



COG Operating LLC

Lea County, NM (NAD27 NME)

Gunner 8 Federal Com

703H

OH / 66565

Design: Surveys (McVay 8)

Standard Survey Report

29 July, 2020



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	Database:	USA Compass

Project	Lea 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	Gunner 8 Federal Com				
Site Position:		Northing:	393,259.80 usft	Latitude:	32° 4' 42.331178 N
From:	Map	Easting:	759,100.10 usft	Longitude:	103° 29' 48.524929 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.44 °

Well	703H					
Well Position	+N/-S	0.00 usft	Northing:	393,478.60 usft	Latitude:	32° 4' 44.417893 N
	+E/-W	0.00 usft	Easting:	760,120.20 usft	Longitude:	103° 29' 36.649778 W
Position Uncertainty		1.00 usft	Wellhead Elevation:	usft	Ground Level:	3,339.70 usft

Wellbore	OH / 66565				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	6/24/2020	6.47	59.70	47,612.29857436

Design	Surveys (McVay 8)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	177.85	

Survey Program	Date	7/29/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	12,305.00	Scientific Gyro Surveys (OH / 66565)	Scientific Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
11,901.00	22,997.00	Gordon MWD Surveys (OH / 66565)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction	

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	0.84	86.55	100.00	0.04	0.73	-0.02	0.84	0.84	0.00
125.00	0.84	79.23	124.99	0.09	1.09	-0.05	0.43	0.00	-29.28
150.00	0.93	79.27	149.99	0.16	1.47	-0.11	0.36	0.36	0.16
175.00	0.95	78.35	174.99	0.24	1.88	-0.17	0.10	0.08	-3.68
200.00	0.92	81.06	199.98	0.31	2.28	-0.23	0.21	-0.12	10.84
225.00	0.98	80.25	224.98	0.38	2.69	-0.28	0.25	0.24	-3.24
250.00	0.96	80.48	249.98	0.45	3.10	-0.34	0.08	-0.08	0.92
275.00	1.14	85.56	274.97	0.51	3.56	-0.37	0.81	0.72	20.32
300.00	1.05	86.55	299.97	0.54	4.03	-0.39	0.37	-0.36	3.96

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Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
325.00	1.00	87.15	324.96	0.56	4.48	-0.40	0.20	-0.20	2.40	
350.00	1.01	88.62	349.96	0.58	4.92	-0.40	0.11	0.04	5.88	
375.00	1.02	87.45	374.96	0.60	5.36	-0.39	0.09	0.04	-4.68	
400.00	1.06	87.84	399.95	0.61	5.82	-0.40	0.16	0.16	1.56	
425.00	1.09	89.37	424.95	0.63	6.28	-0.39	0.17	0.12	6.12	
450.00	1.02	89.76	449.94	0.63	6.74	-0.38	0.28	-0.28	1.56	
475.00	1.05	92.46	474.94	0.62	7.20	-0.35	0.23	0.12	10.80	
500.00	1.14	91.28	499.94	0.60	7.67	-0.32	0.37	0.36	-4.72	
525.00	1.09	91.27	524.93	0.59	8.16	-0.29	0.20	-0.20	-0.04	
550.00	1.16	97.69	549.93	0.55	8.65	-0.23	0.58	0.28	25.68	
575.00	1.19	98.16	574.92	0.48	9.16	-0.14	0.13	0.12	1.88	
600.00	1.19	101.10	599.91	0.40	9.67	-0.03	0.24	0.00	11.76	
625.00	1.15	100.69	624.91	0.30	10.17	0.08	0.16	-0.16	-1.64	
650.00	1.13	99.52	649.90	0.21	10.66	0.19	0.12	-0.08	-4.68	
675.00	1.19	95.80	674.90	0.15	11.16	0.27	0.39	0.24	-14.88	
700.00	1.24	95.54	699.89	0.09	11.69	0.34	0.20	0.20	-1.04	
725.00	1.24	97.40	724.89	0.03	12.23	0.43	0.16	0.00	7.44	
750.00	1.25	104.02	749.88	-0.07	12.76	0.55	0.58	0.04	26.48	
775.00	1.22	107.19	774.88	-0.21	13.28	0.71	0.30	-0.12	12.68	
800.00	1.23	113.28	799.87	-0.40	13.78	0.91	0.52	0.04	24.36	
825.00	1.21	116.25	824.87	-0.62	14.26	1.15	0.27	-0.08	11.88	
850.00	1.23	111.99	849.86	-0.84	14.75	1.39	0.37	0.08	-17.04	
875.00	1.27	113.95	874.85	-1.05	15.25	1.62	0.23	0.16	7.84	
900.00	1.30	114.99	899.85	-1.28	15.76	1.87	0.15	0.12	4.16	
925.00	1.37	120.13	924.84	-1.55	16.27	2.16	0.55	0.28	20.56	
950.00	1.40	128.05	949.83	-1.89	16.77	2.52	0.77	0.12	31.68	
975.00	1.42	129.36	974.83	-2.28	17.25	2.92	0.15	0.08	5.24	
1,000.00	1.37	128.41	999.82	-2.66	17.73	3.32	0.22	-0.20	-3.80	
1,025.00	1.36	130.25	1,024.81	-3.03	18.19	3.72	0.18	-0.04	7.36	
1,050.00	1.34	129.13	1,049.80	-3.41	18.64	4.11	0.13	-0.08	-4.48	
1,075.00	1.40	124.87	1,074.80	-3.77	19.12	4.48	0.47	0.24	-17.04	
1,100.00	1.38	128.86	1,099.79	-4.13	19.60	4.87	0.40	-0.08	15.96	
1,125.00	1.32	126.33	1,124.78	-4.49	20.07	5.24	0.34	-0.24	-10.12	
1,150.00	1.29	128.63	1,149.78	-4.84	20.52	5.61	0.24	-0.12	9.20	
1,175.00	1.24	131.15	1,174.77	-5.19	20.94	5.98	0.30	-0.20	10.08	
1,200.00	1.19	124.67	1,199.76	-5.52	21.36	6.32	0.58	-0.20	-25.92	
1,225.00	1.23	123.75	1,224.76	-5.82	21.80	6.63	0.18	0.16	-3.68	
1,250.00	1.23	124.01	1,249.75	-6.11	22.24	6.94	0.02	0.00	1.04	
1,275.00	1.22	129.13	1,274.75	-6.43	22.67	7.28	0.44	-0.04	20.48	
1,300.00	1.25	126.09	1,299.74	-6.76	23.10	7.62	0.29	0.12	-12.16	
1,325.00	1.18	123.15	1,324.74	-7.06	23.54	7.94	0.37	-0.28	-11.76	
1,350.00	1.16	122.60	1,349.73	-7.34	23.96	8.23	0.09	-0.08	-2.20	
1,375.00	1.20	122.56	1,374.73	-7.62	24.40	8.53	0.16	0.16	-0.16	

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Survey										
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1,400.00	1.25	117.58	1,399.72	-7.88	24.86	8.81	0.47	0.20	-19.92	
1,425.00	1.19	117.39	1,424.71	-8.13	25.33	9.07	0.24	-0.24	-0.76	
1,450.00	1.17	127.58	1,449.71	-8.40	25.77	9.37	0.84	-0.08	40.76	
1,475.00	1.12	119.22	1,474.70	-8.68	26.18	9.66	0.70	-0.20	-33.44	
1,500.00	1.08	112.74	1,499.70	-8.89	26.61	9.88	0.52	-0.16	-25.92	
1,525.00	1.07	111.98	1,524.69	-9.07	27.05	10.08	0.07	-0.04	-3.04	
1,550.00	1.06	111.40	1,549.69	-9.24	27.48	10.26	0.06	-0.04	-2.32	
1,575.00	1.07	110.13	1,574.69	-9.41	27.91	10.45	0.10	0.04	-5.08	
1,600.00	1.13	102.66	1,599.68	-9.54	28.37	10.60	0.62	0.24	-29.88	
1,625.00	1.60	77.19	1,624.67	-9.52	28.95	10.60	3.03	1.88	-101.88	
1,650.00	2.18	59.97	1,649.66	-9.20	29.70	10.31	3.22	2.32	-68.88	
1,675.00	2.31	55.99	1,674.64	-8.68	30.53	9.82	0.81	0.52	-15.92	
1,700.00	2.35	53.98	1,699.62	-8.10	31.37	9.27	0.36	0.16	-8.04	
1,725.00	2.34	52.00	1,724.60	-7.48	32.18	8.68	0.33	-0.04	-7.92	
1,750.00	2.35	51.39	1,749.58	-6.85	32.98	8.08	0.11	0.04	-2.44	
1,775.00	2.29	49.15	1,774.56	-6.20	33.76	7.46	0.43	-0.24	-8.96	
1,800.00	2.31	49.52	1,799.54	-5.55	34.52	6.84	0.10	0.08	1.48	
1,825.00	2.24	50.34	1,824.52	-4.91	35.28	6.23	0.31	-0.28	3.28	
1,850.00	2.16	49.50	1,849.50	-4.29	36.02	5.64	0.35	-0.32	-3.36	
1,875.00	2.14	48.99	1,874.48	-3.68	36.73	5.05	0.11	-0.08	-2.04	
1,900.00	2.18	49.48	1,899.47	-3.06	37.44	4.47	0.18	0.16	1.96	
1,925.00	2.20	50.64	1,924.45	-2.45	38.17	3.88	0.19	0.08	4.64	
1,950.00	2.16	50.86	1,949.43	-1.85	38.91	3.31	0.16	-0.16	0.88	
1,975.00	2.11	51.36	1,974.41	-1.26	39.64	2.75	0.21	-0.20	2.00	
2,000.00	2.06	48.98	1,999.40	-0.68	40.33	2.19	0.40	-0.20	-9.52	
2,025.00	2.13	47.79	2,024.38	-0.07	41.02	1.61	0.33	0.28	-4.76	
2,050.00	2.11	46.06	2,049.36	0.56	41.69	1.01	0.27	-0.08	-6.92	
2,075.00	2.15	46.71	2,074.34	1.20	42.37	0.39	0.19	0.16	2.60	
2,100.00	2.26	47.01	2,099.33	1.86	43.07	-0.24	0.44	0.44	1.20	
2,125.00	2.16	47.06	2,124.31	2.51	43.77	-0.87	0.40	-0.40	0.20	
2,150.00	2.16	48.87	2,149.29	3.14	44.47	-1.47	0.27	0.00	7.24	
2,175.00	2.22	49.76	2,174.27	3.77	45.20	-2.07	0.28	0.24	3.56	
2,200.00	2.29	50.79	2,199.25	4.39	45.95	-2.67	0.32	0.28	4.12	
2,225.00	2.49	51.72	2,224.23	5.05	46.77	-3.29	0.81	0.80	3.72	
2,250.00	2.48	53.32	2,249.21	5.71	47.63	-3.92	0.28	-0.04	6.40	
2,275.00	2.52	53.75	2,274.18	6.35	48.50	-4.53	0.18	0.16	1.72	
2,300.00	2.78	54.24	2,299.16	7.03	49.44	-5.17	1.04	1.04	1.96	
2,325.00	2.72	53.49	2,324.13	7.74	50.41	-5.84	0.28	-0.24	-3.00	
2,350.00	2.85	55.22	2,349.10	8.45	51.40	-6.51	0.62	0.52	6.92	
2,375.00	3.18	55.86	2,374.06	9.19	52.48	-7.22	1.33	1.32	2.56	
2,400.00	3.25	56.19	2,399.02	9.98	53.64	-7.96	0.29	0.28	1.32	
2,425.00	3.35	56.86	2,423.98	10.77	54.84	-8.70	0.43	0.40	2.68	
2,450.00	3.87	55.47	2,448.93	11.65	56.15	-9.53	2.11	2.08	-5.56	

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2,475.00	3.62	56.42	2,473.88	12.56	57.50	-10.40	1.03	-1.00	3.80	
2,500.00	3.63	57.43	2,498.83	13.42	58.83	-11.21	0.26	0.04	4.04	
2,525.00	3.76	57.99	2,523.78	14.28	60.19	-12.02	0.54	0.52	2.24	
2,550.00	3.83	58.60	2,548.72	15.15	61.60	-12.83	0.32	0.28	2.44	
2,575.00	3.86	58.11	2,573.67	16.03	63.02	-13.66	0.18	0.12	-1.96	
2,600.00	3.92	57.94	2,598.61	16.93	64.46	-14.50	0.24	0.24	-0.68	
2,625.00	3.91	57.86	2,623.55	17.84	65.91	-15.35	0.05	-0.04	-0.32	
2,650.00	3.52	57.61	2,648.50	18.70	67.28	-16.17	1.56	-1.56	-1.00	
2,675.00	3.15	55.27	2,673.45	19.51	68.49	-16.92	1.58	-1.48	-9.36	
2,700.00	3.00	54.23	2,698.42	20.28	69.59	-17.65	0.64	-0.60	-4.16	
2,725.00	2.94	54.78	2,723.39	21.03	70.64	-18.37	0.27	-0.24	2.20	
2,750.00	2.93	55.16	2,748.35	21.77	71.69	-19.06	0.09	-0.04	1.52	
2,775.00	3.00	54.62	2,773.32	22.51	72.75	-19.77	0.30	0.28	-2.16	
2,800.00	3.04	55.48	2,798.28	23.26	73.83	-20.48	0.24	0.16	3.44	
2,825.00	3.16	56.14	2,823.25	24.02	74.94	-21.20	0.50	0.48	2.64	
2,850.00	3.14	57.57	2,848.21	24.78	76.09	-21.90	0.32	-0.08	5.72	
2,875.00	3.32	57.69	2,873.17	25.53	77.28	-22.61	0.72	0.72	0.48	
2,900.00	3.46	57.71	2,898.13	26.32	78.53	-23.35	0.56	0.56	0.08	
2,925.00	3.47	58.99	2,923.08	27.11	79.82	-24.10	0.31	0.04	5.12	
2,950.00	3.65	60.30	2,948.03	27.90	81.16	-24.83	0.79	0.72	5.24	
2,975.00	3.60	61.34	2,972.98	28.67	82.54	-25.55	0.33	-0.20	4.16	
3,000.00	3.64	62.08	2,997.93	29.41	83.93	-26.25	0.25	0.16	2.96	
3,025.00	3.61	63.99	3,022.88	30.13	85.34	-26.91	0.50	-0.12	7.64	
3,050.00	3.48	69.65	3,047.83	30.74	86.76	-27.46	1.49	-0.52	22.64	
3,075.00	3.24	78.53	3,072.79	31.15	88.16	-27.82	2.29	-0.96	35.52	
3,100.00	3.33	79.88	3,097.75	31.41	89.57	-28.03	0.47	0.36	5.40	
3,125.00	3.48	82.18	3,122.71	31.64	91.03	-28.21	0.81	0.60	9.20	
3,150.00	3.70	82.67	3,147.66	31.85	92.59	-28.35	0.89	0.88	1.96	
3,175.00	4.03	82.84	3,172.60	32.06	94.26	-28.50	1.32	1.32	0.68	
3,200.00	4.18	82.55	3,197.54	32.29	96.03	-28.66	0.61	0.60	-1.16	
3,225.00	4.18	82.55	3,222.47	32.53	97.84	-28.83	0.00	0.00	0.00	
3,250.00	3.89	78.40	3,247.41	32.82	99.57	-29.06	1.65	-1.16	-16.60	
3,275.00	3.77	74.46	3,272.35	33.21	101.20	-29.39	1.16	-0.48	-15.76	
3,300.00	3.81	74.71	3,297.30	33.65	102.79	-29.77	0.17	0.16	1.00	
3,325.00	3.81	74.75	3,322.24	34.08	104.39	-30.14	0.01	0.00	0.16	
3,350.00	3.85	75.03	3,347.19	34.52	106.00	-30.52	0.18	0.16	1.12	
3,375.00	3.96	73.91	3,372.13	34.97	107.64	-30.91	0.54	0.44	-4.48	
3,400.00	4.16	73.90	3,397.07	35.46	109.35	-31.34	0.80	0.80	-0.04	
3,425.00	4.15	73.46	3,422.00	35.97	111.08	-31.78	0.13	-0.04	-1.76	
3,450.00	4.20	73.32	3,446.93	36.49	112.83	-32.24	0.20	0.20	-0.56	
3,475.00	4.20	73.79	3,471.87	37.01	114.58	-32.69	0.14	0.00	1.88	
3,500.00	4.23	72.13	3,496.80	37.55	116.34	-33.16	0.50	0.12	-6.64	
3,525.00	4.05	66.62	3,521.73	38.18	118.03	-33.73	1.75	-0.72	-22.04	
3,550.00	3.95	50.61	3,546.67	39.08	119.50	-34.57	4.47	-0.40	-64.04	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
3,575.00	3.91	39.93	3,571.62	40.28	120.72	-35.72	2.93	-0.16	-42.72	
3,600.00	3.92	38.33	3,596.56	41.60	121.79	-37.01	0.44	0.04	-6.40	
3,625.00	4.01	39.53	3,621.50	42.95	122.88	-38.31	0.49	0.36	4.80	
3,650.00	4.04	39.71	3,646.44	44.30	124.00	-39.62	0.13	0.12	0.72	
3,675.00	3.92	40.89	3,671.38	45.62	125.12	-40.90	0.58	-0.48	4.72	
3,700.00	3.85	42.35	3,696.32	46.89	126.25	-42.12	0.48	-0.28	5.84	
3,725.00	3.73	43.88	3,721.26	48.10	127.37	-43.28	0.63	-0.48	6.12	
3,750.00	3.73	44.73	3,746.21	49.26	128.51	-44.41	0.22	0.00	3.40	
3,775.00	3.65	44.23	3,771.16	50.41	129.64	-45.51	0.34	-0.32	-2.00	
3,800.00	3.61	44.63	3,796.11	51.54	130.75	-46.60	0.19	-0.16	1.60	
3,825.00	3.58	45.23	3,821.06	52.65	131.85	-47.67	0.19	-0.12	2.40	
3,850.00	3.63	46.54	3,846.01	53.74	132.98	-48.72	0.39	0.20	5.24	
3,875.00	3.64	46.46	3,870.96	54.83	134.13	-49.76	0.04	0.04	-0.32	
3,900.00	3.57	48.59	3,895.91	55.90	135.29	-50.78	0.60	-0.28	8.52	
3,925.00	3.66	49.79	3,920.86	56.93	136.48	-51.77	0.47	0.36	4.80	
3,950.00	3.61	50.24	3,945.81	57.94	137.70	-52.74	0.23	-0.20	1.80	
3,975.00	3.66	51.72	3,970.76	58.94	138.93	-53.69	0.43	0.20	5.92	
4,000.00	3.71	52.34	3,995.71	59.93	140.20	-54.63	0.26	0.20	2.48	
4,025.00	3.78	54.85	4,020.65	60.90	141.51	-55.55	0.71	0.28	10.04	
4,050.00	3.90	59.28	4,045.60	61.81	142.92	-56.40	1.28	0.48	17.72	
4,075.00	3.91	59.26	4,070.54	62.68	144.38	-57.22	0.04	0.04	-0.08	
4,100.00	3.97	61.74	4,095.48	63.52	145.87	-58.01	0.72	0.24	9.92	
4,125.00	4.36	63.53	4,120.42	64.36	147.49	-58.78	1.64	1.56	7.16	
4,150.00	4.13	64.72	4,145.35	65.16	149.15	-59.52	0.99	-0.92	4.76	
4,175.00	3.97	66.00	4,170.28	65.90	150.76	-60.20	0.74	-0.64	5.12	
4,200.00	3.16	66.65	4,195.24	66.53	152.18	-60.77	3.24	-3.24	2.60	
4,225.00	2.31	64.08	4,220.21	67.02	153.26	-61.22	3.43	-3.40	-10.28	
4,250.00	1.98	63.21	4,245.19	67.43	154.10	-61.61	1.33	-1.32	-3.48	
4,275.00	1.85	66.62	4,270.18	67.79	154.86	-61.93	0.69	-0.52	13.64	
4,300.00	1.89	69.94	4,295.16	68.09	155.62	-62.20	0.46	0.16	13.28	
4,325.00	1.89	70.62	4,320.15	68.37	156.39	-62.45	0.09	0.00	2.72	
4,350.00	1.95	74.59	4,345.13	68.62	157.19	-62.67	0.58	0.24	15.88	
4,375.00	2.14	79.85	4,370.12	68.81	158.06	-62.84	1.07	0.76	21.04	
4,400.00	2.24	79.75	4,395.10	68.98	159.00	-62.97	0.40	0.40	-0.40	
4,425.00	2.27	86.19	4,420.08	69.10	159.98	-63.05	1.02	0.12	25.76	
4,450.00	2.59	88.76	4,445.06	69.15	161.04	-63.06	1.35	1.28	10.28	
4,475.00	2.87	90.31	4,470.03	69.16	162.23	-63.02	1.16	1.12	6.20	
4,500.00	3.10	91.75	4,495.00	69.13	163.53	-62.95	0.97	0.92	5.76	
4,525.00	3.44	95.98	4,519.96	69.03	164.95	-62.80	1.67	1.36	16.92	
4,550.00	3.80	96.44	4,544.91	68.86	166.52	-62.57	1.44	1.44	1.84	
4,575.00	4.02	96.04	4,569.85	68.68	168.21	-62.32	0.89	0.88	-1.60	
4,600.00	4.30	91.37	4,594.78	68.56	170.02	-62.14	1.76	1.12	-18.68	
4,625.00	4.67	85.06	4,619.71	68.63	171.97	-62.13	2.46	1.48	-25.24	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
4,650.00	4.85	82.20	4,644.62	68.86	174.03	-62.28	1.19	0.72	-11.44	
4,675.00	4.76	81.44	4,669.53	69.16	176.11	-62.50	0.44	-0.36	-3.04	
4,700.00	4.82	81.75	4,694.44	69.46	178.17	-62.73	0.26	0.24	1.24	
4,725.00	4.73	81.62	4,719.36	69.76	180.23	-62.95	0.36	-0.36	-0.52	
4,750.00	4.30	79.79	4,744.28	70.08	182.17	-63.20	1.81	-1.72	-7.32	
4,775.00	3.17	78.41	4,769.23	70.38	183.77	-63.44	4.53	-4.52	-5.52	
4,800.00	2.92	78.45	4,794.19	70.65	185.07	-63.66	1.00	-1.00	0.16	
4,825.00	2.92	78.65	4,819.16	70.90	186.32	-63.86	0.04	0.00	0.80	
4,850.00	2.90	80.50	4,844.13	71.13	187.57	-64.05	0.38	-0.08	7.40	
4,875.00	2.89	80.73	4,869.09	71.34	188.82	-64.21	0.06	-0.04	0.92	
4,900.00	2.92	79.30	4,894.06	71.56	190.06	-64.38	0.31	0.12	-5.72	
4,925.00	3.01	79.14	4,919.03	71.80	191.33	-64.57	0.36	0.36	-0.64	
4,950.00	2.96	79.15	4,943.99	72.05	192.61	-64.77	0.20	-0.20	0.04	
4,975.00	3.07	81.49	4,968.96	72.27	193.91	-64.94	0.66	0.44	9.36	
5,000.00	3.19	84.78	4,993.92	72.43	195.26	-65.05	0.86	0.48	13.16	
5,025.00	3.24	83.21	5,018.88	72.58	196.66	-65.15	0.41	0.20	-6.28	
5,050.00	2.75	76.61	5,043.85	72.80	197.94	-65.32	2.39	-1.96	-26.40	
5,075.00	1.98	50.00	5,068.83	73.22	198.86	-65.70	5.29	-3.08	-106.44	
5,100.00	2.00	19.97	5,093.81	73.90	199.34	-66.37	4.12	0.08	-120.12	
5,125.00	1.92	14.42	5,118.80	74.72	199.59	-67.18	0.82	-0.32	-22.20	
5,150.00	1.84	17.73	5,143.79	75.51	199.82	-67.96	0.54	-0.32	13.24	
5,175.00	1.84	14.50	5,168.77	76.28	200.04	-68.72	0.41	0.00	-12.92	
5,200.00	1.82	14.97	5,193.76	77.05	200.24	-69.48	0.10	-0.08	1.88	
5,225.00	1.81	7.99	5,218.75	77.82	200.40	-70.25	0.88	-0.04	-27.92	
5,250.00	1.64	9.08	5,243.74	78.57	200.51	-70.99	0.69	-0.68	4.36	
5,275.00	1.70	4.63	5,268.73	79.29	200.60	-71.71	0.57	0.24	-17.80	
5,300.00	1.62	8.17	5,293.72	80.01	200.68	-72.43	0.52	-0.32	14.16	
5,325.00	1.71	4.98	5,318.70	80.73	200.76	-73.14	0.52	0.36	-12.76	
5,350.00	1.67	5.70	5,343.69	81.47	200.83	-73.87	0.18	-0.16	2.88	
5,375.00	1.76	4.24	5,368.68	82.21	200.89	-74.62	0.40	0.36	-5.84	
5,400.00	1.69	6.26	5,393.67	82.96	200.96	-75.36	0.37	-0.28	8.08	
5,425.00	1.70	2.57	5,418.66	83.70	201.02	-76.10	0.44	0.04	-14.76	
5,450.00	1.67	4.43	5,443.65	84.43	201.06	-76.83	0.25	-0.12	7.44	
5,475.00	1.78	359.12	5,468.64	85.18	201.08	-77.58	0.78	0.44	-21.24	
5,500.00	1.62	359.03	5,493.63	85.92	201.07	-78.32	0.64	-0.64	-0.36	
5,525.00	1.66	357.00	5,518.62	86.64	201.05	-79.04	0.28	0.16	-8.12	
5,550.00	1.70	357.17	5,543.61	87.37	201.01	-79.77	0.16	0.16	0.68	
5,575.00	1.70	355.46	5,568.60	88.11	200.96	-80.51	0.20	0.00	-6.84	
5,600.00	1.64	356.52	5,593.58	88.84	200.91	-81.24	0.27	-0.24	4.24	
5,625.00	1.73	354.63	5,618.57	89.57	200.86	-81.97	0.42	0.36	-7.56	
5,650.00	1.50	358.64	5,643.56	90.27	200.81	-82.68	1.02	-0.92	16.04	
5,675.00	1.59	355.55	5,668.55	90.95	200.78	-83.35	0.49	0.36	-12.36	
5,700.00	1.60	355.45	5,693.55	91.64	200.72	-84.05	0.04	0.04	-0.40	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
5,725.00	1.56	352.79	5,718.54	92.33	200.65	-84.73	0.33	-0.16	-10.64	
5,750.00	1.48	350.98	5,743.53	92.98	200.56	-85.39	0.37	-0.32	-7.24	
5,775.00	1.46	346.71	5,768.52	93.61	200.44	-86.03	0.45	-0.08	-17.08	
5,800.00	1.40	346.24	5,793.51	94.22	200.29	-86.64	0.24	-0.24	-1.88	
5,825.00	1.36	345.45	5,818.50	94.80	200.14	-87.23	0.18	-0.16	-3.16	
5,850.00	1.32	343.44	5,843.50	95.36	199.99	-87.79	0.25	-0.16	-8.04	
5,875.00	1.32	336.98	5,868.49	95.91	199.79	-88.34	0.59	0.00	-25.84	
5,900.00	1.30	335.70	5,893.48	96.43	199.56	-88.87	0.14	-0.08	-5.12	
5,925.00	1.24	333.11	5,918.48	96.93	199.32	-89.38	0.33	-0.24	-10.36	
5,950.00	1.22	331.55	5,943.47	97.40	199.07	-89.87	0.16	-0.08	-6.24	
5,975.00	1.26	329.06	5,968.47	97.87	198.81	-90.35	0.27	0.16	-9.96	
6,000.00	1.24	330.32	5,993.46	98.34	198.53	-90.83	0.14	-0.08	5.04	
6,025.00	1.28	329.52	6,018.45	98.82	198.25	-91.31	0.17	0.16	-3.20	
6,050.00	1.23	328.31	6,043.45	99.29	197.97	-91.79	0.23	-0.20	-4.84	
6,075.00	1.21	327.45	6,068.44	99.74	197.69	-92.25	0.11	-0.08	-3.44	
6,100.00	1.25	325.11	6,093.44	100.19	197.39	-92.71	0.26	0.16	-9.36	
6,125.00	1.17	324.78	6,118.43	100.62	197.09	-93.15	0.32	-0.32	-1.32	
6,150.00	1.33	318.90	6,143.42	101.05	196.75	-93.59	0.82	0.64	-23.52	
6,175.00	1.44	310.79	6,168.42	101.47	196.32	-94.03	0.90	0.44	-32.44	
6,200.00	1.64	307.49	6,193.41	101.89	195.80	-94.47	0.87	0.80	-13.20	
6,225.00	1.72	307.37	6,218.40	102.34	195.22	-94.94	0.32	0.32	-0.48	
6,250.00	1.72	306.77	6,243.39	102.79	194.62	-95.42	0.07	0.00	-2.40	
6,275.00	1.84	306.42	6,268.37	103.25	194.00	-95.90	0.48	0.48	-1.40	
6,300.00	1.86	305.87	6,293.36	103.73	193.34	-96.40	0.11	0.08	-2.20	
6,325.00	1.87	306.85	6,318.35	104.21	192.69	-96.91	0.13	0.04	3.92	
6,350.00	1.87	306.90	6,343.33	104.70	192.04	-97.42	0.01	0.00	0.20	
6,375.00	1.82	306.79	6,368.32	105.18	191.39	-97.93	0.20	-0.20	-0.44	
6,400.00	1.82	307.13	6,393.31	105.66	190.76	-98.43	0.04	0.00	1.36	
6,425.00	1.93	307.11	6,418.30	106.15	190.10	-98.95	0.44	0.44	-0.08	
6,450.00	1.90	305.31	6,443.28	106.65	189.43	-99.47	0.27	-0.12	-7.20	
6,475.00	1.93	306.83	6,468.27	107.14	188.76	-99.98	0.24	0.12	6.08	
6,500.00	1.87	307.11	6,493.25	107.64	188.09	-100.51	0.24	-0.24	1.12	
6,525.00	1.91	307.53	6,518.24	108.14	187.44	-101.03	0.17	0.16	1.68	
6,550.00	1.84	304.65	6,543.23	108.62	186.78	-101.54	0.47	-0.28	-11.52	
6,575.00	1.78	306.18	6,568.21	109.08	186.13	-102.02	0.31	-0.24	6.12	
6,600.00	1.78	306.13	6,593.20	109.54	185.51	-102.50	0.01	0.00	-0.20	
6,625.00	1.78	306.94	6,618.19	110.00	184.88	-102.98	0.10	0.00	3.24	
6,650.00	1.74	307.38	6,643.18	110.46	184.27	-103.47	0.17	-0.16	1.76	
6,675.00	1.72	308.75	6,668.17	110.93	183.68	-103.96	0.18	-0.08	5.48	
6,700.00	1.65	306.14	6,693.16	111.37	183.09	-104.43	0.42	-0.28	-10.44	
6,725.00	1.63	308.35	6,718.15	111.81	182.52	-104.88	0.27	-0.08	8.84	
6,750.00	1.65	306.02	6,743.14	112.24	181.95	-105.33	0.28	0.08	-9.32	
6,775.00	1.60	307.96	6,768.13	112.67	181.39	-105.78	0.30	-0.20	7.76	
6,800.00	1.58	306.82	6,793.12	113.09	180.84	-106.22	0.15	-0.08	-4.56	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
6,825.00	1.59	306.24	6,818.11	113.50	180.28	-106.66	0.08	0.04	-2.32	
6,850.00	1.55	306.48	6,843.10	113.90	179.73	-107.08	0.16	-0.16	0.96	
6,875.00	1.57	305.95	6,868.09	114.31	179.18	-107.50	0.10	0.08	-2.12	
6,900.00	1.59	303.56	6,893.08	114.70	178.61	-107.92	0.28	0.08	-9.56	
6,925.00	1.55	304.26	6,918.07	115.08	178.05	-108.32	0.18	-0.16	2.80	
6,950.00	1.69	307.06	6,943.06	115.49	177.47	-108.75	0.64	0.56	11.20	
6,975.00	1.54	306.82	6,968.05	115.92	176.91	-109.20	0.60	-0.60	-0.96	
7,000.00	1.57	308.39	6,993.04	116.33	176.37	-109.63	0.21	0.12	6.28	
7,025.00	1.55	307.19	7,018.03	116.75	175.83	-110.07	0.15	-0.08	-4.80	
7,050.00	1.59	307.82	7,043.02	117.17	175.29	-110.51	0.17	0.16	2.52	
7,075.00	1.64	307.80	7,068.01	117.60	174.73	-110.96	0.20	0.20	-0.08	
7,100.00	1.49	306.78	7,093.00	118.01	174.19	-111.39	0.61	-0.60	-4.08	
7,125.00	1.57	308.75	7,117.99	118.42	173.66	-111.82	0.38	0.32	7.88	
7,150.00	1.59	308.23	7,142.98	118.85	173.12	-112.27	0.10	0.08	-2.08	
7,175.00	1.58	307.60	7,167.97	119.27	172.58	-112.72	0.08	-0.04	-2.52	
7,200.00	1.58	305.98	7,192.96	119.69	172.03	-113.15	0.18	0.00	-6.48	
7,225.00	1.61	304.89	7,217.96	120.09	171.46	-113.57	0.17	0.12	-4.36	
7,250.00	1.50	305.22	7,242.95	120.48	170.90	-113.98	0.44	-0.44	1.32	
7,275.00	1.55	299.58	7,267.94	120.84	170.34	-114.36	0.63	0.20	-22.56	
7,300.00	1.58	304.89	7,292.93	121.20	169.77	-114.75	0.59	0.12	21.24	
7,325.00	1.68	308.66	7,317.92	121.63	169.20	-115.19	0.59	0.40	15.08	
7,350.00	1.72	307.64	7,342.91	122.08	168.61	-115.67	0.20	0.16	-4.08	
7,375.00	1.68	305.41	7,367.90	122.53	168.02	-116.14	0.31	-0.16	-8.92	
7,400.00	1.62	307.13	7,392.89	122.95	167.44	-116.58	0.31	-0.24	6.88	
7,425.00	1.70	303.69	7,417.87	123.37	166.85	-117.02	0.51	0.32	-13.76	
7,450.00	1.76	306.07	7,442.86	123.80	166.23	-117.48	0.37	0.24	9.52	
7,475.00	1.83	305.60	7,467.85	124.26	165.59	-117.96	0.29	0.28	-1.88	
7,500.00	1.85	305.05	7,492.84	124.72	164.94	-118.45	0.11	0.08	-2.20	
7,525.00	1.95	300.39	7,517.82	125.17	164.24	-118.92	0.74	0.40	-18.64	
7,550.00	1.83	297.04	7,542.81	125.57	163.52	-119.34	0.65	-0.48	-13.40	
7,575.00	1.78	301.38	7,567.80	125.95	162.83	-119.75	0.58	-0.20	17.36	
7,600.00	1.86	303.32	7,592.79	126.38	162.16	-120.20	0.40	0.32	7.76	
7,625.00	1.89	296.02	7,617.77	126.78	161.45	-120.63	0.96	0.12	-29.20	
7,650.00	1.78	294.68	7,642.76	127.12	160.73	-121.00	0.47	-0.44	-5.36	
7,675.00	1.67	295.22	7,667.75	127.44	160.05	-121.35	0.44	-0.44	2.16	
7,700.00	1.60	297.33	7,692.74	127.76	159.41	-121.69	0.37	-0.28	8.44	
7,725.00	1.58	297.94	7,717.73	128.08	158.79	-122.03	0.10	-0.08	2.44	
7,750.00	1.56	298.39	7,742.72	128.40	158.19	-122.38	0.09	-0.08	1.80	
7,775.00	1.58	296.62	7,767.71	128.72	157.58	-122.71	0.21	0.08	-7.08	
7,800.00	1.50	292.87	7,792.70	129.00	156.97	-123.02	0.51	-0.32	-15.00	
7,825.00	1.54	294.03	7,817.69	129.26	156.36	-123.31	0.20	0.16	4.64	
7,850.00	1.60	297.12	7,842.68	129.56	155.75	-123.62	0.41	0.24	12.36	
7,875.00	1.59	296.22	7,867.67	129.87	155.12	-123.96	0.11	-0.04	-3.60	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
7,900.00	1.67	296.03	7,892.66	130.18	154.48	-124.30	0.32	0.32	-0.76	
7,925.00	1.63	297.57	7,917.65	130.51	153.84	-124.65	0.24	-0.16	6.16	
7,950.00	1.77	301.19	7,942.64	130.87	153.20	-125.03	0.71	0.56	14.48	
7,975.00	2.28	314.61	7,967.63	131.42	152.51	-125.61	2.77	2.04	53.68	
8,000.00	3.51	328.27	7,992.59	132.42	151.76	-126.64	5.61	4.92	54.64	
8,025.00	3.99	332.80	8,017.54	133.85	150.96	-128.09	2.25	1.92	18.12	
8,050.00	4.00	333.46	8,042.48	135.40	150.17	-129.67	0.19	0.04	2.64	
8,075.00	3.93	333.01	8,067.42	136.94	149.39	-131.24	0.31	-0.28	-1.80	
8,100.00	4.04	334.52	8,092.36	138.50	148.62	-132.83	0.61	0.44	6.04	
8,125.00	3.73	336.95	8,117.30	140.05	147.93	-134.40	1.40	-1.24	9.72	
8,150.00	2.99	351.65	8,142.26	141.44	147.51	-135.81	4.52	-2.96	58.80	
8,175.00	2.69	18.29	8,167.23	142.64	147.60	-137.00	5.36	-1.20	106.56	
8,200.00	2.73	28.16	8,192.20	143.72	148.07	-138.07	1.87	0.16	39.48	
8,225.00	2.85	29.57	8,217.17	144.79	148.65	-139.11	0.55	0.48	5.64	
8,250.00	2.88	29.26	8,242.14	145.88	149.27	-140.17	0.14	0.12	-1.24	
8,275.00	2.84	26.96	8,267.11	146.98	149.86	-141.25	0.49	-0.16	-9.20	
8,300.00	2.69	28.49	8,292.08	148.04	150.42	-142.30	0.67	-0.60	6.12	
8,325.00	2.59	29.18	8,317.05	149.05	150.97	-143.29	0.42	-0.40	2.76	
8,350.00	2.56	27.49	8,342.03	150.04	151.50	-144.25	0.33	-0.12	-6.76	
8,375.00	2.47	30.83	8,367.00	151.00	152.04	-145.19	0.69	-0.36	13.36	
8,400.00	2.44	34.25	8,391.98	151.90	152.61	-146.07	0.60	-0.12	13.68	
8,425.00	2.35	33.22	8,416.96	152.77	153.19	-146.92	0.40	-0.36	-4.12	
8,450.00	2.38	33.99	8,441.94	153.63	153.77	-147.75	0.17	0.12	3.08	
8,475.00	2.40	31.63	8,466.92	154.51	154.33	-148.61	0.40	0.08	-9.44	
8,500.00	2.23	32.99	8,491.90	155.36	154.87	-149.44	0.71	-0.68	5.44	
8,525.00	2.21	32.81	8,516.88	156.17	155.40	-150.23	0.08	-0.08	-0.72	
8,550.00	2.17	37.50	8,541.86	156.95	155.94	-150.99	0.73	-0.16	18.76	
8,575.00	2.17	54.32	8,566.84	157.61	156.62	-151.62	2.54	0.00	67.28	
8,600.00	2.50	73.55	8,591.82	158.04	157.52	-152.01	3.38	1.32	76.92	
8,625.00	2.69	75.69	8,616.80	158.34	158.62	-152.27	0.85	0.76	8.56	
8,650.00	2.51	75.73	8,641.77	158.62	159.72	-152.51	0.72	-0.72	0.16	
8,675.00	2.54	77.02	8,666.75	158.87	160.79	-152.73	0.26	0.12	5.16	
8,700.00	2.50	77.07	8,691.72	159.12	161.86	-152.94	0.16	-0.16	0.20	
8,725.00	2.37	77.57	8,716.70	159.35	162.89	-153.13	0.53	-0.52	2.00	
8,750.00	2.41	80.98	8,741.68	159.55	163.92	-153.29	0.59	0.16	13.64	
8,775.00	2.32	77.38	8,766.66	159.74	164.93	-153.44	0.69	-0.36	-14.40	
8,800.00	2.42	75.13	8,791.63	159.99	165.93	-153.65	0.55	0.40	-9.00	
8,825.00	2.47	80.83	8,816.61	160.21	166.98	-153.83	0.99	0.20	22.80	
8,850.00	2.29	78.17	8,841.59	160.40	168.00	-153.98	0.84	-0.72	-10.64	
8,875.00	2.12	78.84	8,866.57	160.59	168.94	-154.14	0.69	-0.68	2.68	
8,900.00	2.05	78.61	8,891.56	160.77	169.83	-154.28	0.28	-0.28	-0.92	
8,925.00	2.04	79.65	8,916.54	160.93	170.71	-154.42	0.15	-0.04	4.16	
8,950.00	2.00	80.72	8,941.52	161.08	171.58	-154.53	0.22	-0.16	4.28	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
8,975.00	1.95	82.32	8,966.51	161.21	172.43	-154.63	0.30	-0.20	6.40	
9,000.00	1.92	82.32	8,991.49	161.32	173.26	-154.71	0.12	-0.12	0.00	
9,025.00	1.83	81.10	9,016.48	161.44	174.07	-154.80	0.39	-0.36	-4.88	
9,050.00	1.67	79.65	9,041.47	161.57	174.83	-154.90	0.66	-0.64	-5.80	
9,075.00	1.72	78.71	9,066.46	161.71	175.55	-155.01	0.23	0.20	-3.76	
9,100.00	1.70	70.25	9,091.45	161.91	176.27	-155.18	1.01	-0.08	-33.84	
9,125.00	1.62	77.64	9,116.44	162.11	176.96	-155.36	0.91	-0.32	29.56	
9,150.00	1.51	74.94	9,141.43	162.27	177.63	-155.49	0.53	-0.44	-10.80	
9,175.00	1.42	72.10	9,166.42	162.45	178.24	-155.65	0.46	-0.36	-11.36	
9,200.00	1.44	71.11	9,191.41	162.65	178.83	-155.82	0.13	0.08	-3.96	
9,225.00	1.38	64.93	9,216.40	162.88	179.40	-156.03	0.65	-0.24	-24.72	
9,250.00	1.29	63.78	9,241.40	163.13	179.93	-156.26	0.38	-0.36	-4.60	
9,275.00	1.28	68.21	9,266.39	163.36	180.44	-156.47	0.40	-0.04	17.72	
9,300.00	1.30	65.77	9,291.39	163.58	180.96	-156.67	0.23	0.08	-9.76	
9,325.00	1.36	63.38	9,316.38	163.83	181.48	-156.90	0.33	0.24	-9.56	
9,350.00	1.51	61.43	9,341.37	164.12	182.03	-157.17	0.63	0.60	-7.80	
9,375.00	1.66	63.19	9,366.36	164.44	182.65	-157.47	0.63	0.60	7.04	
9,400.00	1.98	62.33	9,391.35	164.80	183.35	-157.81	1.28	1.28	-3.44	
9,425.00	2.01	64.81	9,416.33	165.19	184.13	-158.16	0.37	0.12	9.92	
9,450.00	2.09	65.24	9,441.32	165.57	184.94	-158.51	0.33	0.32	1.72	
9,475.00	2.13	66.62	9,466.30	165.94	185.78	-158.85	0.26	0.16	5.52	
9,500.00	2.17	64.16	9,491.28	166.33	186.64	-159.21	0.40	0.16	-9.84	
9,525.00	2.04	60.21	9,516.27	166.76	187.45	-159.61	0.78	-0.52	-15.80	
9,550.00	1.93	56.27	9,541.25	167.21	188.18	-160.04	0.70	-0.44	-15.76	
9,575.00	1.93	52.93	9,566.24	167.70	188.87	-160.50	0.45	0.00	-13.36	
9,600.00	1.83	50.06	9,591.22	168.21	189.51	-160.98	0.55	-0.40	-11.48	
9,625.00	1.71	47.40	9,616.21	168.72	190.09	-161.47	0.58	-0.48	-10.64	
9,650.00	1.64	45.14	9,641.20	169.22	190.62	-161.95	0.38	-0.28	-9.04	
9,675.00	1.67	45.15	9,666.19	169.73	191.13	-162.44	0.12	0.12	0.04	
9,700.00	1.82	44.27	9,691.18	170.28	191.67	-162.96	0.61	0.60	-3.52	
9,725.00	1.85	42.93	9,716.17	170.85	192.22	-163.52	0.21	0.12	-5.36	
9,750.00	1.67	53.89	9,741.15	171.37	192.79	-164.01	1.52	-0.72	43.84	
9,775.00	1.86	76.86	9,766.14	171.67	193.48	-164.29	2.91	0.76	91.88	
9,800.00	1.98	94.99	9,791.13	171.73	194.30	-164.32	2.47	0.48	72.52	
9,825.00	1.93	99.99	9,816.11	171.62	195.15	-164.17	0.71	-0.20	20.00	
9,850.00	2.10	98.37	9,841.10	171.48	196.02	-164.00	0.72	0.68	-6.48	
9,875.00	2.11	94.87	9,866.08	171.37	196.93	-163.86	0.52	0.04	-14.00	
9,900.00	1.99	85.12	9,891.07	171.37	197.82	-163.83	1.47	-0.48	-39.00	
9,925.00	1.88	86.62	9,916.05	171.43	198.66	-163.86	0.48	-0.44	6.00	
9,950.00	1.81	76.15	9,941.04	171.55	199.45	-163.94	1.38	-0.28	-41.88	
9,975.00	1.64	71.24	9,966.03	171.76	200.18	-164.13	0.90	-0.68	-19.64	
10,000.00	1.32	60.74	9,991.02	172.01	200.77	-164.36	1.67	-1.28	-42.00	
10,025.00	1.15	47.84	10,016.01	172.32	201.20	-164.65	1.30	-0.68	-51.60	
10,050.00	1.13	34.40	10,041.01	172.69	201.53	-165.01	1.07	-0.08	-53.76	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
10,075.00	1.10	23.67	10,066.00	173.12	201.76	-165.43	0.84	-0.12	-42.92	
10,100.00	1.13	17.48	10,091.00	173.57	201.93	-165.87	0.50	0.12	-24.76	
10,125.00	1.09	12.96	10,115.99	174.04	202.06	-166.34	0.38	-0.16	-18.08	
10,150.00	1.11	11.16	10,140.99	174.51	202.16	-166.80	0.16	0.08	-7.20	
10,175.00	1.06	7.98	10,165.99	174.98	202.24	-167.27	0.31	-0.20	-12.72	
10,200.00	1.11	356.50	10,190.98	175.45	202.26	-167.73	0.89	0.20	-45.92	
10,225.00	1.10	5.41	10,215.98	175.93	202.27	-168.21	0.69	-0.04	35.64	
10,250.00	1.14	355.87	10,240.97	176.41	202.27	-168.70	0.76	0.16	-38.16	
10,275.00	1.06	359.40	10,265.97	176.89	202.25	-169.18	0.42	-0.32	14.12	
10,300.00	1.15	353.87	10,290.96	177.37	202.22	-169.66	0.56	0.36	-22.12	
10,325.00	0.83	7.78	10,315.96	177.80	202.22	-170.09	1.59	-1.28	55.64	
10,350.00	0.77	19.98	10,340.96	178.14	202.30	-170.42	0.72	-0.24	48.80	
10,375.00	0.74	30.97	10,365.95	178.44	202.44	-170.72	0.59	-0.12	43.96	
10,400.00	0.87	41.83	10,390.95	178.72	202.65	-170.99	0.80	0.52	43.44	
10,425.00	0.74	51.44	10,415.95	178.96	202.90	-171.22	0.75	-0.52	38.44	
10,450.00	0.92	64.82	10,440.95	179.14	203.21	-171.39	1.05	0.72	53.52	
10,475.00	0.93	78.63	10,465.94	179.27	203.59	-171.51	0.89	0.04	55.24	
10,500.00	0.89	90.48	10,490.94	179.31	203.99	-171.53	0.77	-0.16	47.40	
10,525.00	1.19	92.68	10,515.94	179.29	204.44	-171.50	1.21	1.20	8.80	
10,550.00	1.26	87.84	10,540.93	179.29	204.97	-171.48	0.50	0.28	-19.36	
10,575.00	1.22	84.84	10,565.92	179.33	205.51	-171.49	0.30	-0.16	-12.00	
10,600.00	1.04	95.57	10,590.92	179.33	206.00	-171.47	1.11	-0.72	42.92	
10,625.00	1.03	94.98	10,615.92	179.29	206.45	-171.42	0.06	-0.04	-2.36	
10,650.00	0.98	96.07	10,640.91	179.24	206.89	-171.36	0.21	-0.20	4.36	
10,675.00	1.08	99.58	10,665.91	179.18	207.33	-171.28	0.47	0.40	14.04	
10,700.00	1.06	103.41	10,690.90	179.09	207.79	-171.17	0.30	-0.08	15.32	
10,725.00	1.04	107.05	10,715.90	178.97	208.23	-171.03	0.28	-0.08	14.56	
10,750.00	0.94	105.14	10,740.89	178.85	208.65	-170.90	0.42	-0.40	-7.64	
10,775.00	0.89	120.76	10,765.89	178.70	209.01	-170.73	1.01	-0.20	62.48	
10,800.00	0.75	129.84	10,790.89	178.49	209.31	-170.51	0.76	-0.56	36.32	
10,825.00	0.75	125.78	10,815.89	178.29	209.56	-170.30	0.21	0.00	-16.24	
10,850.00	0.44	136.84	10,840.89	178.13	209.76	-170.13	1.32	-1.24	44.24	
10,875.00	0.48	152.49	10,865.88	177.96	209.88	-169.96	0.53	0.16	62.60	
10,900.00	0.63	149.87	10,890.88	177.75	209.99	-169.75	0.61	0.60	-10.48	
10,925.00	0.72	129.78	10,915.88	177.53	210.18	-169.52	1.01	0.36	-80.36	
10,950.00	0.56	133.84	10,940.88	177.35	210.39	-169.33	0.66	-0.64	16.24	
10,975.00	0.61	147.92	10,965.88	177.15	210.55	-169.13	0.61	0.20	56.32	
11,000.00	0.76	129.58	10,990.88	176.93	210.75	-168.90	1.06	0.60	-73.36	
11,025.00	0.62	118.54	11,015.88	176.76	211.00	-168.72	0.77	-0.56	-44.16	
11,050.00	0.61	112.26	11,040.87	176.65	211.24	-168.60	0.27	-0.04	-25.12	
11,075.00	0.65	105.41	11,065.87	176.56	211.50	-168.50	0.34	0.16	-27.40	
11,100.00	0.68	96.90	11,090.87	176.50	211.78	-168.43	0.41	0.12	-34.04	
11,125.00	0.72	92.73	11,115.87	176.48	212.09	-168.40	0.26	0.16	-16.68	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
11,150.00	0.63	89.21	11,140.87	176.47	212.38	-168.38	0.40	-0.36	-14.08	
11,175.00	1.01	75.39	11,165.86	176.53	212.73	-168.42	1.70	1.52	-55.28	
11,200.00	1.53	66.65	11,190.86	176.72	213.25	-168.59	2.21	2.08	-34.96	
11,225.00	2.02	61.34	11,215.85	177.06	213.94	-168.91	2.07	1.96	-21.24	
11,250.00	2.09	63.07	11,240.83	177.48	214.74	-169.30	0.37	0.28	6.92	
11,275.00	2.18	62.94	11,265.81	177.90	215.57	-169.69	0.36	0.36	-0.52	
11,300.00	2.26	65.22	11,290.79	178.32	216.44	-170.08	0.48	0.32	9.12	
11,325.00	2.42	65.24	11,315.77	178.75	217.36	-170.47	0.64	0.64	0.08	
11,350.00	2.58	67.57	11,340.75	179.19	218.36	-170.87	0.76	0.64	9.32	
11,375.00	2.59	75.63	11,365.72	179.54	219.43	-171.18	1.45	0.04	32.24	
11,400.00	2.60	84.15	11,390.70	179.74	220.54	-171.34	1.54	0.04	34.08	
11,425.00	2.80	94.87	11,415.67	179.75	221.71	-171.30	2.17	0.80	42.88	
11,450.00	3.00	99.02	11,440.64	179.59	222.97	-171.10	1.16	0.80	16.60	
11,475.00	3.07	102.26	11,465.60	179.35	224.27	-170.81	0.74	0.28	12.96	
11,500.00	3.09	102.28	11,490.57	179.06	225.58	-170.47	0.08	0.08	0.08	
11,525.00	3.32	101.58	11,515.53	178.77	226.95	-170.13	0.93	0.92	-2.80	
11,550.00	3.50	99.47	11,540.48	178.50	228.41	-169.81	0.88	0.72	-8.44	
11,575.00	3.72	98.63	11,565.44	178.26	229.97	-169.50	0.91	0.88	-3.36	
11,600.00	3.74	96.54	11,590.38	178.04	231.58	-169.23	0.55	0.08	-8.36	
11,625.00	3.70	95.76	11,615.33	177.87	233.19	-168.99	0.26	-0.16	-3.12	
11,650.00	3.65	95.74	11,640.28	177.71	234.79	-168.77	0.20	-0.20	-0.08	
11,675.00	3.63	98.99	11,665.23	177.50	236.36	-168.51	0.83	-0.08	13.00	
11,700.00	3.30	99.63	11,690.18	177.26	237.85	-168.21	1.33	-1.32	2.56	
11,725.00	2.96	104.54	11,715.14	176.98	239.18	-167.88	1.73	-1.36	19.64	
11,750.00	2.80	109.18	11,740.11	176.61	240.39	-167.47	1.13	-0.64	18.56	
11,775.00	2.67	113.14	11,765.08	176.18	241.50	-167.00	0.92	-0.52	15.84	
11,800.00	2.45	116.78	11,790.06	175.71	242.51	-166.49	1.09	-0.88	14.56	
11,825.00	2.17	126.43	11,815.04	175.19	243.37	-165.94	1.91	-1.12	38.60	
11,850.00	1.94	135.35	11,840.02	174.61	244.05	-165.33	1.57	-0.92	35.68	
11,875.00	2.32	125.92	11,865.01	174.01	244.75	-164.71	2.06	1.52	-37.72	
11,900.00	2.22	129.44	11,889.99	173.41	245.54	-164.08	0.69	-0.40	14.08	
11,901.00	2.22	129.63	11,890.99	173.38	245.57	-164.05	0.74	0.00	19.00	
Tie In										
11,946.00	2.27	135.07	11,935.95	172.20	246.87	-162.81	0.49	0.11	12.09	
First Gordon MWD Survey										
11,985.00	2.33	135.75	11,974.92	171.08	247.97	-161.66	0.17	0.15	1.74	
12,067.00	2.53	138.17	12,056.85	168.54	250.34	-159.03	0.27	0.24	2.95	
12,161.00	2.56	139.51	12,150.75	165.40	253.08	-155.79	0.07	0.03	1.43	
12,256.00	3.38	141.90	12,245.63	161.58	256.19	-151.86	0.87	0.86	2.52	
12,288.00	8.47	155.66	12,277.44	158.69	257.74	-148.91	16.40	15.91	43.00	
12,319.00	13.01	154.74	12,307.89	153.45	260.17	-143.58	14.66	14.65	-2.97	
12,351.00	16.26	160.79	12,338.85	145.96	263.19	-135.98	11.21	10.16	18.91	
12,398.00	23.15	168.60	12,383.08	130.67	267.18	-120.55	15.66	14.66	16.62	
12,418.00	25.68	171.77	12,401.29	122.52	268.58	-112.36	14.24	12.64	15.87	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)
FTP: 12418' MD									
12,446.00	29.31	175.34	12,426.13	109.68	270.01	-99.48	14.24	12.97	12.74
12,493.00	34.22	175.51	12,466.08	85.03	271.98	-74.76	10.45	10.45	0.36
12,540.00	39.06	173.76	12,503.78	57.12	274.62	-46.77	10.53	10.30	-3.72
12,587.00	41.31	174.89	12,539.68	26.94	277.61	-16.50	5.03	4.79	2.40
12,635.00	40.98	176.11	12,575.83	-4.54	280.09	15.05	1.81	-0.69	2.54
12,682.00	45.46	177.55	12,610.07	-36.67	281.86	47.22	9.76	9.53	3.06
12,730.00	48.98	177.45	12,642.67	-71.86	283.39	82.44	7.33	7.33	-0.21
12,777.00	54.74	175.53	12,671.68	-108.74	285.68	119.38	12.67	12.26	-4.09
12,824.00	62.94	171.39	12,695.99	-148.64	290.32	159.43	19.00	17.45	-8.81
12,871.00	68.09	171.29	12,715.46	-190.91	296.76	201.91	10.96	10.96	-0.21
12,918.00	70.57	173.63	12,732.05	-234.50	302.52	245.69	7.04	5.28	4.98
12,965.00	72.86	176.18	12,746.80	-278.95	306.47	290.25	7.09	4.87	5.43
13,014.00	78.96	177.82	12,758.73	-326.38	308.95	337.74	12.86	12.45	3.35
13,061.00	83.93	179.01	12,765.72	-372.83	310.23	384.20	10.87	10.57	2.53
13,109.00	86.14	178.57	12,769.87	-420.63	311.24	432.01	4.69	4.60	-0.92
13,203.00	92.60	182.79	12,770.90	-514.55	310.13	525.82	8.21	6.87	4.49
13,298.00	92.77	183.24	12,766.45	-609.31	305.13	620.33	0.51	0.18	0.47
13,392.00	91.81	183.62	12,762.70	-703.07	299.52	713.81	1.10	-1.02	0.40
13,487.00	87.33	181.91	12,763.41	-797.93	294.93	808.43	5.05	-4.72	-1.80
13,580.00	90.80	180.19	12,764.93	-890.88	293.23	901.26	4.16	3.73	-1.85
13,675.00	86.47	180.34	12,767.19	-985.83	292.79	996.12	4.56	-4.56	0.16
13,769.00	92.44	179.38	12,768.08	-1,079.78	293.02	1,090.02	6.43	6.35	-1.02
13,794.00	92.62	179.35	12,766.98	-1,104.76	293.30	1,114.98	0.73	0.72	-0.12
13,889.00	90.74	177.89	12,764.19	-1,199.68	295.59	1,209.93	2.51	-1.98	-1.54
13,983.00	91.42	178.00	12,762.42	-1,293.60	298.96	1,303.91	0.73	0.72	0.12
14,077.00	89.05	176.19	12,762.04	-1,387.47	303.72	1,397.89	3.17	-2.52	-1.93
14,172.00	89.40	180.52	12,763.32	-1,482.40	306.45	1,492.85	4.57	0.37	4.56
14,267.00	88.63	181.87	12,764.96	-1,577.36	304.46	1,587.68	1.64	-0.81	1.42
14,362.00	88.81	180.75	12,767.08	-1,672.31	302.29	1,682.48	1.19	0.19	-1.18
14,457.00	89.42	181.69	12,768.55	-1,767.28	300.27	1,777.30	1.18	0.64	0.99
14,552.00	88.19	183.22	12,770.53	-1,862.17	296.20	1,871.97	2.07	-1.29	1.61
14,646.00	89.75	182.36	12,772.22	-1,956.04	291.63	1,965.60	1.89	1.66	-0.91
14,741.00	90.74	182.13	12,771.81	-2,050.96	287.91	2,060.32	1.07	1.04	-0.24
14,835.00	89.95	180.83	12,771.24	-2,144.93	285.48	2,154.13	1.62	-0.84	-1.38
14,930.00	90.24	181.98	12,771.09	-2,239.90	283.15	2,248.94	1.25	0.31	1.21
15,024.00	89.17	180.98	12,771.57	-2,333.86	280.72	2,342.75	1.56	-1.14	-1.06
15,119.00	88.69	178.05	12,773.34	-2,428.83	281.53	2,437.68	3.12	-0.51	-3.08
15,213.00	89.06	178.06	12,775.19	-2,522.76	284.72	2,531.66	0.39	0.39	0.01
15,308.00	88.93	178.96	12,776.86	-2,617.71	287.19	2,626.64	0.96	-0.14	0.95
15,402.00	89.62	178.07	12,778.05	-2,711.67	289.62	2,720.63	1.20	0.73	-0.95
15,498.00	88.84	175.78	12,779.34	-2,807.52	294.77	2,816.60	2.52	-0.81	-2.39
15,592.00	88.59	177.78	12,781.44	-2,901.34	300.05	2,910.55	2.14	-0.27	2.13

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
15,687.00	88.35	176.70	12,783.98	-2,996.19	304.62	3,005.51	1.16	-0.25	-1.14	
15,782.00	88.32	178.07	12,786.74	-3,091.05	308.95	3,100.47	1.44	-0.03	1.44	
15,876.00	90.44	182.81	12,787.76	-3,185.01	308.23	3,194.33	5.52	2.26	5.04	
15,971.00	89.63	186.02	12,787.70	-3,279.72	300.92	3,288.70	3.48	-0.85	3.38	
16,066.00	89.49	178.46	12,788.43	-3,374.57	297.21	3,383.35	7.96	-0.15	-7.96	
16,161.00	88.29	176.55	12,790.27	-3,469.46	301.34	3,478.32	2.37	-1.26	-2.01	
16,255.00	87.17	175.80	12,794.00	-3,563.17	307.61	3,572.20	1.43	-1.19	-0.80	
16,350.00	88.78	178.47	12,797.35	-3,657.98	312.35	3,667.13	3.28	1.69	2.81	
16,445.00	90.11	178.04	12,798.27	-3,752.93	315.25	3,762.12	1.47	1.40	-0.45	
16,540.00	89.30	175.84	12,798.76	-3,847.79	320.32	3,857.10	2.47	-0.85	-2.32	
16,636.00	90.45	174.66	12,798.97	-3,943.46	328.27	3,952.99	1.72	1.20	-1.23	
16,731.00	88.98	174.24	12,799.44	-4,038.01	337.45	4,047.82	1.61	-1.55	-0.44	
16,825.00	90.28	179.02	12,800.05	-4,131.81	342.98	4,141.77	5.27	1.38	5.09	
16,920.00	91.45	183.05	12,798.62	-4,226.77	341.26	4,236.59	4.42	1.23	4.24	
17,015.00	90.36	180.72	12,797.12	-4,321.69	338.14	4,331.34	2.71	-1.15	-2.45	
17,110.00	89.79	179.46	12,796.99	-4,416.69	337.99	4,426.26	1.46	-0.60	-1.33	
17,205.00	90.30	181.16	12,796.92	-4,511.69	337.47	4,521.17	1.87	0.54	1.79	
17,300.00	90.30	182.33	12,796.42	-4,606.64	334.58	4,615.95	1.23	0.00	1.23	
17,394.00	90.32	183.26	12,795.91	-4,700.52	330.00	4,709.60	0.99	0.02	0.99	
17,489.00	88.54	182.58	12,796.86	-4,795.39	325.16	4,804.22	2.01	-1.87	-0.72	
17,583.00	88.39	182.36	12,799.37	-4,889.27	321.11	4,897.88	0.28	-0.16	-0.23	
17,678.00	92.02	182.07	12,799.03	-4,984.18	317.44	4,992.58	3.83	3.82	-0.31	
17,773.00	91.69	181.58	12,795.96	-5,079.09	314.41	5,087.31	0.62	-0.35	-0.52	
17,868.00	90.53	181.50	12,794.12	-5,174.03	311.86	5,182.09	1.22	-1.22	-0.08	
17,963.00	88.13	180.68	12,795.23	-5,269.00	310.05	5,276.92	2.67	-2.53	-0.86	
18,057.00	88.85	179.24	12,797.71	-5,362.96	310.12	5,370.82	1.71	0.77	-1.53	
18,153.00	90.17	184.76	12,798.53	-5,458.86	306.77	5,466.53	5.91	1.38	5.75	
18,247.00	91.32	189.28	12,797.31	-5,552.12	295.29	5,559.29	4.96	1.22	4.81	
18,294.00	89.62	184.50	12,796.92	-5,598.77	289.65	5,605.69	10.79	-3.62	-10.17	
18,342.00	88.14	179.98	12,797.86	-5,646.71	287.78	5,653.53	9.91	-3.08	-9.42	
18,437.00	90.88	179.73	12,798.67	-5,741.70	288.02	5,748.46	2.90	2.88	-0.26	
18,532.00	87.39	169.79	12,800.11	-5,836.16	296.68	5,843.18	11.09	-3.67	-10.46	
18,626.00	88.94	168.36	12,803.12	-5,928.40	314.48	5,936.02	2.24	1.65	-1.52	
18,722.00	83.87	170.34	12,809.14	-6,022.52	332.19	6,030.75	5.67	-5.28	2.06	
18,817.00	83.52	177.88	12,819.58	-6,116.38	341.87	6,124.90	7.90	-0.37	7.94	
18,912.00	87.94	181.12	12,826.66	-6,211.08	342.69	6,219.56	5.76	4.65	3.41	
19,007.00	87.78	180.97	12,830.21	-6,306.00	340.96	6,314.35	0.23	-0.17	-0.16	
19,101.00	88.44	181.02	12,833.31	-6,399.93	339.33	6,408.15	0.70	0.70	0.05	
19,196.00	91.17	182.38	12,833.63	-6,494.88	336.51	6,502.93	3.21	2.87	1.43	
19,290.00	90.39	179.76	12,832.35	-6,588.84	334.75	6,596.76	2.91	-0.83	-2.79	
19,385.00	92.02	181.65	12,830.35	-6,683.81	333.59	6,691.62	2.63	1.72	1.99	
19,480.00	92.17	182.14	12,826.88	-6,778.69	330.45	6,786.32	0.54	0.16	0.52	
19,574.00	91.73	178.97	12,823.68	-6,872.62	329.54	6,880.14	3.40	-0.47	-3.37	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	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)	
19,669.00	91.70	177.96	12,820.84	-6,967.54	332.08	6,975.09	1.06	-0.03	-1.06	
19,764.00	91.24	177.53	12,818.40	-7,062.44	335.82	7,070.06	0.66	-0.48	-0.45	
19,858.00	89.04	172.74	12,818.17	-7,156.06	343.79	7,163.92	5.61	-2.34	-5.10	
19,953.00	87.94	176.14	12,820.67	-7,250.57	352.99	7,258.71	3.76	-1.16	3.58	
20,047.00	89.42	179.90	12,822.84	-7,344.47	356.23	7,352.66	4.30	1.57	4.00	
20,142.00	89.40	181.37	12,823.82	-7,439.46	355.18	7,447.54	1.55	-0.02	1.55	
20,236.00	89.51	181.70	12,824.71	-7,533.42	352.66	7,541.34	0.37	0.12	0.35	
20,331.00	91.76	186.39	12,823.66	-7,628.14	345.96	7,635.75	5.48	2.37	4.94	
20,425.00	92.85	183.33	12,819.88	-7,721.72	338.01	7,728.96	3.45	1.16	-3.26	
20,520.00	88.63	177.97	12,818.65	-7,816.65	336.93	7,823.78	7.18	-4.44	-5.64	
20,614.00	88.26	176.74	12,821.20	-7,910.51	341.27	7,917.74	1.37	-0.39	-1.31	
20,709.00	90.47	179.76	12,822.25	-8,005.44	344.17	8,012.72	3.94	2.33	3.18	
20,803.00	91.84	180.48	12,820.36	-8,099.42	343.97	8,106.62	1.65	1.46	0.77	
20,898.00	91.40	180.50	12,817.67	-8,194.38	343.16	8,201.48	0.46	-0.46	0.02	
20,992.00	90.73	179.92	12,815.93	-8,288.36	342.81	8,295.39	0.94	-0.71	-0.62	
21,087.00	91.86	181.05	12,813.78	-8,383.33	342.01	8,390.26	1.68	1.19	1.19	
21,182.00	90.82	180.30	12,811.56	-8,478.29	340.89	8,485.12	1.35	-1.09	-0.79	
21,277.00	86.48	176.78	12,813.80	-8,573.20	343.31	8,580.04	5.88	-4.57	-3.71	
21,372.00	86.31	175.99	12,819.77	-8,667.82	349.29	8,674.82	0.85	-0.18	-0.83	
21,466.00	87.48	178.78	12,824.86	-8,761.58	353.57	8,768.67	3.21	1.24	2.97	
21,561.00	86.84	178.59	12,829.57	-8,856.43	355.74	8,863.55	0.70	-0.67	-0.20	
21,655.00	86.54	178.23	12,835.00	-8,950.24	358.35	8,957.38	0.50	-0.32	-0.38	
21,750.00	89.32	180.72	12,838.43	-9,045.16	359.22	9,052.27	3.93	2.93	2.62	
21,845.00	88.47	178.09	12,840.26	-9,140.13	360.20	9,147.20	2.91	-0.89	-2.77	
21,938.00	92.46	184.06	12,839.50	-9,233.05	358.46	9,239.99	7.72	4.29	6.42	
22,033.00	91.22	183.22	12,836.45	-9,327.80	352.43	9,334.46	1.58	-1.31	-0.88	
22,128.00	92.66	183.68	12,833.24	-9,422.57	346.72	9,428.95	1.59	1.52	0.48	
22,222.00	92.31	181.75	12,829.16	-9,516.37	342.27	9,522.52	2.08	-0.37	-2.05	
22,317.00	92.99	182.47	12,824.77	-9,611.21	338.78	9,617.15	1.04	0.72	0.76	
22,411.00	92.06	179.44	12,820.63	-9,705.09	337.21	9,710.91	3.37	-0.99	-3.22	
22,505.00	90.26	177.32	12,818.72	-9,799.03	339.87	9,804.88	2.96	-1.91	-2.26	
22,599.00	88.47	176.00	12,819.77	-9,892.85	345.35	9,898.85	2.37	-1.90	-1.40	
22,694.00	88.12	176.00	12,822.59	-9,987.58	351.97	9,993.75	0.37	-0.37	0.00	
22,789.00	87.32	175.90	12,826.37	-10,082.27	358.67	10,088.63	0.85	-0.84	-0.11	
22,884.00	88.28	176.33	12,830.02	-10,176.98	365.11	10,183.51	1.11	1.01	0.45	
22,939.00	88.79	176.52	12,831.43	-10,231.85	368.53	10,238.48	0.99	0.93	0.35	
Final Gordon MWD Survey										
22,948.00	88.79	176.52	12,831.62	-10,240.83	369.08	10,247.47	0.00	0.00	0.00	
LTP: 22948' MD										
22,997.00	88.79	176.52	12,832.65	-10,289.73	372.05	10,296.45	0.00	0.00	0.00	
Projection to TD										

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 703H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3365.70usft (McVay 8)
Site:	Gunner 8 Federal Com	MD Reference:	RKB @ 3365.70usft (McVay 8)
Well:	703H	North Reference:	Grid
Wellbore:	OH / 66565	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	Database:	USA Compass

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,901.00	11,890.99	173.38	245.57	Tie In
11,946.00	11,935.95	172.20	246.87	First Gordon MWD Survey
12,418.00	12,401.29	122.52	268.58	FTP: 12418' MD
22,939.00	12,831.43	-10,231.85	368.53	Final Gordon MWD Survey
22,948.00	12,831.62	-10,240.83	369.08	LTP: 22948' MD
22,997.00	12,832.65	-10,289.73	372.05	Projection to TD

Checked By: _____ Approved By: _____ Date: _____