



COG Operating LLC

Lea County, NM (NAD27 NME)

Valor Federal Com

704H

OH / 66416

Design: Surveys (McVay 8)

Standard Survey Report

08 April, 2020



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	Valor Federal Com		
Site Position:		Northing:	398,661.28 usft
From:	Lat/Long	Easting:	745,606.66 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 5' 36.790800 N
		Longitude:	103° 32' 24.882000 W
		Grid Convergence:	0.42 °

Well	704H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	1.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 5' 36.790800 N
		Longitude:	103° 32' 24.882000 W
		Ground Level:	3,327.60 usft

Wellbore	OH / 66416		
Magnetics	Model Name	Sample Date	Declination (°)
	User Defined	3/18/2020	6.56
			Dip Angle (°)
			59.69
			Field Strength (nT)
			47,641.40000000

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 (°)
			182.71

Survey Program	Date	4/8/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	11,729.32	Scientific Keeper Gyro Surveys (OH / 6641	Scientific Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
11,772.00	20,167.00	Gordon MWD Surveys - SQC FDIR (OH /	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	0.66	122.70	100.00	-0.31	0.48	0.29	0.66	0.66	0.00	
125.00	0.71	112.46	125.00	-0.45	0.75	0.41	0.53	0.20	-40.96	
150.00	0.57	120.95	149.99	-0.57	1.00	0.52	0.67	-0.56	33.96	
175.00	0.59	127.99	174.99	-0.71	1.21	0.66	0.30	0.08	28.16	
200.00	0.83	140.08	199.99	-0.93	1.42	0.86	1.13	0.96	48.36	
225.00	0.78	150.69	224.99	-1.22	1.62	1.14	0.63	-0.20	42.44	
250.00	0.87	138.07	249.99	-1.51	1.83	1.42	0.81	0.36	-50.48	
275.00	0.88	126.77	274.98	-1.77	2.11	1.66	0.69	0.04	-45.20	
300.00	0.70	131.60	299.98	-1.98	2.38	1.87	0.77	-0.72	19.32	

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Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	0.73	141.13	324.98	-2.21	2.60	2.08	0.49	0.12	38.12
350.00	0.83	144.58	349.98	-2.48	2.80	2.34	0.44	0.40	13.80
375.00	0.75	139.28	374.97	-2.75	3.01	2.60	0.43	-0.32	-21.20
400.00	0.70	130.97	399.97	-2.97	3.24	2.82	0.47	-0.20	-33.24
425.00	0.49	131.81	424.97	-3.15	3.43	2.98	0.84	-0.84	3.36
450.00	0.68	146.87	449.97	-3.34	3.59	3.17	0.97	0.76	60.24
475.00	0.66	138.41	474.97	-3.57	3.77	3.39	0.40	-0.08	-33.84
500.00	0.71	131.32	499.97	-3.78	3.98	3.59	0.39	0.20	-28.36
525.00	0.63	136.12	524.96	-3.98	4.19	3.78	0.39	-0.32	19.20
550.00	0.64	94.61	549.96	-4.09	4.43	3.88	1.80	0.04	-166.04
575.00	0.54	109.31	574.96	-4.15	4.68	3.92	0.72	-0.40	58.80
600.00	0.54	115.92	599.96	-4.24	4.89	4.00	0.25	0.00	26.44
625.00	0.58	127.13	624.96	-4.36	5.10	4.12	0.47	0.16	44.84
650.00	0.71	122.23	649.96	-4.52	5.33	4.27	0.56	0.52	-19.60
675.00	0.71	116.99	674.96	-4.68	5.60	4.41	0.26	0.00	-20.96
700.00	0.69	110.12	699.95	-4.80	5.88	4.51	0.34	-0.08	-27.48
725.00	0.57	115.72	724.95	-4.90	6.13	4.61	0.54	-0.48	22.40
750.00	0.61	124.29	749.95	-5.03	6.36	4.73	0.39	0.16	34.28
775.00	0.77	124.02	774.95	-5.20	6.61	4.88	0.64	0.64	-1.08
800.00	0.90	120.24	799.95	-5.39	6.91	5.06	0.56	0.52	-15.12
825.00	0.90	128.08	824.94	-5.61	7.24	5.27	0.49	0.00	31.36
850.00	0.82	136.88	849.94	-5.87	7.51	5.50	0.62	-0.32	35.20
875.00	0.93	138.94	874.94	-6.15	7.77	5.77	0.46	0.44	8.24
900.00	0.97	135.96	899.93	-6.45	8.05	6.07	0.25	0.16	-11.92
925.00	0.97	132.05	924.93	-6.75	8.36	6.35	0.26	0.00	-15.64
950.00	0.96	129.17	949.93	-7.02	8.67	6.60	0.20	-0.04	-11.52
975.00	0.82	132.23	974.92	-7.27	8.97	6.84	0.59	-0.56	12.24
1,000.00	0.83	156.00	999.92	-7.56	9.18	7.12	1.36	0.04	95.08
1,025.00	0.94	145.68	1,024.92	-7.89	9.36	7.44	0.77	0.44	-41.28
1,050.00	0.89	138.96	1,049.92	-8.21	9.61	7.75	0.47	-0.20	-26.88
1,075.00	0.77	141.82	1,074.91	-8.49	9.84	8.01	0.51	-0.48	11.44
1,100.00	0.69	142.57	1,099.91	-8.74	10.03	8.26	0.32	-0.32	3.00
1,125.00	0.75	153.49	1,124.91	-9.01	10.20	8.51	0.60	0.24	43.68
1,150.00	0.80	147.29	1,149.91	-9.30	10.37	8.80	0.39	0.20	-24.80
1,175.00	0.78	149.57	1,174.90	-9.59	10.55	9.08	0.15	-0.08	9.12
1,200.00	0.82	152.00	1,199.90	-9.90	10.72	9.38	0.21	0.16	9.72
1,225.00	0.90	154.78	1,224.90	-10.23	10.88	9.71	0.36	0.32	11.12
1,250.00	1.03	155.43	1,249.90	-10.62	11.06	10.08	0.52	0.52	2.60
1,275.00	1.07	156.37	1,274.89	-11.03	11.25	10.49	0.17	0.16	3.76
1,300.00	0.77	144.50	1,299.89	-11.38	11.44	10.83	1.42	-1.20	-47.48
1,325.00	0.89	154.77	1,324.89	-11.70	11.62	11.13	0.76	0.48	41.08
1,350.00	0.99	156.00	1,349.88	-12.07	11.79	11.50	0.41	0.40	4.92
1,375.00	1.07	154.94	1,374.88	-12.48	11.98	11.90	0.33	0.32	-4.24

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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)
1,400.00	1.10	145.19	1,399.87	-12.89	12.21	12.30	0.75	0.12	-39.00
1,425.00	0.27	200.06	1,424.87	-13.14	12.33	12.54	3.88	-3.32	219.48
1,450.00	1.00	311.03	1,449.87	-13.05	12.15	12.46	4.50	2.92	443.88
1,475.00	1.47	318.67	1,474.86	-12.67	11.77	12.10	1.99	1.88	30.56
1,500.00	1.55	312.64	1,499.86	-12.20	11.31	11.65	0.71	0.32	-24.12
1,525.00	1.45	314.03	1,524.85	-11.75	10.83	11.22	0.43	-0.40	5.56
1,550.00	1.62	316.13	1,549.84	-11.27	10.36	10.77	0.72	0.68	8.40
1,575.00	1.62	315.60	1,574.83	-10.77	9.87	10.29	0.06	0.00	-2.12
1,600.00	1.72	316.11	1,599.82	-10.24	9.36	9.79	0.40	0.40	2.04
1,625.00	1.77	312.88	1,624.81	-9.71	8.82	9.28	0.44	0.20	-12.92
1,650.00	1.78	310.25	1,649.79	-9.20	8.24	8.80	0.33	0.04	-10.52
1,675.00	1.69	312.77	1,674.78	-8.70	7.67	8.32	0.47	-0.36	10.08
1,700.00	1.62	313.45	1,699.77	-8.20	7.14	7.86	0.29	-0.28	2.72
1,725.00	1.63	314.82	1,724.76	-7.71	6.64	7.39	0.16	0.04	5.48
1,750.00	1.64	308.93	1,749.75	-7.23	6.10	6.94	0.67	0.04	-23.56
1,775.00	1.56	311.59	1,774.74	-6.78	5.57	6.51	0.44	-0.32	10.64
1,800.00	1.67	312.63	1,799.73	-6.31	5.05	6.06	0.46	0.44	4.16
1,825.00	1.66	313.99	1,824.72	-5.81	4.52	5.59	0.16	-0.04	5.44
1,850.00	1.74	311.92	1,849.71	-5.31	3.98	5.11	0.40	0.32	-8.28
1,875.00	1.65	310.14	1,874.70	-4.82	3.42	4.65	0.42	-0.36	-7.12
1,900.00	1.65	309.58	1,899.69	-4.36	2.87	4.22	0.06	0.00	-2.24
1,925.00	1.54	315.75	1,924.68	-3.89	2.36	3.77	0.82	-0.44	24.68
1,950.00	1.58	314.99	1,949.67	-3.41	1.88	3.31	0.18	0.16	-3.04
1,975.00	1.55	315.60	1,974.66	-2.92	1.40	2.85	0.14	-0.12	2.44
2,000.00	1.49	310.24	1,999.65	-2.47	0.91	2.42	0.62	-0.24	-21.44
2,025.00	1.56	316.48	2,024.64	-2.01	0.43	1.99	0.72	0.28	24.96
2,050.00	1.56	317.64	2,049.63	-1.51	-0.03	1.51	0.13	0.00	4.64
2,075.00	1.59	312.47	2,074.63	-1.03	-0.52	1.05	0.58	0.12	-20.68
2,100.00	1.52	311.99	2,099.62	-0.57	-1.02	0.62	0.28	-0.28	-1.92
2,125.00	1.62	315.42	2,124.61	-0.10	-1.52	0.17	0.55	0.40	13.72
2,150.00	1.63	318.04	2,149.60	0.42	-2.00	-0.32	0.30	0.04	10.48
2,175.00	1.62	314.28	2,174.59	0.93	-2.49	-0.81	0.43	-0.04	-15.04
2,200.00	1.57	317.77	2,199.58	1.43	-2.97	-1.29	0.44	-0.20	13.96
2,225.00	1.41	311.58	2,224.57	1.89	-3.43	-1.72	0.91	-0.64	-24.76
2,250.00	1.49	319.37	2,249.56	2.34	-3.88	-2.15	0.85	0.32	31.16
2,275.00	1.46	314.99	2,274.55	2.81	-4.31	-2.60	0.47	-0.12	-17.52
2,300.00	1.48	319.99	2,299.54	3.28	-4.75	-3.05	0.52	0.08	20.00
2,325.00	1.58	316.27	2,324.53	3.78	-5.19	-3.53	0.56	0.40	-14.88
2,350.00	1.59	313.29	2,349.53	4.26	-5.68	-3.99	0.33	0.04	-11.92
2,375.00	1.57	318.06	2,374.52	4.76	-6.16	-4.46	0.53	-0.08	19.08
2,400.00	1.41	315.92	2,399.51	5.23	-6.61	-4.91	0.68	-0.64	-8.56
2,425.00	1.57	318.61	2,424.50	5.71	-7.05	-5.37	0.70	0.64	10.76
2,450.00	1.53	311.65	2,449.49	6.19	-7.52	-5.83	0.77	-0.16	-27.84

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2,475.00	1.81	305.10	2,474.48	6.64	-8.10	-6.25	1.35	1.12	-26.20
2,500.00	1.95	298.81	2,499.47	7.07	-8.79	-6.65	1.00	0.56	-25.16
2,525.00	1.98	298.64	2,524.45	7.48	-9.54	-7.02	0.12	0.12	-0.68
2,550.00	1.88	295.89	2,549.44	7.87	-10.29	-7.37	0.55	-0.40	-11.00
2,575.00	1.86	298.49	2,574.42	8.24	-11.02	-7.71	0.35	-0.08	10.40
2,600.00	1.95	294.03	2,599.41	8.61	-11.76	-8.04	0.69	0.36	-17.84
2,625.00	1.79	295.41	2,624.40	8.95	-12.50	-8.35	0.66	-0.64	5.52
2,650.00	1.76	300.72	2,649.38	9.31	-13.19	-8.68	0.67	-0.12	21.24
2,675.00	1.64	305.97	2,674.37	9.72	-13.81	-9.05	0.79	-0.48	21.00
2,700.00	1.56	307.32	2,699.36	10.13	-14.37	-9.44	0.35	-0.32	5.40
2,725.00	1.60	316.08	2,724.35	10.59	-14.88	-9.88	0.98	0.16	35.04
2,750.00	1.59	313.77	2,749.34	11.08	-15.37	-10.34	0.26	-0.04	-9.24
2,775.00	1.48	315.50	2,774.34	11.55	-15.85	-10.79	0.48	-0.44	6.92
2,800.00	1.50	319.51	2,799.33	12.03	-16.29	-11.25	0.42	0.08	16.04
2,825.00	1.45	313.34	2,824.32	12.50	-16.73	-11.69	0.67	-0.20	-24.68
2,850.00	1.34	316.89	2,849.31	12.93	-17.16	-12.10	0.56	-0.44	14.20
2,875.00	1.44	327.67	2,874.30	13.41	-17.53	-12.56	1.12	0.40	43.12
2,900.00	1.35	329.06	2,899.30	13.93	-17.85	-13.07	0.38	-0.36	5.56
2,925.00	1.16	333.67	2,924.29	14.41	-18.11	-13.53	0.86	-0.76	18.44
2,950.00	1.26	327.95	2,949.29	14.87	-18.37	-13.98	0.63	0.40	-22.88
2,975.00	1.18	332.48	2,974.28	15.33	-18.63	-14.43	0.50	-0.32	18.12
3,000.00	1.21	335.59	2,999.27	15.80	-18.86	-14.89	0.29	0.12	12.44
3,025.00	1.21	328.16	3,024.27	16.26	-19.11	-15.34	0.63	0.00	-29.72
3,050.00	1.47	327.52	3,049.26	16.75	-19.42	-15.82	1.04	1.04	-2.56
3,075.00	1.63	325.84	3,074.25	17.32	-19.79	-16.36	0.67	0.64	-6.72
3,100.00	1.47	324.94	3,099.24	17.88	-20.18	-16.90	0.65	-0.64	-3.60
3,125.00	1.44	328.10	3,124.24	18.41	-20.53	-17.41	0.34	-0.12	12.64
3,150.00	1.38	332.61	3,149.23	18.94	-20.83	-17.93	0.50	-0.24	18.04
3,175.00	1.53	349.64	3,174.22	19.53	-21.03	-18.52	1.82	0.60	68.12
3,200.00	1.41	1.48	3,199.21	20.17	-21.08	-19.15	1.30	-0.48	47.36
3,225.00	1.51	14.14	3,224.20	20.80	-20.99	-19.78	1.35	0.40	50.64
3,250.00	1.50	17.28	3,249.20	21.43	-20.81	-20.42	0.33	-0.04	12.56
3,275.00	1.41	21.15	3,274.19	22.03	-20.61	-21.03	0.53	-0.36	15.48
3,300.00	1.67	15.94	3,299.18	22.67	-20.40	-21.68	1.18	1.04	-20.84
3,325.00	0.90	22.99	3,324.17	23.20	-20.22	-22.21	3.14	-3.08	28.20
3,350.00	0.23	32.78	3,349.17	23.42	-20.12	-22.44	2.70	-2.68	39.16
3,375.00	0.18	84.54	3,374.17	23.47	-20.05	-22.49	0.74	-0.20	207.04
3,400.00	0.16	106.93	3,399.17	23.46	-19.98	-22.49	0.28	-0.08	89.56
3,425.00	0.11	70.45	3,424.17	23.46	-19.92	-22.49	0.39	-0.20	-145.92
3,450.00	0.17	137.19	3,449.17	23.44	-19.87	-22.47	0.65	0.24	266.96
3,475.00	0.09	100.42	3,474.17	23.41	-19.83	-22.44	0.45	-0.32	-147.08
3,500.00	0.16	248.88	3,499.17	23.39	-19.84	-22.43	0.97	0.28	593.84
3,525.00	1.33	266.42	3,524.17	23.36	-20.16	-22.38	4.71	4.68	70.16
3,550.00	2.45	265.61	3,549.15	23.30	-20.99	-22.28	4.48	4.48	-3.24

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	2.81	261.53	3,574.13	23.17	-22.12	-22.10	1.62	1.44	-16.32
3,600.00	2.71	264.60	3,599.10	23.02	-23.32	-21.90	0.71	-0.40	12.28
3,625.00	2.70	261.60	3,624.07	22.88	-24.49	-21.70	0.57	-0.04	-12.00
3,650.00	2.78	259.65	3,649.04	22.69	-25.67	-21.45	0.49	0.32	-7.80
3,675.00	2.18	258.72	3,674.02	22.49	-26.73	-21.20	2.41	-2.40	-3.72
3,700.00	2.86	258.87	3,698.99	22.27	-27.81	-20.93	2.72	2.72	0.60
3,725.00	2.96	258.64	3,723.96	22.02	-29.05	-20.63	0.40	0.40	-0.92
3,750.00	2.99	257.14	3,748.93	21.75	-30.32	-20.29	0.33	0.12	-6.00
3,775.00	3.03	255.71	3,773.89	21.44	-31.60	-19.93	0.34	0.16	-5.72
3,800.00	3.03	250.76	3,798.86	21.06	-32.86	-19.49	1.05	0.00	-19.80
3,825.00	2.80	258.82	3,823.83	20.73	-34.09	-19.09	1.88	-0.92	32.24
3,850.00	2.75	258.09	3,848.80	20.49	-35.27	-18.79	0.24	-0.20	-2.92
3,875.00	2.49	258.09	3,873.77	20.25	-36.39	-18.51	1.04	-1.04	0.00
3,900.00	2.03	257.28	3,898.75	20.04	-37.35	-18.25	1.84	-1.84	-3.24
3,925.00	1.66	256.79	3,923.74	19.86	-38.14	-18.03	1.48	-1.48	-1.96
3,950.00	1.24	265.70	3,948.73	19.76	-38.76	-17.90	1.90	-1.68	35.64
3,975.00	1.17	270.16	3,973.72	19.74	-39.29	-17.86	0.47	-0.28	17.84
4,000.00	1.03	273.20	3,998.72	19.75	-39.76	-17.85	0.61	-0.56	12.16
4,025.00	1.05	285.30	4,023.72	19.82	-40.21	-17.90	0.88	0.08	48.40
4,050.00	0.94	289.93	4,048.71	19.95	-40.62	-18.01	0.54	-0.44	18.52
4,075.00	1.03	284.91	4,073.71	20.08	-41.03	-18.12	0.50	0.36	-20.08
4,100.00	0.95	291.15	4,098.70	20.21	-41.44	-18.23	0.54	-0.32	24.96
4,125.00	1.16	285.89	4,123.70	20.36	-41.88	-18.36	0.92	0.84	-21.04
4,150.00	1.11	288.08	4,148.70	20.50	-42.35	-18.48	0.26	-0.20	8.76
4,175.00	0.98	294.58	4,173.69	20.67	-42.78	-18.62	0.70	-0.52	26.00
4,200.00	1.03	303.09	4,198.69	20.88	-43.16	-18.81	0.63	0.20	34.04
4,225.00	1.23	300.98	4,223.68	21.14	-43.58	-19.05	0.82	0.80	-8.44
4,250.00	1.13	305.53	4,248.68	21.42	-44.01	-19.32	0.55	-0.40	18.20
4,275.00	1.16	310.61	4,273.67	21.73	-44.40	-19.60	0.42	0.12	20.32
4,300.00	1.07	295.07	4,298.67	21.99	-44.81	-19.85	1.26	-0.36	-62.16
4,325.00	1.21	307.70	4,323.66	22.25	-45.23	-20.09	1.15	0.56	50.52
4,350.00	1.20	310.97	4,348.66	22.59	-45.63	-20.40	0.28	-0.04	13.08
4,375.00	1.02	311.83	4,373.65	22.91	-46.00	-20.70	0.72	-0.72	3.44
4,400.00	0.79	330.04	4,398.65	23.20	-46.25	-20.99	1.46	-0.92	72.84
4,425.00	0.38	357.37	4,423.65	23.44	-46.34	-21.22	1.94	-1.64	109.32
4,450.00	0.52	34.54	4,448.65	23.61	-46.28	-21.40	1.26	0.56	148.68
4,475.00	0.51	49.14	4,473.65	23.78	-46.13	-21.57	0.53	-0.04	58.40
4,500.00	0.81	68.86	4,498.64	23.91	-45.88	-21.72	1.49	1.20	78.88
4,525.00	0.66	75.79	4,523.64	24.01	-45.58	-21.83	0.70	-0.60	27.72
4,550.00	0.74	57.47	4,548.64	24.14	-45.30	-21.97	0.95	0.32	-73.28
4,575.00	0.67	66.15	4,573.64	24.28	-45.03	-22.13	0.51	-0.28	34.72
4,600.00	0.87	66.17	4,598.64	24.42	-44.72	-22.28	0.80	0.80	0.08
4,625.00	0.84	73.82	4,623.63	24.54	-44.37	-22.42	0.47	-0.12	30.60

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	0.83	84.66	4,648.63	24.61	-44.02	-22.50	0.63	-0.04	43.36
4,675.00	1.36	104.17	4,673.63	24.56	-43.55	-22.47	2.56	2.12	78.04
4,700.00	1.65	108.68	4,698.62	24.37	-42.92	-22.31	1.25	1.16	18.04
4,725.00	1.95	113.01	4,723.61	24.09	-42.19	-22.07	1.32	1.20	17.32
4,750.00	1.87	115.67	4,748.59	23.74	-41.43	-21.76	0.48	-0.32	10.64
4,775.00	2.27	119.79	4,773.58	23.32	-40.63	-21.37	1.71	1.60	16.48
4,800.00	2.25	122.36	4,798.56	22.81	-39.79	-20.91	0.41	-0.08	10.28
4,825.00	2.16	124.54	4,823.54	22.28	-38.99	-20.42	0.49	-0.36	8.72
4,850.00	1.35	129.86	4,848.53	21.83	-38.37	-19.99	3.30	-3.24	21.28
4,875.00	0.18	195.95	4,873.52	21.60	-38.16	-19.77	5.15	-4.68	264.36
4,900.00	0.48	279.19	4,898.52	21.58	-38.27	-19.75	1.97	1.20	332.96
4,925.00	0.52	274.73	4,923.52	21.61	-38.49	-19.76	0.22	0.16	-17.84
4,950.00	0.44	286.90	4,948.52	21.64	-38.69	-19.79	0.52	-0.32	48.68
4,975.00	0.38	266.45	4,973.52	21.67	-38.87	-19.80	0.63	-0.24	-81.80
5,000.00	0.45	276.35	4,998.52	21.67	-39.05	-19.80	0.40	0.28	39.60
5,025.00	0.43	285.49	5,023.52	21.71	-39.23	-19.83	0.29	-0.08	36.56
5,050.00	0.52	284.72	5,048.52	21.76	-39.43	-19.87	0.36	0.36	-3.08
5,075.00	0.55	270.56	5,073.52	21.79	-39.66	-19.89	0.54	0.12	-56.64
5,100.00	0.43	271.09	5,098.52	21.79	-39.88	-19.88	0.48	-0.48	2.12
5,125.00	0.56	290.82	5,123.52	21.84	-40.09	-19.92	0.85	0.52	78.92
5,150.00	0.65	281.04	5,148.51	21.91	-40.34	-19.98	0.55	0.36	-39.12
5,175.00	0.70	281.24	5,173.51	21.97	-40.63	-20.02	0.20	0.20	0.80
5,200.00	0.65	274.54	5,198.51	22.01	-40.92	-20.05	0.37	-0.20	-26.80
5,225.00	0.28	267.94	5,223.51	22.02	-41.12	-20.05	1.49	-1.48	-26.40
5,250.00	0.63	286.47	5,248.51	22.05	-41.32	-20.08	1.50	1.40	74.12
5,275.00	0.67	274.41	5,273.51	22.10	-41.59	-20.11	0.57	0.16	-48.24
5,300.00	0.61	279.16	5,298.51	22.14	-41.87	-20.13	0.32	-0.24	19.00
5,325.00	0.70	285.91	5,323.50	22.20	-42.15	-20.18	0.47	0.36	27.00
5,350.00	0.68	272.19	5,348.50	22.25	-42.44	-20.22	0.66	-0.08	-54.88
5,375.00	0.87	289.03	5,373.50	22.31	-42.77	-20.27	1.18	0.76	67.36
5,400.00	0.73	273.51	5,398.50	22.39	-43.11	-20.32	1.03	-0.56	-62.08
5,425.00	0.58	281.96	5,423.50	22.42	-43.39	-20.35	0.71	-0.60	33.80
5,450.00	0.83	278.02	5,448.49	22.47	-43.69	-20.38	1.02	1.00	-15.76
5,475.00	0.70	260.17	5,473.49	22.47	-44.02	-20.37	1.08	-0.52	-71.40
5,500.00	0.82	288.60	5,498.49	22.50	-44.34	-20.38	1.56	0.48	113.72
5,525.00	1.12	277.29	5,523.49	22.59	-44.76	-20.45	1.42	1.20	-45.24
5,550.00	1.26	275.77	5,548.48	22.65	-45.27	-20.49	0.57	0.56	-6.08
5,575.00	1.43	273.21	5,573.47	22.70	-45.86	-20.50	0.72	0.68	-10.24
5,600.00	2.58	281.64	5,598.46	22.83	-46.72	-20.59	4.74	4.60	33.72
5,625.00	3.40	284.08	5,623.42	23.12	-47.99	-20.83	3.32	3.28	9.76
5,650.00	3.63	283.79	5,648.38	23.49	-49.48	-21.12	0.92	0.92	-1.16
5,675.00	3.63	283.73	5,673.33	23.87	-51.02	-21.43	0.02	0.00	-0.24
5,700.00	3.78	284.04	5,698.27	24.25	-52.58	-21.74	0.61	0.60	1.24

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	3.68	283.65	5,723.22	24.64	-54.16	-22.05	0.41	-0.40	-1.56
5,750.00	3.80	284.42	5,748.17	25.04	-55.74	-22.38	0.52	0.48	3.08
5,775.00	3.74	284.02	5,773.11	25.44	-57.34	-22.70	0.26	-0.24	-1.60
5,800.00	3.76	283.44	5,798.06	25.83	-58.93	-23.02	0.17	0.08	-2.32
5,825.00	3.80	283.45	5,823.01	26.21	-60.53	-23.32	0.16	0.16	0.04
5,850.00	3.64	283.88	5,847.95	26.60	-62.11	-23.63	0.65	-0.64	1.72
5,875.00	3.74	283.11	5,872.90	26.97	-63.67	-23.93	0.45	0.40	-3.08
5,900.00	3.75	285.22	5,897.85	27.37	-65.25	-24.26	0.55	0.04	8.44
5,925.00	3.58	285.71	5,922.80	27.80	-66.79	-24.61	0.69	-0.68	1.96
5,950.00	3.71	285.59	5,947.75	28.23	-68.32	-24.96	0.52	0.52	-0.48
5,975.00	3.94	282.31	5,972.69	28.63	-69.94	-25.29	1.27	0.92	-13.12
6,000.00	3.67	286.18	5,997.64	29.03	-71.55	-25.62	1.49	-1.08	15.48
6,025.00	3.55	286.84	6,022.59	29.48	-73.06	-25.99	0.51	-0.48	2.64
6,050.00	3.69	284.56	6,047.54	29.91	-74.58	-26.35	0.80	0.56	-9.12
6,075.00	3.68	283.34	6,072.48	30.29	-76.14	-26.66	0.32	-0.04	-4.88
6,100.00	3.61	281.67	6,097.43	30.64	-77.69	-26.93	0.51	-0.28	-6.68
6,125.00	3.53	284.88	6,122.39	31.00	-79.20	-27.22	0.86	-0.32	12.84
6,150.00	3.60	285.70	6,147.34	31.41	-80.70	-27.55	0.35	0.28	3.28
6,175.00	3.49	284.29	6,172.29	31.81	-82.20	-27.88	0.56	-0.44	-5.64
6,200.00	3.57	281.90	6,197.24	32.15	-83.69	-28.16	0.67	0.32	-9.56
6,225.00	3.52	284.45	6,222.19	32.51	-85.20	-28.44	0.66	-0.20	10.20
6,250.00	3.63	285.27	6,247.15	32.91	-86.71	-28.77	0.49	0.44	3.28
6,275.00	3.57	286.16	6,272.10	33.33	-88.22	-29.12	0.33	-0.24	3.56
6,300.00	3.56	284.55	6,297.05	33.74	-89.72	-29.46	0.40	-0.04	-6.44
6,325.00	3.58	284.23	6,322.00	34.13	-91.22	-29.78	0.11	0.08	-1.28
6,350.00	3.42	283.60	6,346.95	34.50	-92.71	-30.07	0.66	-0.64	-2.52
6,375.00	3.39	285.31	6,371.91	34.87	-94.14	-30.38	0.42	-0.12	6.84
6,400.00	3.34	284.12	6,396.87	35.24	-95.56	-30.68	0.34	-0.20	-4.76
6,425.00	3.53	281.60	6,421.82	35.57	-97.02	-30.95	0.97	0.76	-10.08
6,450.00	3.36	281.85	6,446.78	35.88	-98.49	-31.18	0.68	-0.68	1.00
6,475.00	3.39	281.59	6,471.73	36.18	-99.93	-31.41	0.13	0.12	-1.04
6,500.00	3.22	282.99	6,496.69	36.48	-101.34	-31.65	0.75	-0.68	5.60
6,525.00	3.23	284.26	6,521.65	36.81	-102.71	-31.92	0.29	0.04	5.08
6,550.00	3.40	277.56	6,546.61	37.09	-104.13	-32.12	1.69	0.68	-26.80
6,575.00	3.21	281.94	6,571.57	37.33	-105.55	-32.30	1.26	-0.76	17.52
6,600.00	3.25	285.54	6,596.53	37.66	-106.91	-32.57	0.83	0.16	14.40
6,625.00	3.20	282.96	6,621.49	38.01	-108.28	-32.85	0.61	-0.20	-10.32
6,650.00	3.15	283.64	6,646.45	38.33	-109.62	-33.10	0.25	-0.20	2.72
6,675.00	3.11	281.70	6,671.41	38.63	-110.96	-33.34	0.45	-0.16	-7.76
6,700.00	3.24	283.44	6,696.37	38.93	-112.31	-33.57	0.65	0.52	6.96
6,725.00	3.16	281.54	6,721.33	39.23	-113.67	-33.81	0.53	-0.32	-7.60
6,750.00	3.16	283.61	6,746.30	39.53	-115.01	-34.05	0.46	0.00	8.28
6,775.00	3.16	279.21	6,771.26	39.80	-116.36	-34.26	0.97	0.00	-17.60
6,800.00	3.17	279.06	6,796.22	40.02	-117.73	-34.41	0.05	0.04	-0.60

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	3.07	282.26	6,821.18	40.27	-119.06	-34.60	0.80	-0.40	12.80
6,850.00	3.11	282.38	6,846.15	40.56	-120.38	-34.82	0.16	0.16	0.48
6,875.00	3.08	281.18	6,871.11	40.84	-121.70	-35.04	0.29	-0.12	-4.80
6,900.00	2.97	282.20	6,896.08	41.10	-122.99	-35.24	0.49	-0.44	4.08
6,925.00	3.05	280.81	6,921.04	41.36	-124.28	-35.44	0.43	0.32	-5.56
6,950.00	3.12	279.16	6,946.01	41.60	-125.60	-35.61	0.45	0.28	-6.60
6,975.00	2.96	280.17	6,970.97	41.82	-126.91	-35.77	0.67	-0.64	4.04
7,000.00	2.98	279.74	6,995.94	42.04	-128.19	-35.94	0.12	0.08	-1.72
7,025.00	2.92	276.72	7,020.90	42.23	-129.46	-36.06	0.67	-0.24	-12.08
7,050.00	2.95	276.76	7,045.87	42.38	-130.73	-36.15	0.12	0.12	0.16
7,075.00	2.91	275.67	7,070.84	42.52	-132.00	-36.23	0.27	-0.16	-4.36
7,100.00	2.72	278.43	7,095.81	42.67	-133.22	-36.32	0.93	-0.76	11.04
7,125.00	2.67	276.96	7,120.78	42.82	-134.39	-36.42	0.34	-0.20	-5.88
7,150.00	2.76	278.31	7,145.75	42.98	-135.56	-36.52	0.44	0.36	5.40
7,175.00	2.84	275.09	7,170.72	43.12	-136.77	-36.61	0.71	0.32	-12.88
7,200.00	2.73	277.77	7,195.69	43.26	-137.98	-36.69	0.68	-0.44	10.72
7,225.00	2.67	276.30	7,220.67	43.40	-139.15	-36.78	0.37	-0.24	-5.88
7,250.00	2.77	276.86	7,245.64	43.54	-140.33	-36.86	0.41	0.40	2.24
7,275.00	2.60	273.18	7,270.61	43.64	-141.49	-36.90	0.97	-0.68	-14.72
7,300.00	2.64	269.02	7,295.58	43.66	-142.63	-36.87	0.78	0.16	-16.64
7,325.00	2.54	269.63	7,320.56	43.65	-143.76	-36.81	0.41	-0.40	2.44
7,350.00	2.49	269.27	7,345.53	43.64	-144.86	-36.74	0.21	-0.20	-1.44
7,375.00	2.41	269.22	7,370.51	43.63	-145.93	-36.68	0.32	-0.32	-0.20
7,400.00	2.50	268.17	7,395.49	43.60	-147.00	-36.60	0.40	0.36	-4.20
7,425.00	2.45	270.98	7,420.46	43.59	-148.08	-36.54	0.52	-0.20	11.24
7,450.00	2.48	267.74	7,445.44	43.58	-149.15	-36.48	0.57	0.12	-12.96
7,475.00	2.80	271.30	7,470.42	43.57	-150.30	-36.42	1.44	1.28	14.24
7,500.00	3.21	270.81	7,495.38	43.60	-151.61	-36.38	1.64	1.64	-1.96
7,525.00	3.18	268.24	7,520.34	43.59	-153.01	-36.30	0.59	-0.12	-10.28
7,550.00	3.17	272.62	7,545.30	43.60	-154.39	-36.25	0.97	-0.04	17.52
7,575.00	3.28	270.49	7,570.26	43.63	-155.80	-36.22	0.65	0.44	-8.52
7,600.00	3.28	270.36	7,595.22	43.65	-157.23	-36.16	0.03	0.00	-0.52
7,625.00	3.25	269.54	7,620.18	43.64	-158.65	-36.09	0.22	-0.12	-3.28
7,650.00	3.38	268.88	7,645.14	43.62	-160.10	-36.01	0.54	0.52	-2.64
7,675.00	3.26	269.06	7,670.10	43.60	-161.54	-35.91	0.48	-0.48	0.72
7,700.00	3.01	268.76	7,695.06	43.57	-162.91	-35.82	1.00	-1.00	-1.20
7,725.00	3.06	268.29	7,720.03	43.54	-164.23	-35.72	0.22	0.20	-1.88
7,750.00	2.96	266.46	7,744.99	43.48	-165.54	-35.60	0.55	-0.40	-7.32
7,775.00	3.03	265.56	7,769.96	43.39	-166.85	-35.45	0.34	0.28	-3.60
7,800.00	3.07	261.54	7,794.92	43.24	-168.17	-35.24	0.87	0.16	-16.08
7,825.00	2.75	263.23	7,819.89	43.07	-169.43	-35.01	1.33	-1.28	6.76
7,850.00	2.66	264.03	7,844.86	42.94	-170.60	-34.82	0.39	-0.36	3.20
7,875.00	2.63	264.29	7,869.84	42.82	-171.75	-34.65	0.13	-0.12	1.04

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	2.37	265.22	7,894.81	42.72	-172.83	-34.50	1.05	-1.04	3.72	
7,925.00	2.18	260.17	7,919.79	42.60	-173.82	-34.33	1.10	-0.76	-20.20	
7,950.00	2.38	259.30	7,944.77	42.42	-174.79	-34.11	0.81	0.80	-3.48	
7,975.00	2.31	259.31	7,969.75	42.23	-175.80	-33.87	0.28	-0.28	0.04	
8,000.00	2.34	258.19	7,994.73	42.03	-176.79	-33.62	0.22	0.12	-4.48	
8,025.00	2.27	255.50	8,019.71	41.80	-177.77	-33.35	0.52	-0.28	-10.76	
8,050.00	2.45	250.94	8,044.69	41.50	-178.76	-33.01	1.04	0.72	-18.24	
8,075.00	2.34	253.30	8,069.67	41.18	-179.75	-32.64	0.59	-0.44	9.44	
8,100.00	2.18	254.13	8,094.65	40.91	-180.70	-32.32	0.65	-0.64	3.32	
8,125.00	2.23	245.50	8,119.63	40.57	-181.60	-31.94	1.34	0.20	-34.52	
8,150.00	2.18	251.14	8,144.61	40.22	-182.49	-31.55	0.89	-0.20	22.56	
8,175.00	2.17	247.11	8,169.59	39.88	-183.38	-31.17	0.61	-0.04	-16.12	
8,200.00	2.07	251.61	8,194.58	39.55	-184.24	-30.80	0.78	-0.40	18.00	
8,225.00	2.07	249.36	8,219.56	39.25	-185.09	-30.46	0.33	0.00	-9.00	
8,250.00	1.79	238.29	8,244.55	38.89	-185.85	-30.06	1.86	-1.12	-44.28	
8,275.00	2.12	248.89	8,269.53	38.52	-186.61	-29.65	1.95	1.32	42.40	
8,300.00	1.95	251.14	8,294.51	38.21	-187.44	-29.31	0.75	-0.68	9.00	
8,325.00	2.00	248.15	8,319.50	37.91	-188.25	-28.97	0.46	0.20	-11.96	
8,350.00	1.89	249.93	8,344.49	37.61	-189.04	-28.63	0.50	-0.44	7.12	
8,375.00	1.84	247.23	8,369.47	37.31	-189.80	-28.30	0.40	-0.20	-10.80	
8,400.00	1.87	251.88	8,394.46	37.03	-190.56	-27.98	0.61	0.12	18.60	
8,425.00	1.85	250.12	8,419.45	36.77	-191.33	-27.68	0.24	-0.08	-7.04	
8,450.00	1.88	244.49	8,444.43	36.45	-192.08	-27.33	0.74	0.12	-22.52	
8,475.00	1.88	244.84	8,469.42	36.10	-192.82	-26.94	0.05	0.00	1.40	
8,500.00	1.91	243.95	8,494.41	35.74	-193.56	-26.55	0.17	0.12	-3.56	
8,525.00	1.99	245.06	8,519.39	35.38	-194.33	-26.15	0.35	0.32	4.44	
8,550.00	1.91	247.63	8,544.38	35.04	-195.11	-25.77	0.47	-0.32	10.28	
8,575.00	1.89	245.23	8,569.36	34.70	-195.87	-25.40	0.33	-0.08	-9.60	
8,600.00	2.09	247.36	8,594.35	34.36	-196.66	-25.02	0.85	0.80	8.52	
8,625.00	1.71	238.78	8,619.33	33.99	-197.40	-24.62	1.89	-1.52	-34.32	
8,650.00	1.92	245.46	8,644.32	33.62	-198.10	-24.22	1.19	0.84	26.72	
8,675.00	1.96	244.94	8,669.31	33.27	-198.87	-23.83	0.17	0.16	-2.08	
8,700.00	1.82	249.61	8,694.29	32.95	-199.63	-23.47	0.83	-0.56	18.68	
8,725.00	1.99	263.38	8,719.28	32.76	-200.43	-23.24	1.95	0.68	55.08	
8,750.00	1.99	260.46	8,744.27	32.64	-201.29	-23.08	0.41	0.00	-11.68	
8,775.00	2.24	258.23	8,769.25	32.46	-202.20	-22.87	1.05	1.00	-8.92	
8,800.00	2.54	275.35	8,794.23	32.42	-203.23	-22.77	3.08	1.20	68.48	
8,825.00	2.96	279.11	8,819.20	32.57	-204.42	-22.87	1.83	1.68	15.04	
8,850.00	3.17	278.97	8,844.16	32.78	-205.74	-23.02	0.84	0.84	-0.56	
8,875.00	3.42	283.17	8,869.12	33.06	-207.15	-23.23	1.39	1.00	16.80	
8,900.00	3.92	287.46	8,894.07	33.48	-208.69	-23.58	2.28	2.00	17.16	
8,925.00	4.19	287.62	8,919.01	34.02	-210.37	-24.03	1.08	1.08	0.64	
8,950.00	4.22	287.18	8,943.94	34.56	-212.12	-24.50	0.18	0.12	-1.76	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	4.28	286.53	8,968.87	35.10	-213.90	-24.95	0.31	0.24	-2.60	
9,000.00	4.24	286.06	8,993.80	35.62	-215.68	-25.39	0.21	-0.16	-1.88	
9,025.00	4.30	287.27	9,018.73	36.16	-217.46	-25.83	0.43	0.24	4.84	
9,050.00	4.19	287.06	9,043.66	36.70	-219.23	-26.30	0.44	-0.44	-0.84	
9,075.00	4.20	285.48	9,068.60	37.22	-220.99	-26.73	0.46	0.04	-6.32	
9,100.00	4.25	284.63	9,093.53	37.69	-222.76	-27.12	0.32	0.20	-3.40	
9,125.00	4.04	284.02	9,118.46	38.14	-224.52	-27.48	0.86	-0.84	-2.44	
9,150.00	3.87	285.88	9,143.40	38.59	-226.18	-27.85	0.85	-0.68	7.44	
9,175.00	3.70	285.78	9,168.35	39.04	-227.77	-28.22	0.68	-0.68	-0.40	
9,200.00	3.59	284.92	9,193.30	39.46	-229.30	-28.57	0.49	-0.44	-3.44	
9,225.00	3.62	281.18	9,218.25	39.81	-230.83	-28.85	0.95	0.12	-14.96	
9,250.00	3.42	282.49	9,243.20	40.13	-232.33	-29.10	0.86	-0.80	5.24	
9,275.00	3.29	281.74	9,268.16	40.43	-233.76	-29.33	0.55	-0.52	-3.00	
9,300.00	3.10	282.30	9,293.12	40.72	-235.13	-29.56	0.77	-0.76	2.24	
9,325.00	2.89	282.08	9,318.09	41.00	-236.40	-29.77	0.84	-0.84	-0.88	
9,350.00	2.99	275.48	9,343.05	41.19	-237.67	-29.91	1.41	0.40	-26.40	
9,375.00	3.03	286.66	9,368.02	41.44	-238.95	-30.10	2.35	0.16	44.72	
9,400.00	3.03	292.78	9,392.98	41.89	-240.19	-30.49	1.29	0.00	24.48	
9,425.00	2.98	291.62	9,417.95	42.38	-241.41	-30.92	0.31	-0.20	-4.64	
9,450.00	2.92	294.23	9,442.92	42.89	-242.59	-31.37	0.59	-0.24	10.44	
9,475.00	2.80	291.96	9,467.89	43.38	-243.74	-31.80	0.66	-0.48	-9.08	
9,500.00	2.67	296.13	9,492.86	43.86	-244.83	-32.24	0.95	-0.52	16.68	
9,525.00	2.62	297.86	9,517.83	44.38	-245.86	-32.71	0.38	-0.20	6.92	
9,550.00	2.40	299.39	9,542.81	44.91	-246.82	-33.19	0.92	-0.88	6.12	
9,575.00	2.26	296.70	9,567.79	45.39	-247.71	-33.62	0.71	-0.56	-10.76	
9,600.00	2.13	301.25	9,592.77	45.85	-248.55	-34.05	0.87	-0.52	18.20	
9,625.00	2.08	300.97	9,617.75	46.32	-249.34	-34.48	0.20	-0.20	-1.12	
9,650.00	2.13	301.50	9,642.73	46.80	-250.12	-34.92	0.21	0.20	2.12	
9,675.00	2.16	303.80	9,667.72	47.30	-250.91	-35.39	0.36	0.12	9.20	
9,700.00	2.10	299.85	9,692.70	47.79	-251.70	-35.84	0.63	-0.24	-15.80	
9,725.00	2.09	297.91	9,717.68	48.24	-252.50	-36.24	0.29	-0.04	-7.76	
9,750.00	2.03	300.71	9,742.67	48.67	-253.28	-36.64	0.47	-0.24	11.20	
9,775.00	1.86	300.96	9,767.65	49.11	-254.01	-37.04	0.68	-0.68	1.00	
9,800.00	1.80	296.73	9,792.64	49.49	-254.71	-37.40	0.59	-0.24	-16.92	
9,825.00	1.75	294.71	9,817.63	49.83	-255.41	-37.70	0.32	-0.20	-8.08	
9,850.00	1.66	296.95	9,842.62	50.15	-256.08	-37.99	0.45	-0.36	8.96	
9,875.00	1.66	294.13	9,867.61	50.47	-256.73	-38.27	0.33	0.00	-11.28	
9,900.00	1.66	294.66	9,892.60	50.77	-257.39	-38.54	0.06	0.00	2.12	
9,925.00	1.72	294.02	9,917.58	51.07	-258.06	-38.81	0.25	0.24	-2.56	
9,950.00	1.50	283.32	9,942.57	51.30	-258.72	-39.01	1.49	-0.88	-42.80	
9,975.00	1.48	278.39	9,967.57	51.42	-259.36	-39.10	0.52	-0.08	-19.72	
10,000.00	1.42	267.46	9,992.56	51.45	-259.99	-39.10	1.13	-0.24	-43.72	
10,025.00	1.27	261.74	10,017.55	51.40	-260.57	-39.02	0.80	-0.60	-22.88	
10,050.00	1.23	252.43	10,042.55	51.28	-261.10	-38.88	0.83	-0.16	-37.24	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	1.23	240.57	10,067.54	51.07	-261.59	-38.64	1.02	0.00	-47.44
10,100.00	1.32	225.94	10,092.53	50.73	-262.03	-38.29	1.35	0.36	-58.52
10,125.00	1.39	221.86	10,117.53	50.31	-262.44	-37.84	0.48	0.28	-16.32
10,150.00	1.42	224.47	10,142.52	49.86	-262.86	-37.38	0.28	0.12	10.44
10,175.00	1.37	222.69	10,167.51	49.42	-263.28	-36.92	0.26	-0.20	-7.12
10,200.00	1.57	222.78	10,192.50	48.95	-263.72	-36.43	0.80	0.80	0.36
10,225.00	1.51	227.92	10,217.49	48.48	-264.19	-35.93	0.60	-0.24	20.56
10,250.00	1.44	236.37	10,242.49	48.08	-264.70	-35.51	0.91	-0.28	33.80
10,275.00	1.46	249.49	10,267.48	47.80	-265.26	-35.20	1.33	0.08	52.48
10,300.00	1.66	264.65	10,292.47	47.65	-265.92	-35.03	1.83	0.80	60.64
10,325.00	2.01	276.99	10,317.46	47.67	-266.71	-35.01	2.10	1.40	49.36
10,350.00	2.20	285.08	10,342.44	47.85	-267.61	-35.14	1.41	0.76	32.36
10,375.00	2.25	291.58	10,367.42	48.15	-268.53	-35.40	1.03	0.20	26.00
10,400.00	2.34	290.15	10,392.40	48.51	-269.47	-35.72	0.43	0.36	-5.72
10,425.00	2.28	292.64	10,417.38	48.88	-270.41	-36.04	0.47	-0.24	9.96
10,450.00	2.22	292.02	10,442.36	49.25	-271.31	-36.37	0.26	-0.24	-2.48
10,475.00	2.30	292.82	10,467.34	49.63	-272.22	-36.70	0.34	0.32	3.20
10,500.00	2.49	297.51	10,492.32	50.07	-273.17	-37.10	1.09	0.76	18.76
10,525.00	2.57	295.31	10,517.30	50.56	-274.16	-37.54	0.50	0.32	-8.80
10,550.00	2.63	297.16	10,542.27	51.06	-275.17	-38.00	0.41	0.24	7.40
10,575.00	2.65	294.02	10,567.24	51.56	-276.21	-38.44	0.58	0.08	-12.56
10,600.00	2.84	302.75	10,592.21	52.13	-277.26	-38.96	1.83	0.76	34.92
10,625.00	3.07	304.58	10,617.18	52.85	-278.33	-39.63	0.99	0.92	7.32
10,650.00	3.24	304.65	10,642.14	53.63	-279.47	-40.36	0.68	0.68	0.28
10,675.00	3.25	303.81	10,667.10	54.42	-280.64	-41.10	0.19	0.04	-3.36
10,700.00	3.78	308.06	10,692.06	55.33	-281.87	-41.94	2.36	2.12	17.00
10,725.00	4.15	307.36	10,717.00	56.38	-283.24	-42.93	1.49	1.48	-2.80
10,750.00	4.25	307.82	10,741.93	57.50	-284.69	-43.98	0.42	0.40	1.84
10,775.00	4.26	308.08	10,766.86	58.64	-286.15	-45.05	0.09	0.04	1.04
10,800.00	4.14	311.64	10,791.79	59.81	-287.56	-46.15	1.15	-0.48	14.24
10,825.00	4.10	312.40	10,816.73	61.02	-288.89	-47.29	0.27	-0.16	3.04
10,850.00	4.05	313.32	10,841.67	62.22	-290.20	-48.43	0.33	-0.20	3.68
10,875.00	3.84	316.12	10,866.61	63.43	-291.42	-49.58	1.14	-0.84	11.20
10,900.00	3.69	319.08	10,891.55	64.65	-292.53	-50.74	0.98	-0.60	11.84
10,925.00	3.62	321.03	10,916.50	65.87	-293.55	-51.91	0.57	-0.28	7.80
10,950.00	3.41	326.07	10,941.45	67.10	-294.46	-53.10	1.49	-0.84	20.16
10,975.00	3.37	325.72	10,966.41	68.32	-295.29	-54.28	0.18	-0.16	-1.40
11,000.00	3.24	328.45	10,991.37	69.53	-296.07	-55.45	0.82	-0.52	10.92
11,025.00	3.29	331.34	11,016.33	70.76	-296.79	-56.65	0.69	0.20	11.56
11,050.00	3.24	337.93	11,041.29	72.05	-297.40	-57.90	1.51	-0.20	26.36
11,075.00	3.33	337.80	11,066.25	73.37	-297.94	-59.20	0.36	0.36	-0.52
11,100.00	3.39	338.90	11,091.20	74.73	-298.48	-60.54	0.35	0.24	4.40
11,125.00	3.83	341.42	11,116.15	76.22	-299.01	-61.99	1.87	1.76	10.08

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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	3.43	338.21	11,141.10	77.70	-299.55	-63.45	1.79	-1.60	-12.84
11,175.00	3.91	335.91	11,166.05	79.17	-300.18	-64.89	2.01	1.92	-9.20
11,200.00	4.02	336.73	11,190.99	80.76	-300.87	-66.44	0.50	0.44	3.28
11,225.00	4.43	337.46	11,215.92	82.45	-301.59	-68.10	1.65	1.64	2.92
11,250.00	4.60	334.08	11,240.85	84.25	-302.40	-69.86	1.26	0.68	-13.52
11,275.00	4.68	330.75	11,265.77	86.04	-303.33	-71.60	1.12	0.32	-13.32
11,300.00	4.50	326.03	11,290.69	87.74	-304.38	-73.25	1.67	-0.72	-18.88
11,325.00	4.43	322.19	11,315.61	89.32	-305.52	-74.77	1.23	-0.28	-15.36
11,350.00	4.34	321.69	11,340.54	90.82	-306.70	-76.22	0.39	-0.36	-2.00
11,375.00	4.27	320.88	11,365.47	92.29	-307.87	-77.63	0.37	-0.28	-3.24
11,400.00	4.32	320.11	11,390.40	93.73	-309.06	-79.02	0.31	0.20	-3.08
11,425.00	4.48	312.66	11,415.32	95.12	-310.38	-80.34	2.37	0.64	-29.80
11,450.00	4.25	318.28	11,440.25	96.47	-311.72	-81.62	1.94	-0.92	22.48
11,475.00	4.10	320.26	11,465.18	97.85	-312.91	-82.94	0.83	-0.60	7.92
11,500.00	4.19	320.48	11,490.12	99.24	-314.06	-84.28	0.37	0.36	0.88
11,525.00	4.17	320.42	11,515.05	100.65	-315.22	-85.63	0.08	-0.08	-0.24
11,550.00	3.90	320.34	11,539.99	102.00	-316.34	-86.93	1.08	-1.08	-0.32
11,575.00	3.83	318.39	11,564.93	103.28	-317.44	-88.15	0.60	-0.28	-7.80
11,600.00	3.77	318.81	11,589.88	104.52	-318.53	-89.34	0.26	-0.24	1.68
11,625.00	3.45	319.96	11,614.83	105.72	-319.56	-90.49	1.31	-1.28	4.60
11,650.00	3.43	322.31	11,639.78	106.88	-320.50	-91.61	0.57	-0.08	9.40
11,675.00	3.51	324.02	11,664.74	108.10	-321.41	-92.78	0.52	0.32	6.84
11,700.00	3.28	324.48	11,689.69	109.30	-322.27	-93.94	0.93	-0.92	1.84
11,725.00	3.12	321.51	11,714.65	110.41	-323.11	-95.01	0.92	-0.64	-11.88
11,729.32	3.09	320.90	11,718.97	110.59	-323.26	-95.19	1.03	-0.69	-14.12
11,772.00	3.21	312.83	11,761.58	112.30	-324.86	-96.81	1.08	0.28	-18.91
First Gordon MWD Survey									
11,854.00	3.19	314.35	11,843.46	115.45	-328.18	-99.81	0.11	-0.02	1.85
11,917.00	3.05	314.62	11,906.36	117.86	-330.62	-102.09	0.22	-0.22	0.43
12,012.00	1.18	351.45	12,001.30	120.60	-332.57	-104.74	2.34	-1.97	38.77
12,059.00	4.25	157.67	12,048.26	119.47	-331.98	-103.64	11.50	6.53	353.66
12,106.00	10.93	168.32	12,094.83	113.48	-330.41	-97.74	14.46	14.21	22.66
12,133.00	12.93	174.70	12,121.24	107.97	-329.61	-92.27	8.85	7.39	23.63
FTP: 12133' MD									
12,154.00	14.56	178.44	12,141.64	102.99	-329.32	-87.31	8.85	7.78	17.80
12,201.00	16.47	177.72	12,186.93	90.43	-328.90	-74.78	4.08	4.06	-1.53
12,249.00	23.91	185.59	12,231.95	73.92	-329.58	-58.26	16.47	15.50	16.40
12,296.00	27.75	187.09	12,274.25	53.58	-331.86	-37.83	8.29	8.17	3.19
12,344.00	27.05	184.93	12,316.87	31.61	-334.17	-15.78	2.53	-1.46	-4.50
12,390.00	28.03	188.90	12,357.66	10.51	-336.74	5.42	4.52	2.13	8.63
12,438.00	28.23	190.26	12,399.99	-11.80	-340.51	27.89	1.40	0.42	2.83
12,485.00	35.39	187.18	12,439.90	-36.28	-344.20	52.51	15.62	15.23	-6.55
12,517.00	40.66	186.93	12,465.10	-55.83	-346.61	72.16	16.48	16.47	-0.78
12,548.00	47.15	185.95	12,487.43	-77.18	-349.01	93.60	21.05	20.94	-3.16

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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)
12,580.00	52.62	186.59	12,508.04	-101.50	-351.69	118.01	17.16	17.09	2.00
12,611.00	59.09	185.49	12,525.43	-127.00	-354.38	143.61	21.08	20.87	-3.55
12,642.00	64.99	183.88	12,539.96	-154.28	-356.60	170.97	19.58	19.03	-5.19
12,674.00	70.35	185.29	12,552.11	-183.77	-358.98	200.54	17.24	16.75	4.41
12,706.00	76.22	186.22	12,561.31	-214.25	-362.05	231.13	18.55	18.34	2.91
12,737.00	82.80	185.22	12,566.95	-244.56	-365.09	261.55	21.46	21.23	-3.23
12,768.00	88.23	184.22	12,569.38	-275.35	-367.63	292.43	17.81	17.52	-3.23
12,862.00	94.45	182.16	12,567.18	-369.13	-372.86	386.35	6.97	6.62	-2.19
12,957.00	96.86	181.25	12,557.82	-463.62	-375.67	480.86	2.71	2.54	-0.96
13,053.00	97.77	180.60	12,545.59	-558.82	-377.21	576.03	1.16	0.95	-0.68
13,147.00	95.86	181.05	12,534.44	-652.14	-378.55	669.31	2.09	-2.03	0.48
13,242.00	94.41	180.29	12,525.94	-746.75	-379.66	763.87	1.72	-1.53	-0.80
13,337.00	94.01	180.26	12,518.96	-841.50	-380.11	858.53	0.42	-0.42	-0.03
13,431.00	90.75	179.53	12,515.06	-935.40	-379.94	952.32	3.55	-3.47	-0.78
13,526.00	91.31	178.09	12,513.35	-1,030.36	-377.97	1,047.08	1.63	0.59	-1.52
13,621.00	91.90	181.67	12,510.69	-1,125.31	-377.77	1,141.91	3.82	0.62	3.77
13,715.00	91.91	180.92	12,507.57	-1,219.23	-379.89	1,235.83	0.80	0.01	-0.80
13,810.00	92.93	180.98	12,503.56	-1,314.13	-381.46	1,330.70	1.08	1.07	0.06
13,905.00	90.41	180.97	12,500.79	-1,409.07	-383.08	1,425.61	2.65	-2.65	-0.01
13,999.00	89.73	180.83	12,500.67	-1,503.06	-384.56	1,519.56	0.74	-0.72	-0.15
14,094.00	89.35	179.33	12,501.44	-1,598.05	-384.69	1,614.45	1.63	-0.40	-1.58
14,189.00	89.72	180.89	12,502.21	-1,693.05	-384.87	1,709.35	1.69	0.39	1.64
14,284.00	89.22	180.75	12,503.08	-1,788.03	-386.23	1,804.29	0.55	-0.53	-0.15
14,379.00	88.38	181.89	12,505.07	-1,882.98	-388.42	1,899.24	1.49	-0.88	1.20
14,473.00	87.74	181.10	12,508.26	-1,976.90	-390.87	1,993.17	1.08	-0.68	-0.84
14,568.00	87.27	181.58	12,512.39	-2,071.78	-393.09	2,088.05	0.71	-0.49	0.51
14,663.00	87.17	179.19	12,517.00	-2,166.66	-393.73	2,182.85	2.52	-0.11	-2.52
14,757.00	88.65	178.68	12,520.43	-2,260.58	-391.98	2,276.58	1.67	1.57	-0.54
14,852.00	87.81	179.20	12,523.36	-2,355.52	-390.22	2,371.33	1.04	-0.88	0.55
14,946.00	88.41	178.63	12,526.46	-2,449.45	-388.45	2,465.07	0.88	0.64	-0.61
15,041.00	89.81	180.44	12,527.94	-2,544.43	-387.68	2,559.91	2.41	1.47	1.91
15,136.00	93.13	180.27	12,525.50	-2,639.38	-388.26	2,654.78	3.50	3.49	-0.18
15,232.00	91.56	179.55	12,521.57	-2,735.30	-388.11	2,750.59	1.80	-1.64	-0.75
15,326.00	88.47	178.31	12,521.55	-2,829.27	-386.36	2,844.37	3.54	-3.29	-1.32
15,421.00	88.09	177.81	12,524.40	-2,924.17	-383.14	2,939.01	0.66	-0.40	-0.53
15,515.00	88.54	178.99	12,527.16	-3,018.09	-380.52	3,032.70	1.34	0.48	1.26
15,609.00	88.64	178.82	12,529.48	-3,112.04	-378.72	3,126.47	0.21	0.11	-0.18
15,703.00	87.81	177.58	12,532.39	-3,205.95	-375.77	3,220.13	1.59	-0.88	-1.32
15,799.00	88.19	176.77	12,535.74	-3,301.77	-371.04	3,315.62	0.93	0.40	-0.84
15,893.00	87.34	175.93	12,539.41	-3,395.51	-365.07	3,408.97	1.27	-0.90	-0.89
15,988.00	89.30	177.36	12,542.19	-3,490.30	-359.51	3,503.39	2.55	2.06	1.51
16,084.00	90.15	178.95	12,542.65	-3,586.24	-356.42	3,599.08	1.88	0.89	1.66
16,178.00	90.27	179.23	12,542.31	-3,680.23	-354.93	3,692.90	0.32	0.13	0.30

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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)
16,273.00	90.85	179.12	12,541.38	-3,775.22	-353.56	3,787.71	0.62	0.61	-0.12
16,367.00	90.99	179.39	12,539.87	-3,869.20	-352.34	3,881.53	0.32	0.15	0.29
16,462.00	89.54	179.52	12,539.43	-3,964.19	-351.43	3,976.37	1.53	-1.53	0.14
16,557.00	89.69	179.49	12,540.07	-4,059.18	-350.61	4,071.22	0.16	0.16	-0.03
16,652.00	90.09	179.49	12,540.25	-4,154.18	-349.77	4,166.07	0.42	0.42	0.00
16,747.00	89.23	178.86	12,540.81	-4,249.17	-348.40	4,260.89	1.12	-0.91	-0.66
16,841.00	87.66	178.12	12,543.37	-4,343.09	-345.92	4,354.59	1.85	-1.67	-0.79
16,935.00	89.41	177.82	12,545.77	-4,437.00	-342.59	4,448.24	1.89	1.86	-0.32
17,030.00	90.52	178.24	12,545.83	-4,531.94	-339.33	4,542.92	1.25	1.17	0.44
17,124.00	92.10	177.79	12,543.68	-4,625.86	-336.07	4,636.58	1.75	1.68	-0.48
17,218.00	92.90	181.34	12,539.58	-4,719.75	-335.36	4,730.33	3.87	0.85	3.78
17,313.00	92.70	181.59	12,534.94	-4,814.61	-337.79	4,825.19	0.34	-0.21	0.26
17,407.00	89.68	179.60	12,532.98	-4,908.57	-338.76	4,919.09	3.85	-3.21	-2.12
17,502.00	87.88	178.84	12,535.01	-5,003.53	-337.47	5,013.89	2.06	-1.89	-0.80
17,597.00	90.73	179.65	12,536.16	-5,098.50	-336.22	5,108.70	3.12	3.00	0.85
17,691.00	90.21	178.98	12,535.39	-5,192.49	-335.09	5,202.53	0.90	-0.55	-0.71
17,786.00	90.84	180.22	12,534.52	-5,287.49	-334.43	5,297.38	1.46	0.66	1.31
17,881.00	90.57	181.14	12,533.35	-5,382.47	-335.56	5,392.32	1.01	-0.28	0.97
17,975.00	91.14	182.10	12,531.94	-5,476.42	-338.21	5,486.29	1.19	0.61	1.02
18,070.00	91.40	182.05	12,529.84	-5,571.34	-341.65	5,581.26	0.28	0.27	-0.05
18,166.00	91.16	181.55	12,527.69	-5,667.26	-344.67	5,677.22	0.58	-0.25	-0.52
18,261.00	90.12	180.66	12,526.63	-5,762.24	-346.50	5,772.18	1.44	-1.09	-0.94
18,356.00	91.74	181.47	12,525.09	-5,857.20	-348.26	5,867.12	1.91	1.71	0.85
18,451.00	91.99	181.47	12,522.00	-5,952.12	-350.70	5,962.05	0.26	0.26	0.00
18,545.00	92.47	180.93	12,518.34	-6,046.03	-352.67	6,055.94	0.77	0.51	-0.57
18,640.00	92.40	180.74	12,514.31	-6,140.93	-354.05	6,150.81	0.21	-0.07	-0.20
18,735.00	88.81	177.46	12,513.30	-6,235.89	-352.56	6,245.58	5.12	-3.78	-3.45
18,829.00	91.00	178.28	12,513.46	-6,329.82	-349.06	6,339.24	2.49	2.33	0.87
18,923.00	89.70	176.58	12,512.88	-6,423.72	-344.85	6,432.84	2.28	-1.38	-1.81
19,017.00	91.05	173.49	12,512.27	-6,517.35	-336.72	6,525.98	3.59	1.44	-3.29
19,113.00	89.67	172.40	12,511.67	-6,612.62	-324.93	6,620.58	1.83	-1.44	-1.14
19,208.00	93.83	179.11	12,508.76	-6,707.24	-317.90	6,714.76	8.31	4.38	7.06
19,303.00	94.33	181.19	12,502.00	-6,801.99	-318.14	6,809.42	2.25	0.53	2.19
19,398.00	92.19	179.95	12,496.60	-6,896.82	-319.09	6,904.20	2.60	-2.25	-1.31
19,493.00	91.42	185.36	12,493.61	-6,991.64	-323.48	6,999.11	5.75	-0.81	5.69
19,586.00	92.83	186.34	12,490.16	-7,084.09	-332.96	7,091.91	1.85	1.52	1.05
19,682.00	91.39	184.47	12,486.62	-7,179.59	-341.99	7,187.73	2.46	-1.50	-1.95
19,776.00	90.11	182.85	12,485.39	-7,273.38	-347.99	7,281.70	2.20	-1.36	-1.72
19,871.00	92.71	184.50	12,483.05	-7,368.15	-354.08	7,376.65	3.24	2.74	1.74
19,966.00	88.91	180.99	12,481.71	-7,463.00	-358.62	7,471.61	5.44	-4.00	-3.69
20,060.00	89.70	181.93	12,482.85	-7,556.96	-361.02	7,565.58	1.31	0.84	1.00
20,109.00	89.97	182.06	12,482.99	-7,605.93	-362.69	7,614.57	0.61	0.55	0.27
Final Gordon MWD Survey									

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Valor Federal Com
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3353.60usft (McVay 8)
Site:	Valor Federal Com	MD Reference:	RKB @ 3353.60usft (McVay 8)
Well:	704H	North Reference:	Grid
Wellbore:	OH / 66416	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)
20,119.00	89.97	182.06	12,483.00	-7,615.92	-363.08	7,624.57	0.00	0.00	0.00
LTP: 20119' MD									
20,167.00	89.97	182.06	12,483.02	-7,663.89	-364.78	7,672.57	0.00	0.00	0.00
Projection to TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,772.00	11,761.58	112.30	-324.86	First Gordon MWD Survey
12,133.00	12,121.24	107.97	-329.61	FTP: 12133' MD
20,109.00	12,482.99	-7,605.93	-362.69	Final Gordon MWD Survey
20,119.00	12,483.00	-7,615.92	-363.08	LTP: 20119' MD
20,167.00	12,483.02	-7,663.89	-364.78	Projection to TD

Checked By: _____ Approved By: _____ Date: _____