



COG Operating LLC

**Lea County, NM (NAD27 NME)
Baseball Cap Federal Com
707H**

OH / 64773

Design: Surveys (McVay 8)

Standard Survey Report

18 August, 2019



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 707H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3449.00usft (McVay 8)
Site:	Baseball Cap Federal Com	MD Reference:	RKB @ 3449.00usft (McVay 8)
Well:	707H	North Reference:	Grid
Wellbore:	OH / 64773	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	Baseball Cap Federal Com		
Site Position:		Northing:	431,112.90 usft
From:	Map	Easting:	782,226.20 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 10' 55.044304 N
		Longitude:	103° 25' 16.037016 W
		Grid Convergence:	0.49 °

Well	707H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	OH / 64773		
Magnetics	Model Name	Sample Date	Declination (°)
	MVHD	7/13/2019	6.60
			Dip Angle (°)
			59.81
			Field Strength (nT)
			47,796.23833989

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)
	0.00	0.00	0.00
			Direction (°)
			356.46

Survey Program	Date 8/18/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.00	12,129.00	Scientific Gyro Surveys (OH / 64773)	Scientific Gyro
12,129.00	23,035.00	Phoenix MWD Surveys (OH / 64773)	MWD+HRGM
			Description
			Scientific Drilling Intl. Standard Wireline Keeper
			OWSG MWD + HRGM

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	0.55	188.61	100.00	-0.47	-0.07	-0.47	0.55	0.55	0.00
200.00	0.57	187.30	199.99	-1.44	-0.21	-1.43	0.02	0.02	-1.31
300.00	0.30	173.89	299.99	-2.20	-0.24	-2.18	0.29	-0.27	-13.41
400.00	0.24	180.10	399.99	-2.67	-0.21	-2.65	0.07	-0.06	6.21
500.00	0.21	171.96	499.99	-3.06	-0.19	-3.04	0.04	-0.03	-8.14
600.00	0.29	187.03	599.99	-3.49	-0.19	-3.47	0.10	0.08	15.07
700.00	0.30	187.99	699.99	-4.00	-0.26	-3.98	0.01	0.01	0.96
800.00	0.29	193.84	799.99	-4.50	-0.36	-4.47	0.03	-0.01	5.85
900.00	0.36	185.93	899.98	-5.06	-0.45	-5.03	0.08	0.07	-7.91

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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)
1,000.00	0.55	169.80	999.98	-5.85	-0.40	-5.81	0.23	0.19	-16.13
1,100.00	0.84	167.39	1,099.97	-7.04	-0.15	-7.01	0.29	0.29	-2.41
1,200.00	1.01	154.57	1,199.96	-8.55	0.38	-8.55	0.27	0.17	-12.82
1,300.00	1.23	153.08	1,299.94	-10.30	1.25	-10.36	0.22	0.22	-1.49
1,400.00	1.08	149.56	1,399.92	-12.07	2.21	-12.18	0.17	-0.15	-3.52
1,500.00	1.00	146.98	1,499.90	-13.61	3.16	-13.78	0.09	-0.08	-2.58
1,600.00	0.88	147.94	1,599.89	-15.00	4.05	-15.22	0.12	-0.12	0.96
1,700.00	0.74	141.99	1,699.88	-16.16	4.85	-16.42	0.16	-0.14	-5.95
1,800.00	0.53	127.06	1,799.87	-16.94	5.62	-17.26	0.27	-0.21	-14.93
1,900.00	0.53	113.28	1,899.87	-17.40	6.41	-17.77	0.13	0.00	-13.78
2,000.00	0.40	82.77	1,999.87	-17.54	7.18	-17.95	0.27	-0.13	-30.51
2,100.00	0.60	105.75	2,099.86	-17.64	8.04	-18.10	0.28	0.20	22.98
2,200.00	0.40	94.57	2,199.86	-17.81	8.89	-18.33	0.22	-0.20	-11.18
2,300.00	0.40	94.74	2,299.86	-17.87	9.58	-18.43	0.00	0.00	0.17
2,400.00	0.44	92.83	2,399.85	-17.92	10.31	-18.52	0.04	0.04	-1.91
2,500.00	0.27	97.91	2,499.85	-17.97	10.93	-18.61	0.17	-0.17	5.08
2,600.00	0.65	248.97	2,599.85	-18.20	10.64	-18.83	0.90	0.38	151.06
2,700.00	0.88	245.25	2,699.84	-18.73	9.41	-19.27	0.24	0.23	-3.72
2,800.00	2.55	246.81	2,799.79	-19.93	6.67	-20.30	1.67	1.67	1.56
2,900.00	2.51	242.86	2,899.70	-21.80	2.67	-21.92	0.18	-0.04	-3.95
3,000.00	2.23	236.51	2,999.61	-23.87	-0.90	-23.77	0.38	-0.28	-6.35
3,100.00	2.05	228.74	3,099.54	-26.13	-3.87	-25.84	0.34	-0.18	-7.77
3,200.00	1.70	209.75	3,199.49	-28.59	-5.95	-28.17	0.71	-0.35	-18.99
3,300.00	1.66	204.85	3,299.45	-31.20	-7.29	-30.69	0.15	-0.04	-4.90
3,400.00	1.51	185.86	3,399.41	-33.82	-8.03	-33.26	0.54	-0.15	-18.99
3,500.00	1.48	174.41	3,499.37	-36.42	-8.04	-35.85	0.30	-0.03	-11.45
3,600.00	0.74	197.35	3,599.35	-38.32	-8.11	-37.74	0.85	-0.74	22.94
3,700.00	0.59	189.18	3,699.35	-39.44	-8.38	-38.85	0.18	-0.15	-8.17
3,800.00	0.87	159.15	3,799.34	-40.66	-8.20	-40.08	0.46	0.28	-30.03
3,900.00	1.34	149.99	3,899.32	-42.38	-7.34	-41.85	0.50	0.47	-9.16
4,000.00	1.84	190.19	3,999.29	-44.98	-7.04	-44.46	1.19	0.50	40.20
4,100.00	2.70	229.39	4,099.21	-48.09	-9.11	-47.43	1.72	0.86	39.20
4,200.00	2.74	230.54	4,199.10	-51.14	-12.75	-50.26	0.07	0.04	1.15
4,300.00	2.39	224.56	4,299.00	-54.15	-16.05	-53.05	0.44	-0.35	-5.98
4,400.00	2.12	220.94	4,398.92	-57.03	-18.73	-55.76	0.31	-0.27	-3.62
4,500.00	2.30	232.40	4,498.85	-59.65	-21.53	-58.21	0.48	0.18	11.46
4,600.00	1.91	212.50	4,598.78	-62.28	-24.02	-60.68	0.82	-0.39	-19.90
4,700.00	1.05	232.99	4,698.75	-64.24	-25.64	-62.53	1.00	-0.86	20.49
4,800.00	1.20	194.92	4,798.73	-65.80	-26.65	-64.03	0.75	0.15	-38.07
4,900.00	1.85	214.08	4,898.69	-68.15	-27.82	-66.30	0.82	0.65	19.16
5,000.00	2.04	220.48	4,998.64	-70.84	-29.88	-68.86	0.29	0.19	6.40
5,100.00	1.95	235.95	5,098.58	-73.15	-32.44	-71.00	0.54	-0.09	15.47
5,200.00	2.29	246.72	5,198.51	-74.89	-35.69	-72.54	0.52	0.34	10.77

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Survey

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5,300.00	1.69	236.52	5,298.45	-76.49	-38.75	-73.95	0.69	-0.60	-10.20
5,400.00	2.87	271.15	5,398.37	-77.26	-42.49	-74.48	1.76	1.18	34.63
5,500.00	2.84	274.43	5,498.25	-77.01	-47.46	-73.94	0.17	-0.03	3.28
5,600.00	2.59	270.53	5,598.14	-76.80	-52.19	-73.43	0.31	-0.25	-3.90
5,700.00	2.31	275.32	5,698.04	-76.59	-56.46	-72.96	0.35	-0.28	4.79
5,800.00	3.99	250.48	5,797.89	-77.57	-61.74	-73.61	2.13	1.68	-24.84
5,900.00	3.92	248.67	5,897.66	-79.98	-68.21	-75.61	0.14	-0.07	-1.81
6,000.00	3.69	247.42	5,997.44	-82.45	-74.36	-77.71	0.24	-0.23	-1.25
6,100.00	3.39	245.06	6,097.24	-84.94	-80.01	-79.83	0.33	-0.30	-2.36
6,200.00	3.38	245.06	6,197.07	-87.43	-85.37	-81.99	0.01	-0.01	0.00
6,300.00	4.34	242.73	6,296.84	-90.40	-91.40	-84.59	0.97	0.96	-2.33
6,400.00	4.18	242.25	6,396.57	-93.83	-97.99	-87.60	0.16	-0.16	-0.48
6,500.00	3.81	239.39	6,496.32	-97.22	-104.08	-90.61	0.42	-0.37	-2.86
6,600.00	3.52	240.02	6,596.12	-100.45	-109.60	-93.49	0.29	-0.29	0.63
6,700.00	4.03	240.33	6,695.90	-103.72	-115.31	-96.40	0.51	0.51	0.31
6,800.00	5.39	242.25	6,795.56	-107.65	-122.52	-99.88	1.37	1.36	1.92
6,900.00	5.45	243.01	6,895.11	-111.99	-130.91	-103.69	0.09	0.06	0.76
7,000.00	5.09	242.00	6,994.69	-116.23	-139.05	-107.42	0.37	-0.36	-1.01
7,100.00	4.81	240.86	7,094.32	-120.35	-146.63	-111.07	0.30	-0.28	-1.14
7,200.00	4.35	239.80	7,194.00	-124.30	-153.57	-114.58	0.47	-0.46	-1.06
7,300.00	4.29	240.26	7,293.71	-128.06	-160.10	-117.93	0.07	-0.06	0.46
7,400.00	3.77	239.73	7,393.47	-131.58	-166.18	-121.06	0.52	-0.52	-0.53
7,500.00	3.65	240.70	7,493.26	-134.79	-171.80	-123.93	0.14	-0.12	0.97
7,600.00	3.44	239.27	7,593.07	-137.88	-177.15	-126.68	0.23	-0.21	-1.43
7,700.00	4.36	232.02	7,692.83	-141.75	-182.73	-130.20	1.04	0.92	-7.25
7,800.00	4.46	232.92	7,792.54	-146.44	-188.83	-134.50	0.12	0.10	0.90
7,900.00	4.14	231.78	7,892.26	-151.02	-194.77	-138.70	0.33	-0.32	-1.14
8,000.00	3.72	231.00	7,992.02	-155.29	-200.12	-142.64	0.42	-0.42	-0.78
8,100.00	3.64	229.74	8,091.81	-159.38	-205.07	-146.42	0.11	-0.08	-1.26
8,200.00	3.27	238.52	8,191.63	-162.92	-209.92	-149.65	0.64	-0.37	8.78
8,300.00	3.26	240.01	8,291.47	-165.84	-214.82	-152.25	0.09	-0.01	1.49
8,400.00	3.32	239.65	8,391.31	-168.72	-219.78	-154.83	0.06	0.06	-0.36
8,500.00	3.70	236.49	8,491.12	-171.96	-224.97	-157.75	0.43	0.38	-3.16
8,600.00	3.98	234.57	8,590.89	-175.76	-230.49	-161.19	0.31	0.28	-1.92
8,700.00	3.88	237.60	8,690.66	-179.58	-236.17	-164.66	0.23	-0.10	3.03
8,800.00	3.67	241.05	8,790.44	-182.94	-241.83	-167.66	0.31	-0.21	3.45
8,900.00	4.31	233.67	8,890.20	-186.72	-247.65	-171.07	0.82	0.64	-7.38
9,000.00	4.43	234.71	8,989.91	-191.18	-253.83	-175.14	0.14	0.12	1.04
9,100.00	5.19	218.88	9,089.56	-196.93	-259.83	-180.51	1.52	0.76	-15.83
9,200.00	5.27	217.61	9,189.14	-204.09	-265.47	-187.31	0.14	0.08	-1.27
9,300.00	4.85	225.80	9,288.76	-210.67	-271.30	-193.52	0.83	-0.42	8.19
9,400.00	4.71	233.43	9,388.41	-216.07	-277.63	-198.51	0.65	-0.14	7.63
9,500.00	4.67	242.94	9,488.08	-220.37	-284.55	-202.37	0.78	-0.04	9.51

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9,600.00	4.57	251.11	9,587.75	-223.51	-291.95	-205.05	0.67	-0.10	8.17
9,700.00	4.46	252.95	9,687.44	-225.94	-299.43	-207.02	0.18	-0.11	1.84
9,800.00	4.60	254.74	9,787.13	-228.13	-307.02	-208.74	0.20	0.14	1.79
9,900.00	4.37	256.84	9,886.82	-230.05	-314.60	-210.19	0.28	-0.23	2.10
10,000.00	4.41	255.83	9,986.53	-231.86	-322.03	-211.54	0.09	0.04	-1.01
10,100.00	4.29	256.33	10,086.24	-233.69	-329.40	-212.90	0.13	-0.12	0.50
10,200.00	4.01	255.44	10,185.98	-235.45	-336.42	-214.23	0.29	-0.28	-0.89
10,300.00	3.86	253.67	10,285.74	-237.28	-343.03	-215.64	0.19	-0.15	-1.77
10,400.00	3.53	250.05	10,385.54	-239.27	-349.15	-217.26	0.40	-0.33	-3.62
10,500.00	3.43	250.45	10,485.35	-241.33	-354.87	-218.95	0.10	-0.10	0.40
10,600.00	2.82	243.93	10,585.20	-243.41	-359.90	-220.72	0.71	-0.61	-6.52
10,700.00	2.34	232.70	10,685.10	-245.73	-363.73	-222.80	0.69	-0.48	-11.23
10,800.00	1.91	222.31	10,785.03	-248.19	-366.47	-225.09	0.58	-0.43	-10.39
10,900.00	1.47	211.22	10,884.99	-250.52	-368.26	-227.31	0.55	-0.44	-11.09
11,000.00	1.52	209.99	10,984.95	-252.77	-369.59	-229.47	0.06	0.05	-1.23
11,100.00	1.37	206.65	11,084.92	-254.99	-370.79	-231.61	0.17	-0.15	-3.34
11,200.00	1.82	200.78	11,184.88	-257.54	-371.89	-234.09	0.48	0.45	-5.87
11,300.00	1.75	198.69	11,284.84	-260.47	-372.94	-236.95	0.10	-0.07	-2.09
11,400.00	1.55	213.59	11,384.79	-263.04	-374.18	-239.44	0.47	-0.20	14.90
11,500.00	1.62	219.25	11,484.76	-265.27	-375.82	-241.55	0.17	0.07	5.66
11,600.00	1.37	231.24	11,584.72	-267.11	-377.65	-243.28	0.40	-0.25	11.99
11,700.00	1.18	238.73	11,684.70	-268.39	-379.46	-244.45	0.25	-0.19	7.49
11,800.00	1.37	251.84	11,784.67	-269.30	-381.48	-245.23	0.35	0.19	13.11
11,900.00	1.44	255.88	11,884.64	-269.98	-383.83	-245.76	0.12	0.07	4.04
12,000.00	1.68	260.26	11,984.61	-270.53	-386.49	-246.15	0.27	0.24	4.38
12,100.00	1.88	258.82	12,084.56	-271.10	-389.55	-246.53	0.20	0.20	-1.44
12,129.00	1.89	262.06	12,113.54	-271.26	-390.49	-246.63	0.37	0.03	11.17
Tie In									
12,229.00	1.95	266.28	12,213.49	-271.59	-393.82	-246.76	0.15	0.06	4.22
First Phoenix MWD Survey									
12,323.00	1.75	311.60	12,307.44	-270.75	-396.49	-245.75	1.53	-0.21	48.21
12,355.00	3.26	332.45	12,339.41	-269.61	-397.27	-244.57	5.44	4.72	65.16
12,386.00	4.86	338.91	12,370.33	-267.61	-398.15	-242.51	5.36	5.16	20.84
12,417.00	7.49	338.84	12,401.15	-264.50	-399.36	-239.33	8.48	8.48	-0.23
12,449.00	10.99	340.45	12,432.73	-259.68	-401.13	-234.41	10.97	10.94	5.03
12,480.00	14.02	340.34	12,462.99	-253.35	-403.38	-227.96	9.77	9.77	-0.35
12,512.00	16.76	340.82	12,493.84	-245.34	-406.20	-219.80	8.57	8.56	1.50
12,543.00	19.37	342.41	12,523.31	-236.22	-409.23	-210.50	8.57	8.42	5.13
12,575.00	22.45	342.01	12,553.20	-225.35	-412.72	-199.44	9.64	9.63	-1.25
12,607.00	25.80	342.08	12,582.40	-212.91	-416.75	-186.77	10.47	10.47	0.22
12,638.00	29.14	343.25	12,609.90	-199.26	-421.00	-172.88	10.91	10.77	3.77
12,670.00	32.08	344.70	12,637.44	-183.60	-425.49	-156.97	9.47	9.19	4.53
12,701.00	34.01	345.75	12,663.42	-167.25	-429.80	-140.40	6.49	6.23	3.39
12,733.00	35.91	346.85	12,689.65	-149.44	-434.13	-122.35	6.26	5.94	3.44

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 707H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3449.00usft (McVay 8)
Site:	Baseball Cap Federal Com	MD Reference:	RKB @ 3449.00usft (McVay 8)
Well:	707H	North Reference:	Grid
Wellbore:	OH / 64773	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)
12,764.00	35.87	348.29	12,714.76	-131.69	-438.05	-104.39	2.73	-0.13	4.65
12,796.00	36.79	351.99	12,740.55	-113.02	-441.28	-85.56	7.43	2.88	11.56
12,827.00	33.32	354.87	12,765.92	-95.34	-443.34	-67.79	12.40	-11.19	9.29
12,859.00	35.84	353.98	12,792.26	-77.27	-445.11	-49.64	8.03	7.88	-2.78
12,890.00	41.21	352.26	12,816.51	-58.11	-447.44	-30.37	17.66	17.32	-5.55
12,922.00	46.83	352.91	12,839.51	-36.07	-450.30	-8.19	17.62	17.56	2.03
12,953.00	51.76	354.31	12,859.72	-12.72	-452.90	15.27	16.27	15.90	4.52
12,961.48	53.21	354.28	12,864.89	-6.03	-453.57	21.99	17.10	17.09	-0.30
FTP: 12,961' MD									
12,985.00	57.23	354.22	12,878.30	13.19	-455.51	41.29	17.10	17.09	-0.28
13,017.00	62.24	353.68	12,894.42	40.67	-458.42	68.89	15.72	15.66	-1.69
13,048.00	67.35	352.65	12,907.62	68.50	-461.76	96.89	16.76	16.48	-3.32
13,079.00	73.16	352.81	12,918.09	97.44	-465.45	125.99	18.75	18.74	0.52
13,110.00	78.12	354.02	12,925.78	127.26	-468.89	155.97	16.44	16.00	3.90
13,142.00	83.65	354.30	12,930.84	158.68	-472.11	187.53	17.30	17.28	0.88
13,174.00	90.14	354.77	12,932.58	190.47	-475.15	219.44	20.33	20.28	1.47
13,276.00	93.78	353.13	12,929.09	291.82	-485.89	321.27	3.91	3.57	-1.61
13,371.00	88.68	351.35	12,927.05	385.90	-498.71	415.95	5.69	-5.37	-1.87
13,465.00	89.58	355.51	12,928.48	479.25	-509.46	509.79	4.53	0.96	4.43
13,559.00	92.38	359.98	12,926.87	573.13	-513.16	603.72	5.61	2.98	4.76
13,653.00	89.61	359.23	12,925.24	667.10	-513.81	697.55	3.05	-2.95	-0.80
13,747.00	92.49	0.11	12,923.51	761.07	-514.35	791.38	3.20	3.06	0.94
13,841.00	94.37	2.02	12,917.89	854.88	-512.61	884.90	2.85	2.00	2.03
13,936.00	93.22	0.74	12,911.60	949.64	-510.32	979.34	1.81	-1.21	-1.35
14,030.00	91.48	358.93	12,907.75	1,043.55	-510.59	1,073.09	2.67	-1.85	-1.93
14,124.00	88.29	358.11	12,907.94	1,137.51	-513.02	1,167.01	3.50	-3.39	-0.87
14,219.00	87.84	356.90	12,911.14	1,232.36	-517.16	1,261.94	1.36	-0.47	-1.27
14,313.00	91.12	356.68	12,912.00	1,326.20	-522.42	1,355.92	3.50	3.49	-0.23
14,407.00	90.11	359.59	12,910.99	1,420.13	-525.48	1,449.87	3.28	-1.07	3.10
14,502.00	89.52	357.43	12,911.29	1,515.09	-527.95	1,544.80	2.36	-0.62	-2.27
14,596.00	89.10	358.01	12,912.43	1,609.01	-531.69	1,638.77	0.76	-0.45	0.62
14,690.00	89.94	357.98	12,913.21	1,702.95	-534.97	1,732.73	0.89	0.89	-0.03
14,784.00	91.65	357.72	12,911.91	1,796.87	-538.50	1,826.69	1.84	1.82	-0.28
14,880.00	89.33	356.68	12,911.09	1,892.74	-543.19	1,922.67	2.65	-2.42	-1.08
14,975.00	87.54	358.88	12,913.68	1,987.63	-546.87	2,017.60	2.98	-1.88	2.32
15,070.00	89.97	0.21	12,915.75	2,082.59	-547.62	2,112.43	2.92	2.56	1.40
15,164.00	90.28	359.40	12,915.54	2,176.59	-547.94	2,206.27	0.92	0.33	-0.86
15,259.00	91.76	0.42	12,913.85	2,271.57	-548.09	2,301.08	1.89	1.56	1.07
15,353.00	88.60	358.93	12,913.56	2,365.56	-548.62	2,394.92	3.72	-3.36	-1.59
15,448.00	89.41	358.35	12,915.20	2,460.51	-550.88	2,489.83	1.05	0.85	-0.61
15,542.00	91.76	358.77	12,914.25	2,554.47	-553.24	2,583.76	2.54	2.50	0.45
15,637.00	89.38	357.09	12,913.30	2,649.39	-556.67	2,678.71	3.07	-2.51	-1.77
15,732.00	89.22	357.09	12,914.46	2,744.26	-561.49	2,773.70	0.17	-0.17	0.00

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 707H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3449.00usft (McVay 8)
Site:	Baseball Cap Federal Com	MD Reference:	RKB @ 3449.00usft (McVay 8)
Well:	707H	North Reference:	Grid
Wellbore:	OH / 64773	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)
15,827.00	90.11	0.99	12,915.02	2,839.23	-563.09	2,868.58	4.21	0.94	4.11
15,921.00	90.70	0.77	12,914.35	2,933.22	-561.64	2,962.30	0.67	0.63	-0.23
16,016.00	88.82	0.41	12,914.75	3,028.21	-560.66	3,057.05	2.01	-1.98	-0.38
16,110.00	87.56	0.16	12,917.72	3,122.16	-560.20	3,150.79	1.37	-1.34	-0.27
16,205.00	89.08	1.50	12,920.50	3,217.10	-558.82	3,245.47	2.13	1.60	1.41
16,300.00	88.91	0.63	12,922.17	3,312.07	-557.06	3,340.14	0.93	-0.18	-0.92
16,394.00	89.78	0.70	12,923.25	3,406.06	-555.96	3,433.88	0.93	0.93	0.07
16,489.00	90.20	0.08	12,923.26	3,501.05	-555.32	3,528.66	0.79	0.44	-0.65
16,584.00	90.81	0.74	12,922.42	3,596.05	-554.64	3,623.43	0.95	0.64	0.69
16,679.00	90.00	358.96	12,921.75	3,691.04	-554.89	3,718.26	2.06	-0.85	-1.87
16,774.00	89.33	357.09	12,922.31	3,785.98	-558.16	3,813.22	2.09	-0.71	-1.97
16,868.00	88.68	356.99	12,923.94	3,879.84	-563.01	3,907.20	0.70	-0.69	-0.11
16,963.00	89.38	358.30	12,925.55	3,974.74	-566.92	4,002.16	1.56	0.74	1.38
17,061.00	91.68	359.45	12,924.64	4,072.71	-568.84	4,100.06	2.62	2.35	1.17
17,156.00	95.86	0.15	12,918.40	4,167.48	-569.17	4,194.67	4.46	4.40	0.74
17,251.00	94.99	0.78	12,909.42	4,262.05	-568.41	4,289.01	1.13	-0.92	0.66
17,346.00	94.48	359.68	12,901.57	4,356.72	-568.03	4,383.48	1.27	-0.54	-1.16
17,440.00	94.15	0.96	12,894.50	4,450.45	-567.50	4,477.00	1.40	-0.35	1.36
17,535.00	93.64	1.93	12,888.05	4,545.20	-565.11	4,571.42	1.15	-0.54	1.02
17,630.00	94.06	2.07	12,881.67	4,639.93	-561.80	4,665.76	0.47	0.44	0.15
17,724.00	94.26	2.30	12,874.85	4,733.61	-558.23	4,759.05	0.32	0.21	0.24
17,820.00	94.40	1.92	12,867.60	4,829.27	-554.70	4,854.31	0.42	0.15	-0.40
17,915.00	95.72	1.08	12,859.22	4,923.87	-552.23	4,948.57	1.65	1.39	-0.88
18,009.00	93.78	0.46	12,851.44	5,017.53	-550.97	5,041.98	2.17	-2.06	-0.66
18,103.00	91.65	358.46	12,846.99	5,111.41	-551.86	5,135.73	3.11	-2.27	-2.13
18,198.00	92.10	358.55	12,843.88	5,206.33	-554.33	5,230.62	0.48	0.47	0.09
18,293.00	92.55	358.51	12,840.02	5,301.22	-556.77	5,325.48	0.48	0.47	-0.04
18,388.00	91.85	359.47	12,836.38	5,396.13	-558.44	5,420.32	1.25	-0.74	1.01
18,482.00	91.62	359.71	12,833.53	5,490.09	-559.11	5,514.13	0.35	-0.24	0.26
18,577.00	95.84	2.54	12,827.35	5,584.84	-557.26	5,608.59	5.34	4.44	2.98
18,671.00	94.06	358.84	12,819.24	5,678.46	-556.13	5,701.96	4.35	-1.89	-3.94
18,765.00	94.35	358.91	12,812.35	5,772.19	-557.97	5,795.63	0.32	0.31	0.07
18,859.00	94.37	358.58	12,805.20	5,865.89	-560.03	5,889.28	0.35	0.02	-0.35
18,954.00	93.53	358.08	12,798.65	5,960.63	-562.79	5,984.00	1.03	-0.88	-0.53
19,049.00	90.45	357.50	12,795.36	6,055.49	-566.45	6,078.91	3.30	-3.24	-0.61
19,144.00	91.46	358.06	12,793.77	6,150.40	-570.13	6,173.87	1.22	1.06	0.59
19,238.00	92.63	357.63	12,790.42	6,244.27	-573.66	6,267.78	1.33	1.24	-0.46
19,333.00	95.22	358.69	12,783.92	6,338.99	-576.71	6,362.51	2.94	2.73	1.12
19,428.00	97.36	358.97	12,773.51	6,433.39	-578.64	6,456.85	2.27	2.25	0.29
19,522.00	97.72	358.47	12,761.17	6,526.56	-580.72	6,549.96	0.65	0.38	-0.53
19,616.00	97.22	358.86	12,748.95	6,619.73	-582.89	6,643.09	0.67	-0.53	0.41
19,711.00	95.53	1.34	12,738.40	6,714.14	-582.72	6,737.30	3.15	-1.78	2.61
19,806.00	94.60	1.84	12,730.02	6,808.73	-580.09	6,831.55	1.11	-0.98	0.53
19,901.00	96.29	2.06	12,721.00	6,903.24	-576.88	6,925.69	1.79	1.78	0.23

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 707H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3449.00usft (McVay 8)
Site:	Baseball Cap Federal Com	MD Reference:	RKB @ 3449.00usft (McVay 8)
Well:	707H	North Reference:	Grid
Wellbore:	OH / 64773	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)
19,995.00	95.50	1.20	12,711.35	6,996.70	-574.22	7,018.81	1.24	-0.84	-0.91
20,089.00	95.83	0.24	12,702.07	7,090.24	-573.04	7,112.09	1.08	0.35	-1.02
20,183.00	94.40	358.19	12,693.69	7,183.84	-574.33	7,205.60	2.65	-1.52	-2.18
20,278.00	95.97	358.06	12,685.10	7,278.40	-577.42	7,300.17	1.66	1.65	-0.14
20,373.00	94.99	357.22	12,676.03	7,372.89	-581.32	7,394.71	1.36	-1.03	-0.88
20,468.00	89.97	357.30	12,671.92	7,467.66	-585.85	7,489.58	5.28	-5.28	0.08
20,562.00	91.82	357.36	12,670.45	7,561.54	-590.23	7,583.56	1.97	1.97	0.06
20,656.00	92.46	357.20	12,666.94	7,655.37	-594.69	7,677.48	0.70	0.68	-0.17
20,750.00	91.37	356.29	12,663.80	7,749.16	-600.02	7,771.43	1.51	-1.16	-0.97
20,844.00	90.25	355.93	12,662.47	7,842.93	-606.40	7,865.41	1.25	-1.19	-0.38
20,939.00	95.41	358.72	12,657.78	7,937.67	-610.83	7,960.24	6.17	5.43	2.94
21,033.00	91.65	359.06	12,652.00	8,031.46	-612.65	8,053.96	4.02	-4.00	0.36
21,127.00	93.33	359.23	12,647.91	8,125.36	-614.05	8,147.77	1.80	1.79	0.18
21,222.00	93.42	357.51	12,642.32	8,220.15	-616.75	8,242.55	1.81	0.09	-1.81
21,316.00	91.43	357.40	12,638.34	8,313.97	-620.92	8,336.45	2.12	-2.12	-0.12
21,410.00	89.13	358.52	12,637.88	8,407.90	-624.26	8,430.40	2.72	-2.45	1.19
21,504.00	91.12	359.80	12,637.68	8,501.88	-625.64	8,524.29	2.52	2.12	1.36
21,599.00	90.76	359.27	12,636.12	8,596.87	-626.41	8,619.14	0.67	-0.38	-0.56
21,694.00	94.18	359.38	12,632.03	8,691.76	-627.53	8,713.92	3.60	3.60	0.12
21,788.00	91.91	359.83	12,627.03	8,785.62	-628.17	8,807.64	2.46	-2.41	0.48
21,883.00	90.00	358.48	12,625.45	8,880.59	-629.58	8,902.52	2.46	-2.01	-1.42
21,978.00	90.48	1.93	12,625.05	8,975.57	-629.24	8,997.30	3.67	0.51	3.63
22,072.00	91.57	4.04	12,623.37	9,069.42	-624.34	9,090.67	2.53	1.16	2.24
22,167.00	92.52	3.41	12,619.98	9,164.16	-618.17	9,184.84	1.20	1.00	-0.66
22,262.00	87.45	3.03	12,620.00	9,258.98	-612.84	9,279.15	5.35	-5.34	-0.40
22,356.00	91.62	4.89	12,620.77	9,352.73	-606.35	9,372.32	4.86	4.44	1.98
22,452.00	89.72	1.69	12,619.64	9,448.54	-600.84	9,467.62	3.88	-1.98	-3.33
22,547.00	89.52	359.62	12,620.27	9,543.53	-599.76	9,562.35	2.19	-0.21	-2.18
22,642.00	89.78	357.67	12,620.85	9,638.50	-602.00	9,657.28	2.07	0.27	-2.05
22,737.00	90.90	355.00	12,620.29	9,733.29	-608.07	9,752.27	3.05	1.18	-2.81
22,832.00	92.24	354.88	12,617.69	9,827.88	-616.45	9,847.19	1.42	1.41	-0.13
22,906.04	94.28	354.20	12,613.48	9,901.47	-623.48	9,921.07	2.90	2.75	-0.92
LTP: 22,096' MD									
22,928.00	94.88	354.00	12,611.73	9,923.24	-625.73	9,942.94	2.90	2.75	-0.92
22,974.00	95.44	352.44	12,607.59	9,968.73	-631.14	9,988.68	3.59	1.22	-3.39
Final Phoenix MWD Survey									
23,035.00	95.44	352.44	12,601.81	10,028.93	-639.13	10,049.26	0.00	0.00	0.00
Projection to TD									

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 707H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3449.00usft (McVay 8)
Site:	Baseball Cap Federal Com	MD Reference:	RKB @ 3449.00usft (McVay 8)
Well:	707H	North Reference:	Grid
Wellbore:	OH / 64773	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)	
12,129.00	12,113.54	-271.26	-390.49	Tie In
12,229.00	12,213.49	-271.59	-393.82	First Phoenix MWD Survey
12,961.48	12,864.89	-6.03	-453.57	FTP: 12,961' MD
22,906.04	12,613.48	9,901.47	-623.48	LTP: 22,096' MD
22,974.00	12,607.59	9,968.73	-631.14	Final Phoenix MWD Survey
23,035.00	12,601.81	10,028.93	-639.13	Projection to TD