.96	33.39	-16.17	34.13	0.33	-0.24	9.36
1,675.00	1.28	332.52	1,673.95	33.89	-16.45	34.65	0.50	-0.36	15.12
1,700.00	1.26	334.44	1,698.95	34.39	-16.70	35.15	0.19	-0.08	7.68
1,725.00	1.32	335.39	1,723.94	34.90	-16.94	35.68	0.25	0.24	3.80
1,750.00	1.32	334.73	1,748.93	35.42	-17.18	36.21	0.06	0.00	-2.64
1,775.00	1.54	338.17	1,773.93	35.99	-17.43	36.79	0.94	0.88	13.76
1,800.00	1.73	336.99	1,798.92	36.65	-17.70	37.46	0.77	0.76	-4.72
1,825.00	1.93	339.75	1,823.90	37.39	-17.99	38.22	0.87	0.80	11.04
1,850.00	2.24	339.09	1,848.89	38.25	-18.31	39.09	1.24	1.24	-2.64
1,875.00	2.47	340.34	1,873.87	39.21	-18.67	40.07	0.94	0.92	5.00
1,900.00	2.55	342.23	1,898.84	40.25	-19.02	41.12	0.46	0.32	7.56
1,925.00	2.59	344.45	1,923.82	41.32	-19.34	42.21	0.43	0.16	8.88
1,950.00	2.56	347.13	1,948.79	42.41	-19.62	43.31	0.50	-0.12	10.72
1,975.00	2.67	352.71	1,973.76	43.53	-19.81	44.44	1.11	0.44	22.32
2,000.00	2.69	357.83	1,998.74	44.69	-19.91	45.60	0.96	0.08	20.48
2,025.00	2.68	3.25	2,023.71	45.86	-19.90	46.77	1.02	-0.04	21.68
2,050.00	2.75	8.81	2,048.68	47.04	-19.77	47.94	1.09	0.28	22.24
2,075.00	2.81	13.24	2,073.65	48.23	-19.54	49.12	0.89	0.24	17.72
2,100.00	2.83	16.87	2,098.62	49.42	-19.22	50.29	0.72	0.08	14.52
2,125.00	2.83	18.40	2,123.59	50.59	-18.85	51.44	0.30	0.00	6.12
2,150.00	2.57	18.16	2,148.56	51.71	-18.48	52.54	1.04	-1.04	-0.96
2,175.00	2.16	13.79	2,173.54	52.70	-18.19	53.52	1.79	-1.64	-17.48
2,200.00	1.76	4.25	2,198.53	53.54	-18.05	54.35	2.06	-1.60	-38.16
2,225.00	1.70	343.45	2,223.52	54.28	-18.13	55.09	2.51	-0.24	-83.20
2,250.00	1.85	322.18	2,248.51	54.95	-18.48	55.78	2.69	0.60	-85.08
2,275.00	2.20	313.29	2,273.49	55.60	-19.08	56.46	1.88	1.40	-35.56
2,300.00	2.37	311.01	2,298.47	56.27	-19.82	57.16	0.77	0.68	-9.12
2,325.00	2.50	311.12	2,323.45	56.97	-20.62	57.90	0.52	0.52	0.44
2,350.00	2.53	313.24	2,348.42	57.70	-21.43	58.67	0.39	0.12	8.48
2,375.00	2.58	316.14	2,373.40	58.49	-22.22	59.49	0.55	0.20	11.60
2,400.00	2.61	316.75	2,398.37	59.31	-23.00	60.35	0.16	0.12	2.44
2,425.00	2.63	320.78	2,423.35	60.17	-23.76	61.24	0.74	0.08	16.12



Survey Report



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Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)
2,450.00	2.73	323.54	2,448.32	61.09	-24.47	62.20	0.65	0.40	11.04
2,475.00	2.65	324.18	2,473.29	62.04	-25.16	63.18	0.34	-0.32	2.56
2,500.00	2.72	323.91	2,498.26	62.99	-25.85	64.16	0.28	0.28	-1.08
2,525.00	2.70	324.67	2,523.24	63.95	-26.54	65.15	0.16	-0.08	3.04
2,550.00	2.65	324.66	2,548.21	64.90	-27.22	66.14	0.20	-0.20	-0.04
2,575.00	2.75	324.90	2,573.18	65.86	-27.90	67.13	0.40	0.40	0.96
2,600.00	2.83	325.06	2,598.15	66.86	-28.59	68.16	0.32	0.32	0.64
2,625.00	2.68	324.82	2,623.12	67.84	-29.28	69.17	0.60	-0.60	-0.96
2,650.00	2.68	324.03	2,648.10	68.79	-29.96	70.16	0.15	0.00	-3.16
2,675.00	2.73	324.39	2,673.07	69.75	-30.65	71.15	0.21	0.20	1.44
2,700.00	2.63	325.44	2,698.04	70.70	-31.33	72.13	0.45	-0.40	4.20
2,725.00	2.75	325.50	2,723.01	71.67	-31.99	73.13	0.48	0.48	0.24
2,750.00	2.69	325.35	2,747.98	72.65	-32.66	74.14	0.24	-0.24	-0.60
2,775.00	2.81	323.67	2,772.96	73.62	-33.36	75.15	0.58	0.48	-6.72
2,800.00	2.82	325.47	2,797.93	74.62	-34.07	76.18	0.36	0.04	7.20
2,825.00	2.76	324.98	2,822.90	75.62	-34.77	77.21	0.26	-0.24	-1.96
2,850.00	2.81	325.27	2,847.87	76.62	-35.46	78.24	0.21	0.20	1.16
2,875.00	2.73	324.62	2,872.84	77.61	-36.16	79.26	0.34	-0.32	-2.60
2,900.00	2.83	322.92	2,897.81	78.59	-36.87	80.28	0.52	0.40	-6.80
2,925.00	2.77	324.30	2,922.78	79.57	-37.60	81.29	0.36	-0.24	5.52
2,950.00	2.87	322.71	2,947.75	80.56	-38.33	82.32	0.51	0.40	-6.36
2,975.00	2.82	322.09	2,972.72	81.54	-39.09	83.33	0.23	-0.20	-2.48
3,000.00	2.83	322.53	2,997.69	82.52	-39.84	84.34	0.10	0.04	1.76
3,025.00	2.82	321.37	3,022.66	83.49	-40.60	85.35	0.23	-0.04	-4.64
3,050.00	2.90	319.11	3,047.62	84.45	-41.40	86.35	0.55	0.32	-9.04
3,075.00	2.83	318.39	3,072.59	85.38	-42.22	87.32	0.31	-0.28	-2.88
3,100.00	2.84	318.16	3,097.56	86.31	-43.04	88.29	0.06	0.04	-0.92
3,125.00	2.77	319.41	3,122.53	87.23	-43.85	89.24	0.37	-0.28	5.00
3,150.00	2.85	317.73	3,147.50	88.15	-44.66	90.20	0.46	0.32	-6.72
3,175.00	2.83	317.35	3,172.47	89.06	-45.50	91.15	0.11	-0.08	-1.52
3,200.00	2.90	316.43	3,197.44	89.97	-46.35	92.11	0.34	0.28	-3.68
3,225.00	2.83	313.97	3,222.41	90.86	-47.23	93.03	0.57	-0.28	-9.84
3,250.00	2.77	314.35	3,247.38	91.71	-48.11	93.93	0.25	-0.24	1.52
3,275.00	2.65	312.69	3,272.35	92.52	-48.96	94.78	0.57	-0.48	-6.64
3,300.00	2.74	311.93	3,297.32	93.32	-49.83	95.61	0.39	0.36	-3.04
3,325.00	2.67	312.62	3,322.30	94.11	-50.71	96.45	0.31	-0.28	2.76
3,350.00	2.65	312.49	3,347.27	94.89	-51.56	97.27	0.08	-0.08	-0.52
3,375.00	2.75	312.21	3,372.24	95.69	-52.43	98.11	0.40	0.40	-1.12
3,400.00	2.75	311.55	3,397.21	96.49	-53.32	98.95	0.13	0.00	-2.64
3,425.00	2.79	311.89	3,422.18	97.29	-54.23	99.80	0.17	0.16	1.36
3,450.00	2.73	311.72	3,447.15	98.09	-55.12	100.64	0.24	-0.24	-0.68
3,475.00	2.77	311.20	3,472.13	98.89	-56.02	101.48	0.19	0.16	-2.08
3,500.00	2.84	311.05	3,497.10	99.69	-56.94	102.33	0.28	0.28	-0.60
3,525.00	2.70	311.53	3,522.07	100.49	-57.85	103.17	0.57	-0.56	1.92



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Site:	Myox 6 State Corn	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)	
3,550.00	2.79	311.21	3,547.04	101.28	-58.75	104.00	0.37	0.36	-1.28	
3,575.00	2.80	312.05	3,572.01	102.09	-59.66	104.85	0.17	0.04	3.36	
3,600.00	2.81	310.71	3,596.98	102.90	-60.58	105.71	0.27	0.04	-5.36	
3,625.00	2.84	310.56	3,621.95	103.70	-61.51	106.55	0.12	0.12	-0.60	
3,650.00	2.88	312.25	3,646.92	104.53	-62.45	107.42	0.37	0.16	6.76	
3,675.00	2.79	311.91	3,671.89	105.36	-63.37	108.29	0.37	-0.36	-1.36	
3,700.00	2.87	310.83	3,696.86	106.17	-64.29	109.15	0.38	0.32	-4.32	
3,725.00	2.83	311.28	3,721.83	106.99	-65.23	110.01	0.18	-0.16	1.80	
3,750.00	2.82	310.15	3,746.79	107.79	-66.16	110.86	0.23	-0.04	-4.52	
3,775.00	2.65	312.59	3,771.77	108.58	-67.06	111.69	0.82	-0.68	9.76	
3,800.00	1.97	320.32	3,796.75	109.30	-67.76	112.45	2.99	-2.72	30.92	
3,825.00	1.77	323.70	3,821.73	109.94	-68.26	113.11	0.91	-0.80	13.52	
3,850.00	1.58	324.61	3,846.72	110.53	-68.69	113.72	0.77	-0.76	3.64	
3,875.00	1.65	322.25	3,871.71	111.10	-69.11	114.31	0.39	0.28	-9.44	
3,900.00	1.53	326.81	3,896.70	111.66	-69.51	114.89	0.70	-0.48	18.24	
3,925.00	1.57	325.95	3,921.69	112.23	-69.89	115.47	0.19	0.16	-3.44	
3,950.00	1.42	322.84	3,946.68	112.76	-70.27	116.02	0.68	-0.60	-12.44	
3,975.00	1.38	323.66	3,971.68	113.25	-70.63	116.53	0.18	-0.16	3.28	
4,000.00	1.32	322.01	3,996.67	113.72	-70.99	117.01	0.29	-0.24	-6.60	
4,025.00	1.35	322.64	4,021.66	114.18	-71.34	117.49	0.13	0.12	2.52	
4,050.00	1.32	323.11	4,046.66	114.64	-71.70	117.97	0.13	-0.12	1.88	
4,075.00	1.30	323.19	4,071.65	115.10	-72.04	118.44	0.08	-0.08	0.32	
4,100.00	1.37	322.27	4,096.64	115.56	-72.39	118.92	0.29	0.28	-3.68	
4,125.00	1.36	323.75	4,121.64	116.04	-72.75	119.42	0.15	-0.04	5.92	
4,150.00	1.36	324.53	4,146.63	116.52	-73.10	119.91	0.07	0.00	3.12	
4,175.00	1.38	323.57	4,171.62	117.00	-73.45	120.41	0.12	0.08	-3.84	
4,200.00	1.36	321.65	4,196.61	117.48	-73.81	120.91	0.20	-0.08	-7.68	
4,225.00	1.37	319.64	4,221.61	117.94	-74.19	121.38	0.20	0.04	-8.04	
4,250.00	1.49	318.45	4,246.60	118.41	-74.60	121.87	0.49	0.48	-4.76	
4,275.00	1.37	318.90	4,271.59	118.88	-75.01	122.36	0.48	-0.48	1.80	
4,300.00	1.32	314.18	4,296.59	119.30	-75.41	122.81	0.49	-0.20	-18.88	
4,325.00	1.39	312.73	4,321.58	119.71	-75.84	123.23	0.31	0.28	-5.80	
4,350.00	1.23	307.98	4,346.57	120.08	-76.28	123.63	0.77	-0.64	-19.00	
4,375.00	1.37	307.46	4,371.57	120.43	-76.73	123.99	0.56	0.56	-2.08	
4,400.00	1.47	308.56	4,396.56	120.81	-77.21	124.40	0.41	0.40	4.40	
4,425.00	2.57	311.96	4,421.54	121.38	-77.88	125.00	4.42	4.40	13.60	
4,450.00	1.40	306.83	4,446.53	121.94	-78.54	125.59	4.73	-4.68	-20.52	
4,475.00	1.38	307.98	4,471.52	122.31	-79.02	125.98	0.14	-0.08	4.60	
4,500.00	1.44	304.25	4,496.51	122.67	-79.52	126.37	0.44	0.24	-14.92	
4,525.00	1.56	297.60	4,521.50	123.01	-80.08	126.73	0.84	0.48	-26.60	
4,550.00	1.51	294.66	4,546.49	123.30	-80.68	127.06	0.37	-0.20	-11.76	
4,575.00	1.49	291.38	4,571.49	123.56	-81.29	127.34	0.35	-0.08	-13.12	
4,600.00	1.58	291.25	4,596.48	123.80	-81.91	127.61	0.36	0.36	-0.52	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)
4,625.00	1.60	294.34	4,621.47	124.07	-82.55	127.91	0.35	0.08	12.36
4,650.00	1.55	298.76	4,646.46	124.38	-83.16	128.25	0.53	-0.20	17.68
4,675.00	1.61	304.15	4,671.45	124.74	-83.75	128.64	0.64	0.24	21.56
4,700.00	1.59	304.04	4,696.44	125.13	-84.33	129.05	0.08	-0.08	-0.44
4,725.00	1.61	305.51	4,721.43	125.53	-84.90	129.48	0.18	0.08	5.88
4,750.00	1.58	305.07	4,746.42	125.93	-85.47	129.91	0.13	-0.12	-1.76
4,775.00	1.69	303.69	4,771.41	126.33	-86.06	130.34	0.47	0.44	-5.52
4,800.00	1.62	303.95	4,796.40	126.73	-86.66	130.77	0.28	-0.28	1.04
4,825.00	1.43	300.01	4,821.39	127.09	-87.22	131.15	0.87	-0.76	-15.76
4,850.00	1.51	297.55	4,846.38	127.39	-87.78	131.49	0.41	0.32	-9.84
4,875.00	1.50	300.77	4,871.37	127.71	-88.36	131.83	0.34	-0.04	12.88
4,900.00	1.54	299.88	4,896.36	128.05	-88.93	132.19	0.19	0.16	-3.56
4,925.00	1.74	316.79	4,921.35	128.49	-89.48	132.66	2.08	0.80	67.64
4,950.00	1.93	323.40	4,946.34	129.11	-89.99	133.30	1.14	0.76	26.44
4,975.00	1.87	323.16	4,971.33	129.77	-90.49	133.99	0.24	-0.24	-0.96
5,000.00	1.86	322.23	4,996.31	130.42	-90.98	134.66	0.13	-0.04	-3.72
5,025.00	1.96	324.08	5,021.30	131.09	-91.48	135.35	0.47	0.40	7.40
5,050.00	1.93	322.96	5,046.29	131.77	-91.98	136.06	0.19	-0.12	-4.48
5,075.00	1.93	322.85	5,071.27	132.44	-92.49	136.75	0.01	0.00	-0.44
5,100.00	1.77	320.60	5,096.26	133.07	-92.99	137.41	0.70	-0.64	-9.00
5,125.00	1.70	321.70	5,121.25	133.66	-93.47	138.02	0.31	-0.28	4.40
5,150.00	1.60	322.93	5,146.24	134.23	-93.91	138.61	0.42	-0.40	4.92
5,175.00	1.45	320.50	5,171.23	134.75	-94.32	139.15	0.65	-0.60	-9.72
5,200.00	1.44	324.54	5,196.22	135.25	-94.70	139.67	0.41	-0.04	16.16
5,225.00	1.47	326.11	5,221.21	135.78	-95.06	140.21	0.20	0.12	6.28
5,250.00	1.47	326.57	5,246.20	136.31	-95.42	140.76	0.05	0.00	1.84
5,275.00	1.40	326.13	5,271.20	136.83	-95.76	141.30	0.28	-0.28	-1.76
5,300.00	1.28	324.97	5,296.19	137.31	-96.09	141.80	0.49	-0.48	-4.64
5,325.00	1.31	326.03	5,321.18	137.78	-96.41	142.28	0.15	0.12	4.24
5,350.00	1.45	324.89	5,346.17	138.28	-96.76	142.79	0.57	0.56	-4.56
5,375.00	1.42	328.07	5,371.17	138.80	-97.10	143.33	0.34	-0.12	12.72
5,400.00	2.16	337.85	5,396.15	139.50	-97.44	144.04	3.19	2.96	39.12
5,425.00	2.53	342.11	5,421.13	140.46	-97.79	145.02	1.64	1.48	17.04
5,450.00	2.69	341.18	5,446.11	141.54	-98.15	146.11	0.66	0.64	-3.72
5,475.00	3.14	340.60	5,471.08	142.74	-98.57	147.33	1.80	1.80	-2.32
5,500.00	3.55	334.91	5,496.03	144.09	-99.12	148.71	2.11	1.64	-22.76
5,525.00	3.63	333.17	5,520.98	145.49	-99.81	150.14	0.54	0.32	-6.96
5,550.00	3.87	334.84	5,545.93	146.96	-100.52	151.65	1.05	0.96	6.68
5,575.00	3.81	333.62	5,570.87	148.47	-101.25	153.19	0.41	-0.24	-4.88
5,600.00	3.82	333.04	5,595.82	149.96	-102.00	154.71	0.16	0.04	-2.32
5,625.00	3.65	330.68	5,620.77	151.39	-102.76	156.18	0.92	-0.68	-9.44
5,650.00	3.62	330.45	5,645.72	152.77	-103.54	157.60	0.13	-0.12	-0.92
5,675.00	3.36	328.66	5,670.67	154.09	-104.31	158.94	1.13	-1.04	-7.16



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)	
5,700.00	3.32	328.67	5,695.63	155.33	-105.07	160.22	0.16	-0.16	0.04	
5,725.00	3.27	327.38	5,720.59	156.55	-105.83	161.48	0.36	-0.20	-5.16	
5,750.00	3.05	325.63	5,745.55	157.70	-106.59	162.66	0.96	-0.88	-7.00	
5,775.00	2.92	324.88	5,770.51	158.77	-107.33	163.77	0.54	-0.52	-3.00	
5,800.00	2.90	324.76	5,795.48	159.81	-108.06	164.84	0.08	-0.08	-0.48	
5,825.00	2.97	324.13	5,820.45	160.85	-108.81	165.92	0.31	0.28	-2.52	
5,850.00	3.05	322.94	5,845.41	161.90	-109.59	167.01	0.41	0.32	-4.76	
5,875.00	3.97	322.08	5,870.37	163.12	-110.52	168.26	3.69	3.68	-3.44	
5,900.00	4.13	321.01	5,895.30	164.50	-111.62	169.70	0.71	0.64	-4.28	
5,925.00	4.32	320.01	5,920.24	165.92	-112.79	171.17	0.82	0.76	-4.00	
5,950.00	4.67	319.18	5,945.16	167.41	-114.06	172.73	1.42	1.40	-3.32	
5,975.00	4.97	317.22	5,970.07	168.98	-115.46	174.36	1.37	1.20	-7.84	
6,000.00	5.08	316.58	5,994.97	170.58	-116.96	176.03	0.49	0.44	-2.56	
6,025.00	4.99	315.97	6,019.88	172.16	-118.48	177.68	0.42	-0.36	-2.44	
6,050.00	4.93	315.52	6,044.78	173.71	-119.98	179.30	0.29	-0.24	-1.80	
6,075.00	4.72	316.56	6,069.70	175.22	-121.44	180.88	0.91	-0.84	4.16	
6,100.00	4.15	321.65	6,094.62	176.68	-122.71	182.40	2.77	-2.28	20.36	
6,125.00	3.59	328.30	6,119.56	178.05	-123.68	183.82	2.87	-2.24	26.60	
6,150.00	3.43	331.17	6,144.52	179.38	-124.46	185.18	0.95	-0.64	11.48	
6,175.00	3.21	330.67	6,169.48	180.64	-125.16	186.48	0.89	-0.88	-2.00	
6,200.00	2.98	330.63	6,194.44	181.82	-125.82	187.68	0.92	-0.92	-0.16	
6,225.00	3.11	329.64	6,219.40	182.97	-126.48	188.86	0.56	0.52	-3.96	
6,250.00	3.81	325.13	6,244.36	184.24	-127.30	190.17	3.00	2.80	-18.04	
6,275.00	4.22	323.86	6,269.30	185.66	-128.32	191.64	1.68	1.64	-5.08	
6,300.00	4.14	321.20	6,294.23	187.11	-129.43	193.14	0.84	-0.32	-10.64	
6,325.00	4.46	320.26	6,319.16	188.56	-130.61	194.65	1.31	1.28	-3.76	
6,350.00	5.12	319.61	6,344.07	190.15	-131.96	196.31	2.65	2.64	-2.60	
6,375.00	5.26	318.46	6,368.97	191.86	-133.44	198.08	0.70	0.56	-4.60	
6,400.00	5.06	316.13	6,393.87	193.51	-134.96	199.81	1.16	-0.80	-9.32	
6,425.00	4.66	314.81	6,418.78	195.02	-136.45	201.39	1.66	-1.60	-5.28	
6,450.00	4.40	312.26	6,443.70	196.38	-137.88	202.81	1.32	-1.04	-10.20	
6,475.00	4.14	309.95	6,468.63	197.61	-139.28	204.11	1.25	-1.04	-9.24	
6,500.00	4.17	309.07	6,493.57	198.76	-140.68	205.32	0.28	0.12	-3.52	
6,525.00	4.28	311.71	6,518.50	199.95	-142.08	206.58	0.89	0.44	10.56	
6,550.00	4.92	320.80	6,543.42	201.41	-143.45	208.10	3.87	2.56	36.36	
6,575.00	4.79	321.91	6,568.33	203.06	-144.78	209.81	0.64	-0.52	4.44	
6,600.00	4.02	316.73	6,593.25	204.52	-146.02	211.33	3.46	-3.08	-20.72	
6,625.00	2.98	307.25	6,618.21	205.55	-147.14	212.42	4.75	-4.16	-37.92	
6,650.00	2.23	291.43	6,643.18	206.12	-148.11	213.03	4.13	-3.00	-63.28	
6,675.00	2.03	284.29	6,668.16	206.41	-148.99	213.36	1.33	-0.80	-28.56	
6,700.00	2.19	287.71	6,693.15	206.66	-149.87	213.66	0.81	0.64	13.68	
6,725.00	2.96	310.19	6,718.12	207.22	-150.82	214.27	5.02	3.08	89.92	
6,750.00	3.29	316.72	6,743.08	208.16	-151.81	215.25	1.94	1.32	26.12	
6,775.00	3.57	317.63	6,768.04	209.26	-152.82	216.40	1.14	1.12	3.64	



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)	
6,800.00	3.90	320.30	6,792.99	210.49	-153.89	217.68	1.49	1.32	10.68	
6,825.00	4.97	328.39	6,817.91	212.07	-155.00	219.31	4.95	4.28	32.36	
6,850.00	5.56	330.05	6,842.81	214.04	-156.17	221.33	2.44	2.36	6.64	
6,875.00	5.40	327.37	6,867.69	216.08	-157.41	223.43	1.21	-0.64	-10.72	
6,900.00	4.99	324.02	6,892.59	217.95	-158.69	225.36	2.04	-1.64	-13.40	
6,925.00	4.66	320.74	6,917.50	219.61	-159.97	227.08	1.72	-1.32	-13.12	
6,950.00	4.23	316.88	6,942.43	221.07	-161.24	228.60	2.09	-1.72	-15.44	
6,975.00	4.14	314.35	6,967.36	222.38	-162.52	229.97	0.82	-0.36	-10.12	
7,000.00	4.09	318.40	6,992.29	223.68	-163.75	231.32	1.18	-0.20	16.20	
7,025.00	4.19	325.34	7,017.23	225.09	-164.86	232.79	2.04	0.40	27.76	
7,050.00	5.23	328.10	7,042.14	226.81	-165.99	234.56	4.26	4.16	11.04	
7,075.00	4.48	328.26	7,067.05	228.61	-167.10	236.41	3.00	-3.00	0.64	
7,100.00	5.16	330.24	7,091.97	230.42	-168.17	238.27	2.80	2.72	7.92	
7,125.00	5.80	330.22	7,116.85	232.49	-169.36	240.40	2.56	2.56	-0.08	
7,150.00	5.95	329.01	7,141.72	234.70	-170.65	242.66	0.78	0.60	-4.84	
7,175.00	5.71	329.54	7,166.59	236.88	-171.95	244.91	0.98	-0.96	2.12	
7,200.00	5.23	328.05	7,191.48	238.92	-173.18	247.00	2.00	-1.92	-5.96	
7,225.00	4.81	325.71	7,216.38	240.75	-174.38	248.89	1.87	-1.68	-9.36	
7,250.00	4.58	323.73	7,241.30	242.42	-175.56	250.62	1.13	-0.92	-7.92	
7,275.00	4.65	324.96	7,266.22	244.05	-176.73	252.31	0.48	0.28	4.92	
7,300.00	4.94	328.47	7,291.13	245.80	-177.88	254.11	1.65	1.16	14.04	
7,325.00	5.05	330.04	7,316.03	247.67	-178.99	256.03	0.70	0.44	6.28	
7,350.00	4.79	330.49	7,340.94	249.53	-180.05	257.94	1.05	-1.04	1.80	
7,375.00	4.30	328.09	7,365.86	251.24	-181.06	259.69	2.10	-1.96	-9.60	
7,400.00	3.87	322.87	7,390.80	252.71	-182.07	261.21	2.27	-1.72	-20.88	
7,425.00	3.36	316.22	7,415.75	253.91	-183.08	262.46	2.64	-2.04	-26.60	
7,450.00	3.39	315.96	7,440.71	254.97	-184.10	263.56	0.13	0.12	-1.04	
7,475.00	4.37	322.38	7,465.65	256.25	-185.20	264.90	4.28	3.92	25.68	
7,500.00	5.57	327.63	7,490.55	258.03	-186.43	266.74	5.13	4.80	21.00	
7,511.00	5.69	328.01	7,501.50	258.95	-187.00	267.68	1.14	1.09	3.45	
7,598.00	4.38	314.71	7,588.17	264.94	-191.65	273.89	2.01	-1.51	-15.29	
7,691.00	3.30	315.88	7,680.96	269.36	-196.04	278.52	1.16	-1.16	1.26	
7,722.00	3.78	321.97	7,711.90	270.81	-197.29	280.02	1.96	1.55	19.65	
7,754.00	6.47	332.63	7,743.77	273.24	-198.77	282.52	8.88	8.41	33.31	
7,786.00	10.21	338.01	7,775.42	277.47	-200.66	286.84	11.93	11.69	16.81	
7,817.00	14.20	337.02	7,805.72	283.52	-203.17	293.01	12.89	12.87	-3.19	
7,848.00	17.09	340.14	7,835.57	291.31	-206.21	300.93	9.71	9.32	10.06	
7,880.00	20.13	344.11	7,865.89	301.03	-209.31	310.79	10.29	9.50	12.41	
7,911.00	23.34	345.42	7,894.68	312.11	-212.32	322.00	10.47	10.35	4.23	
7,943.00	26.29	345.55	7,923.73	325.11	-215.68	335.15	9.22	9.22	0.41	
7,974.00	29.24	345.05	7,951.15	339.07	-219.35	349.27	9.55	9.52	-1.61	
8,006.00	32.39	344.54	7,978.63	354.89	-223.65	365.28	9.88	9.84	-1.59	
8,037.00	35.59	344.21	8,004.33	371.58	-228.32	382.17	10.34	10.32	-1.06	



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)	
8,068.00	38.49	342.44	8,029.07	389.46	-233.69	400.29	9.97	9.35	-5.71	
8,100.00	40.59	340.87	8,053.75	408.79	-240.11	419.91	7.27	6.56	-4.91	
8,131.00	42.05	340.42	8,077.03	428.10	-246.89	439.53	4.81	4.71	-1.45	
8,162.00	44.02	341.54	8,099.69	448.10	-253.78	459.84	6.82	6.35	3.61	
8,194.00	47.43	342.25	8,122.03	469.88	-260.90	481.93	10.77	10.66	2.22	
8,225.00	51.00	342.99	8,142.27	492.27	-267.90	504.64	11.66	11.52	2.39	
8,257.00	54.40	342.93	8,161.66	516.61	-275.36	529.31	10.63	10.63	-0.19	
8,288.00	58.73	343.07	8,178.74	541.34	-282.92	554.38	13.97	13.97	0.45	
8,320.00	63.16	343.24	8,194.28	568.11	-291.02	581.50	13.85	13.84	0.53	
8,351.00	65.66	343.17	8,207.67	594.87	-299.10	608.63	8.07	8.06	-0.23	
8,383.00	68.72	344.78	8,220.07	623.22	-307.24	637.33	10.63	9.56	5.03	
8,414.00	71.28	345.45	8,230.67	651.37	-314.72	665.81	8.50	8.26	2.16	
8,445.00	75.00	345.15	8,239.66	680.06	-322.25	694.83	12.04	12.00	-0.97	
Tie In - ST01										
8,505.00	68.72	351.18	8,258.35	735.80	-333.98	751.07	14.16	-10.47	10.05	
First Phoenix MWD Survey - ST01										
8,516.00	69.06	352.19	8,262.31	745.95	-335.47	761.29	9.11	3.09	9.18	
8,548.00	71.02	355.22	8,273.24	775.84	-338.76	791.30	10.80	6.13	9.47	
8,580.00	74.85	356.50	8,282.62	806.35	-340.96	821.88	12.56	11.97	4.00	
8,612.00	79.01	355.48	8,289.86	837.44	-343.15	853.03	13.37	13.00	-3.19	
8,643.00	83.05	352.92	8,294.69	867.89	-346.24	883.60	15.37	13.03	-8.26	
8,674.00	86.77	349.54	8,297.44	898.40	-350.95	914.30	16.18	12.00	-10.90	
8,706.00	90.03	346.95	8,298.34	929.71	-357.47	945.89	13.01	10.19	-8.09	
8,737.00	90.77	346.25	8,298.12	959.86	-364.65	976.36	3.29	2.39	-2.26	
8,784.00	92.92	343.26	8,296.61	1,005.18	-377.00	1,022.21	7.83	4.57	-6.36	
8,831.00	92.88	343.06	8,294.23	1,050.10	-390.60	1,067.75	0.43	-0.09	-0.43	
8,925.00	90.71	342.26	8,291.29	1,139.78	-418.60	1,158.67	2.46	-2.31	-0.85	
9,019.00	91.51	344.88	8,289.46	1,229.92	-445.18	1,249.99	2.91	0.85	2.79	
9,113.00	92.24	349.33	8,286.39	1,321.47	-466.14	1,342.45	4.79	0.78	4.73	
9,208.00	91.49	350.55	8,283.30	1,414.96	-482.73	1,436.63	1.51	-0.79	1.28	
9,302.00	91.94	350.24	8,280.48	1,507.60	-498.40	1,529.92	0.58	0.48	-0.33	
9,396.00	91.95	352.91	8,277.29	1,600.53	-512.17	1,623.40	2.84	0.01	2.84	
9,491.00	91.06	355.22	8,274.80	1,694.98	-521.99	1,718.21	2.61	-0.94	2.43	
9,585.00	91.64	357.90	8,272.58	1,788.77	-527.62	1,812.17	2.92	0.62	2.85	
9,680.00	89.88	1.75	8,271.32	1,883.74	-527.91	1,907.04	4.46	-1.85	4.05	
9,775.00	91.37	0.45	8,270.28	1,978.71	-526.09	2,001.82	2.08	1.57	-1.37	
9,798.00	91.49	0.29	8,269.71	2,001.71	-525.94	2,024.77	0.87	0.52	-0.70	
9,809.00	91.58	0.23	8,269.42	2,012.70	-525.89	2,035.75	0.98	0.82	-0.55	
9,904.00	92.52	359.80	8,266.02	2,107.64	-525.87	2,130.58	1.09	0.99	-0.45	
9,997.00	92.78	0.15	8,261.72	2,200.54	-525.91	2,223.37	0.47	0.28	0.38	
10,091.00	93.65	359.88	8,256.45	2,294.39	-525.88	2,317.11	0.97	0.93	-0.29	
10,186.00	92.59	1.24	8,251.27	2,389.24	-524.95	2,411.81	1.81	-1.12	1.43	
10,279.00	90.84	1.89	8,248.49	2,482.16	-522.42	2,504.50	2.01	-1.88	0.70	
10,374.00	89.73	1.04	8,248.02	2,577.13	-519.99	2,599.24	1.47	-1.17	-0.89	



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)	
10,468.00	91.20	0.82	8,247.26	2,671.11	-518.46	2,693.03	1.58	1.56	-0.23	
10,563.00	90.41	1.56	8,245.92	2,766.08	-516.49	2,787.80	1.14	-0.83	0.78	
10,655.00	91.04	1.74	8,244.76	2,858.03	-513.84	2,879.52	0.71	0.68	0.20	
10,749.00	88.88	0.54	8,244.82	2,952.01	-511.97	2,973.29	2.63	-2.30	-1.28	
10,844.00	89.90	0.36	8,245.83	3,047.00	-511.22	3,068.13	1.09	1.07	-0.19	
10,938.00	89.36	358.52	8,246.44	3,140.99	-512.14	3,162.06	2.04	-0.57	-1.96	
11,032.00	90.06	357.68	8,246.92	3,234.93	-515.26	3,256.04	1.16	0.74	-0.89	
11,126.00	91.04	358.03	8,246.01	3,328.86	-518.78	3,350.03	1.11	1.04	0.37	
11,221.00	89.62	358.41	8,245.47	3,423.81	-521.73	3,445.01	1.55	-1.49	0.40	
11,316.00	89.96	358.09	8,245.82	3,518.77	-524.63	3,540.00	0.49	0.36	-0.34	
11,410.00	90.45	358.30	8,245.48	3,612.72	-527.59	3,633.98	0.57	0.52	0.22	
11,500.00	88.65	359.39	8,246.19	3,702.69	-529.40	3,723.94	2.34	-2.00	1.21	
11,589.00	88.47	358.66	8,248.42	3,791.65	-530.92	3,812.87	0.84	-0.20	-0.82	
11,679.00	89.30	358.78	8,250.17	3,881.61	-532.93	3,902.82	0.93	0.92	0.13	
11,770.00	90.14	358.28	8,250.62	3,972.58	-535.26	3,993.79	1.07	0.92	-0.55	
11,862.00	90.77	357.97	8,249.89	4,064.52	-538.27	4,085.78	0.76	0.68	-0.34	
11,953.00	90.09	359.80	8,249.21	4,155.50	-540.04	4,176.73	2.15	-0.75	2.01	
12,043.00	90.31	359.17	8,248.89	4,245.50	-540.85	4,266.66	0.74	0.24	-0.70	
12,134.00	90.19	1.01	8,248.49	4,336.49	-540.71	4,357.55	2.03	-0.13	2.02	
12,227.00	91.14	1.50	8,247.41	4,429.46	-538.67	4,450.31	1.15	1.02	0.53	
12,319.00	92.05	1.69	8,244.85	4,521.39	-536.11	4,542.01	1.01	0.99	0.21	
12,411.00	90.20	1.56	8,243.05	4,613.33	-533.50	4,633.71	2.02	-2.01	-0.14	
12,505.00	90.42	1.48	8,242.54	4,707.30	-531.01	4,727.45	0.25	0.23	-0.09	
12,599.00	87.93	1.61	8,243.89	4,801.24	-528.48	4,821.17	2.65	-2.65	0.14	
12,692.00	87.64	2.22	8,247.49	4,894.12	-525.37	4,913.79	0.73	-0.31	0.66	
12,786.00	87.82	2.42	8,251.21	4,987.97	-521.57	5,007.34	0.29	0.19	0.21	
12,881.00	88.28	2.14	8,254.44	5,082.84	-517.79	5,101.92	0.57	0.48	-0.29	
12,974.00	88.37	0.10	8,257.16	5,175.78	-515.98	5,194.66	2.19	0.10	-2.19	
13,067.00	88.88	359.89	8,259.39	5,268.75	-515.98	5,287.52	0.59	0.55	-0.23	
13,161.00	89.25	359.22	8,260.93	5,362.74	-516.71	5,381.43	0.81	0.39	-0.71	
13,255.00	89.67	358.86	8,261.81	5,456.72	-518.29	5,475.38	0.59	0.45	-0.38	
13,349.00	90.46	358.52	8,261.71	5,550.69	-520.44	5,569.35	0.91	0.84	-0.36	
13,444.00	90.69	357.83	8,260.75	5,645.64	-523.46	5,664.33	0.77	0.24	-0.73	
13,538.00	90.06	359.20	8,260.14	5,739.60	-525.90	5,758.30	1.60	-0.67	1.46	
13,632.00	90.48	359.06	8,259.69	5,833.59	-527.33	5,852.25	0.47	0.45	-0.15	
13,726.00	91.06	359.33	8,258.43	5,927.57	-528.65	5,946.19	0.68	0.62	0.29	
13,819.00	91.38	359.40	8,256.45	6,020.54	-529.68	6,039.10	0.35	0.34	0.08	
13,913.00	91.50	359.62	8,254.09	6,114.51	-530.48	6,133.00	0.27	0.13	0.23	
14,007.00	91.64	359.38	8,251.51	6,208.47	-531.30	6,226.89	0.30	0.15	-0.26	
14,103.00	92.03	359.81	8,248.44	6,304.42	-531.98	6,322.76	0.60	0.41	0.45	
14,197.00	92.58	359.65	8,244.66	6,398.34	-532.42	6,416.59	0.61	0.59	-0.17	
14,291.00	90.55	0.16	8,242.09	6,492.30	-532.58	6,510.45	2.23	-2.16	0.54	
14,385.00	88.41	359.70	8,242.94	6,586.29	-532.69	6,604.34	2.33	-2.28	-0.49	



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Corn	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)	
14,479.00	89.46	359.43	8,244.69	6,680.27	-533.40	6,698.24	1.15	1.12	-0.29	
14,573.00	89.83	359.25	8,245.27	6,774.26	-534.49	6,792.17	0.44	0.39	-0.19	
14,667.00	90.03	359.25	8,245.39	6,868.26	-535.72	6,886.12	0.21	0.21	0.00	
14,760.00	90.17	359.74	8,245.23	6,961.25	-536.54	6,979.04	0.55	0.15	0.53	
14,854.00	90.03	359.80	8,245.06	7,055.25	-536.91	7,072.95	0.16	-0.15	0.06	
14,948.00	90.14	0.01	8,244.92	7,149.25	-537.07	7,166.85	0.25	0.12	0.22	
15,042.00	90.32	0.03	8,244.55	7,243.25	-537.04	7,260.74	0.19	0.19	0.02	
15,136.00	90.72	0.18	8,243.69	7,337.25	-536.87	7,354.61	0.45	0.43	0.16	
15,230.00	91.07	0.30	8,242.22	7,431.23	-536.47	7,448.47	0.39	0.37	0.13	
15,322.00	90.83	0.56	8,240.70	7,523.22	-535.78	7,540.32	0.38	-0.26	0.28	
15,416.00	88.62	0.59	8,241.15	7,617.21	-534.84	7,634.15	2.35	-2.35	0.03	
15,509.00	88.61	0.29	8,243.40	7,710.18	-534.12	7,726.98	0.32	-0.01	-0.32	
15,604.00	88.56	0.24	8,245.74	7,805.15	-533.69	7,821.81	0.07	-0.05	-0.05	
15,698.00	88.51	0.22	8,248.15	7,899.11	-533.31	7,915.65	0.06	-0.05	-0.02	
15,794.00	88.74	359.99	8,250.45	7,995.09	-533.13	8,011.51	0.34	0.24	-0.24	
15,888.00	88.87	0.25	8,252.41	8,089.07	-532.94	8,105.37	0.31	0.14	0.28	
15,982.00	89.11	0.31	8,254.07	8,183.05	-532.48	8,199.22	0.26	0.26	0.06	
16,076.00	88.64	359.32	8,255.91	8,277.03	-532.78	8,293.10	1.17	-0.50	-1.05	
16,170.00	89.05	358.74	8,257.81	8,371.00	-534.37	8,387.04	0.76	0.44	-0.62	
16,264.00	89.46	358.51	8,259.03	8,464.96	-536.63	8,481.00	0.50	0.44	-0.24	
16,359.00	89.90	357.48	8,259.56	8,559.90	-539.95	8,575.99	1.18	0.46	-1.08	
16,453.00	89.59	358.56	8,259.98	8,653.84	-543.20	8,669.98	1.20	-0.33	1.15	
16,547.00	90.00	358.56	8,260.32	8,747.81	-545.56	8,763.95	0.44	0.44	0.00	
16,641.00	90.72	358.07	8,259.73	8,841.77	-548.32	8,857.93	0.93	0.77	-0.52	
16,736.00	91.40	357.60	8,257.97	8,936.68	-551.91	8,952.91	0.87	0.72	-0.49	
16,830.00	90.44	359.74	8,256.46	9,030.64	-554.09	9,046.86	2.49	-1.02	2.28	
16,923.00	90.89	359.77	8,255.38	9,123.63	-554.49	9,139.77	0.48	0.48	0.03	
17,016.00	91.44	359.18	8,253.49	9,216.61	-555.34	9,232.67	0.87	0.59	-0.63	
17,111.00	92.41	359.27	8,250.30	9,311.54	-556.63	9,327.56	1.03	1.02	0.09	
17,205.00	93.59	359.23	8,245.38	9,405.41	-557.86	9,421.37	1.26	1.26	-0.04	
17,299.00	91.54	0.52	8,241.17	9,499.30	-558.06	9,515.17	2.58	-2.18	1.37	
17,394.00	89.76	0.97	8,240.09	9,594.29	-556.82	9,609.98	1.93	-1.87	0.47	
17,488.00	88.94	0.70	8,241.16	9,688.27	-555.45	9,703.79	0.92	-0.87	-0.29	
17,583.00	89.70	0.11	8,242.29	9,783.26	-554.78	9,798.64	1.01	0.80	-0.62	
17,677.00	90.18	359.92	8,242.39	9,877.26	-554.76	9,892.53	0.55	0.51	-0.20	
17,771.00	89.17	358.90	8,242.92	9,971.25	-555.73	9,986.45	1.53	-1.07	-1.09	
17,865.00	88.99	358.88	8,244.43	10,065.22	-557.55	10,080.40	0.19	-0.19	-0.02	
17,959.00	88.89	359.13	8,246.17	10,159.19	-559.18	10,174.34	0.29	-0.11	0.27	
18,053.00	89.28	359.41	8,247.67	10,253.17	-560.38	10,268.27	0.51	0.41	0.30	
18,147.00	89.06	359.32	8,249.03	10,347.15	-561.42	10,362.19	0.25	-0.23	-0.10	
18,242.00	89.05	358.78	8,250.60	10,442.13	-562.99	10,457.13	0.57	-0.01	-0.57	
18,336.00	88.73	0.70	8,252.42	10,536.11	-563.42	10,551.02	2.07	-0.34	2.04	
18,431.00	88.59	1.13	8,254.64	10,631.07	-561.90	10,645.80	0.48	-0.15	0.45	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 510H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3103.00usft (Ensign 155)
Site:	Myox 6 State Com	MD Reference:	KB @ 3103.00usft (Ensign 155)
Well:	510H	North Reference:	Grid
Wellbore:	ST01 / 65026	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	USA Compass

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)
18,525.00	89.31	2.43	8,256.36	10,725.00	-558.98	10,739.48	1.58	0.77	1.38
18,619.00	88.82	2.10	8,257.90	10,818.92	-555.27	10,833.11	0.63	-0.52	-0.35
18,713.00	88.34	1.88	8,260.23	10,912.83	-552.01	10,926.76	0.56	-0.51	-0.23
18,807.00	88.01	1.80	8,263.22	11,006.73	-548.99	11,020.40	0.36	-0.35	-0.09
18,901.00	87.57	1.36	8,266.84	11,100.63	-546.40	11,114.06	0.66	-0.47	-0.47
18,979.00	87.19	1.05	8,270.41	11,178.53	-544.76	11,191.79	0.63	-0.49	-0.40
Final Phoenix MWD Survey - ST01									
19,042.00	87.19	1.05	8,273.50	11,241.44	-543.61	11,254.56	0.00	0.00	0.00
Projection to TD - ST01									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,445.00	8,239.66	680.06	-322.25	Tie In - ST01
8,505.00	8,258.35	735.80	-333.98	First Phoenix MWD Survey - ST01
18,979.00	8,270.41	11,178.53	-544.76	Final Phoenix MWD Survey - ST01
19,042.00	8,273.50	11,241.44	-543.61	Projection to TD - ST01