

COG Operating LLC

Lea County, NM (NAD 27 NME)

Stove Pipe Federal Com

#707H

OH

Design: OH

Standard Survey Report

08 April, 2020

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

Project	Lea County, NM (NAD 27 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		Stove Pipe Federal Com			
Site Position:		Northing:	425,816.30 usft	Latitude:	32° 10' 2.432 N
From:	Map	Easting:	784,611.50 usft	Longitude:	103° 24' 48.812 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.49 °

Well	#707H					
Well Position	+N/-S	0.00 usft	Northing:	425,816.30 usft	Latitude:	32° 10' 2.432 N
	+E/-W	0.00 usft	Easting:	784,611.50 usft	Longitude:	103° 24' 48.812 W
Position Uncertainty		3.00 usft	Wellhead Elevation:	usft	Ground Level:	3,348.50 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/31/2019	6.55	59.77	47,785.10000000

Design	OH				
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	179.58	

Survey Program	Date	4/8/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	12,291.00	Survey #3 (OH)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
11,808.00	23,115.00	Survey #5 (OH)	Superior QC	OWSG MWD + IFR1 + FDIR Correction	
23,172.00	23,172.00	Projection (OH)	Project	Projection	

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	0.33	271.04	100.00	0.01	-0.29	-0.01	0.33	0.33	0.00	
125.00	0.44	284.70	125.00	0.03	-0.45	-0.03	0.57	0.44	54.64	
150.00	0.55	286.46	150.00	0.09	-0.66	-0.09	0.44	0.44	7.04	
175.00	0.69	297.87	175.00	0.19	-0.91	-0.20	0.74	0.56	45.64	
200.00	0.76	296.50	199.99	0.34	-1.19	-0.35	0.29	0.28	-5.48	
225.00	0.79	298.04	224.99	0.49	-1.49	-0.50	0.15	0.12	6.16	

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Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
250.00	0.80	297.10	249.99	0.65	-1.80	-0.67	0.07	0.04	-3.76	
275.00	0.80	297.58	274.99	0.81	-2.11	-0.83	0.03	0.00	1.92	
300.00	0.85	302.38	299.98	0.99	-2.42	-1.01	0.34	0.20	19.20	
325.00	0.81	299.69	324.98	1.18	-2.73	-1.20	0.22	-0.16	-10.76	
350.00	0.85	296.99	349.98	1.35	-3.05	-1.37	0.22	0.16	-10.80	
375.00	0.79	292.68	374.98	1.50	-3.37	-1.53	0.34	-0.24	-17.24	
400.00	0.64	286.16	399.98	1.61	-3.67	-1.64	0.68	-0.60	-26.08	
425.00	0.42	247.44	424.97	1.61	-3.88	-1.64	1.63	-0.88	-154.88	
450.00	0.54	184.11	449.97	1.46	-3.98	-1.49	2.06	0.48	-253.32	
475.00	0.77	163.93	474.97	1.18	-3.94	-1.21	1.29	0.92	-80.72	
500.00	0.94	155.41	499.97	0.83	-3.81	-0.86	0.85	0.68	-34.08	
525.00	1.00	151.89	524.97	0.45	-3.62	-0.48	0.34	0.24	-14.08	
550.00	0.99	147.55	549.96	0.08	-3.40	-0.10	0.30	-0.04	-17.36	
575.00	0.99	142.30	574.96	-0.27	-3.15	0.25	0.36	0.00	-21.00	
600.00	1.04	133.88	599.95	-0.60	-2.86	0.58	0.63	0.20	-33.68	
625.00	1.03	121.89	624.95	-0.88	-2.50	0.86	0.87	-0.04	-47.96	
650.00	1.03	119.62	649.95	-1.11	-2.12	1.09	0.16	0.00	-9.08	
675.00	1.01	121.17	674.94	-1.33	-1.73	1.32	0.14	-0.08	6.20	
700.00	0.96	121.99	699.94	-1.56	-1.37	1.55	0.21	-0.20	3.28	
725.00	0.94	121.49	724.93	-1.78	-1.01	1.77	0.09	-0.08	-2.00	
750.00	0.90	116.05	749.93	-1.97	-0.66	1.96	0.38	-0.16	-21.76	
775.00	0.93	112.41	774.93	-2.13	-0.30	2.13	0.26	0.12	-14.56	
800.00	1.01	114.70	799.92	-2.30	0.09	2.30	0.36	0.32	9.16	
825.00	1.07	117.34	824.92	-2.50	0.50	2.51	0.31	0.24	10.56	
850.00	1.03	119.58	849.92	-2.72	0.90	2.73	0.23	-0.16	8.96	
875.00	0.88	124.25	874.91	-2.94	1.25	2.95	0.68	-0.60	18.68	
900.00	0.68	119.57	899.91	-3.12	1.54	3.13	0.84	-0.80	-18.72	
925.00	0.63	121.08	924.91	-3.26	1.79	3.28	0.21	-0.20	6.04	
950.00	0.64	116.36	949.91	-3.40	2.03	3.41	0.21	0.04	-18.88	
975.00	0.58	106.04	974.91	-3.49	2.28	3.51	0.50	-0.24	-41.28	
1,000.00	0.64	108.40	999.90	-3.57	2.53	3.59	0.26	0.24	9.44	
1,025.00	0.67	111.76	1,024.90	-3.67	2.80	3.69	0.19	0.12	13.44	
1,050.00	0.72	98.54	1,049.90	-3.75	3.09	3.77	0.67	0.20	-52.88	
1,075.00	0.71	102.78	1,074.90	-3.81	3.40	3.83	0.22	-0.04	16.96	
1,100.00	0.89	102.87	1,099.90	-3.88	3.74	3.91	0.72	0.72	0.36	
1,125.00	0.95	103.75	1,124.89	-3.98	4.13	4.01	0.25	0.24	3.52	
1,150.00	0.97	100.36	1,149.89	-4.06	4.54	4.10	0.24	0.08	-13.56	
1,175.00	0.90	92.07	1,174.89	-4.11	4.94	4.15	0.61	-0.28	-33.16	
1,200.00	0.95	95.01	1,199.88	-4.13	5.34	4.17	0.28	0.20	11.76	
1,225.00	1.08	105.13	1,224.88	-4.21	5.78	4.26	0.88	0.52	40.48	
1,250.00	1.14	109.94	1,249.87	-4.36	6.24	4.41	0.44	0.24	19.24	
1,275.00	1.20	108.02	1,274.87	-4.53	6.72	4.58	0.29	0.24	-7.68	

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Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)
1,300.00	1.21	113.60	1,299.86	-4.71	7.21	4.77	0.47	0.04	22.32
1,325.00	1.19	113.12	1,324.86	-4.92	7.69	4.98	0.09	-0.08	-1.92
1,350.00	1.11	115.82	1,349.85	-5.13	8.15	5.19	0.39	-0.32	10.80
1,375.00	1.08	116.24	1,374.85	-5.34	8.58	5.40	0.12	-0.12	1.68
1,400.00	1.06	110.26	1,399.84	-5.52	9.01	5.59	0.45	-0.08	-23.92
1,425.00	1.12	110.09	1,424.84	-5.69	9.45	5.75	0.24	0.24	-0.68
1,450.00	1.17	114.89	1,449.84	-5.88	9.92	5.95	0.43	0.20	19.20
1,475.00	1.20	128.52	1,474.83	-6.15	10.35	6.22	1.13	0.12	54.52
1,500.00	1.90	163.09	1,499.82	-6.71	10.68	6.78	4.55	2.80	138.28
1,525.00	2.25	173.12	1,524.80	-7.59	10.86	7.67	2.01	1.40	40.12
1,550.00	2.38	173.41	1,549.78	-8.59	10.97	8.67	0.52	0.52	1.16
1,575.00	2.46	172.86	1,574.76	-9.64	11.10	9.72	0.33	0.32	-2.20
1,600.00	2.54	172.24	1,599.74	-10.72	11.24	10.80	0.34	0.32	-2.48
1,625.00	2.62	172.74	1,624.71	-11.84	11.39	11.92	0.33	0.32	2.00
1,650.00	2.66	174.29	1,649.69	-12.98	11.52	13.07	0.33	0.16	6.20
1,675.00	2.59	176.92	1,674.66	-14.12	11.61	14.21	0.56	-0.28	10.52
1,700.00	2.49	174.91	1,699.64	-15.23	11.69	15.31	0.54	-0.40	-8.04
1,725.00	2.49	173.03	1,724.61	-16.31	11.80	16.39	0.33	0.00	-7.52
1,750.00	2.52	171.92	1,749.59	-17.39	11.94	17.48	0.23	0.12	-4.44
1,775.00	2.59	172.12	1,774.56	-18.50	12.10	18.58	0.28	0.28	0.80
1,800.00	2.75	172.76	1,799.54	-19.65	12.25	19.74	0.65	0.64	2.56
1,825.00	2.68	175.33	1,824.51	-20.83	12.37	20.92	0.56	-0.28	10.28
1,850.00	2.60	177.27	1,849.48	-21.98	12.45	22.07	0.48	-0.32	7.76
1,875.00	2.49	173.35	1,874.46	-23.08	12.54	23.17	0.82	-0.44	-15.68
1,900.00	2.35	167.52	1,899.43	-24.12	12.71	24.21	1.13	-0.56	-23.32
1,925.00	2.44	164.98	1,924.41	-25.14	12.96	25.23	0.56	0.36	-10.16
1,950.00	2.45	164.94	1,949.39	-26.17	13.24	26.26	0.04	0.04	-0.16
1,975.00	2.47	165.81	1,974.37	-27.20	13.51	27.30	0.17	0.08	3.48
2,000.00	2.45	167.28	1,999.34	-28.25	13.76	28.35	0.26	-0.08	5.88
2,025.00	2.34	163.55	2,024.32	-29.26	14.02	29.36	0.76	-0.44	-14.92
2,050.00	2.37	160.52	2,049.30	-30.24	14.34	30.34	0.51	0.12	-12.12
2,075.00	2.44	158.50	2,074.28	-31.22	14.70	31.33	0.44	0.28	-8.08
2,100.00	2.52	159.46	2,099.26	-32.23	15.09	32.34	0.36	0.32	3.84
2,125.00	2.68	160.48	2,124.23	-33.29	15.48	33.41	0.67	0.64	4.08
2,150.00	2.58	162.13	2,149.20	-34.38	15.85	34.50	0.50	-0.40	6.60
2,175.00	2.41	162.92	2,174.18	-35.42	16.18	35.54	0.69	-0.68	3.16
2,200.00	2.41	161.52	2,199.16	-36.42	16.50	36.54	0.24	0.00	-5.60
2,225.00	2.30	164.88	2,224.14	-37.40	16.79	37.52	0.71	-0.44	13.44
2,250.00	1.94	180.55	2,249.12	-38.31	16.92	38.43	2.72	-1.44	62.68
2,275.00	1.87	197.83	2,274.11	-39.12	16.79	39.24	2.31	-0.28	69.12
2,300.00	1.78	204.93	2,299.09	-39.86	16.50	39.98	0.97	-0.36	28.40
2,325.00	1.68	204.32	2,324.08	-40.55	16.19	40.66	0.41	-0.40	-2.44

LEAM Drilling Systems

Survey Report

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Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
2,350.00	1.68	201.62	2,349.07	-41.22	15.90	41.34	0.32	0.00	-10.80	
2,375.00	1.80	203.16	2,374.06	-41.92	15.61	42.04	0.52	0.48	6.16	
2,400.00	1.77	206.39	2,399.05	-42.63	15.29	42.74	0.42	-0.12	12.92	
2,425.00	1.70	203.20	2,424.04	-43.32	14.97	43.43	0.48	-0.28	-12.76	
2,450.00	1.78	202.17	2,449.02	-44.02	14.68	44.12	0.34	0.32	-4.12	
2,475.00	1.67	206.30	2,474.01	-44.70	14.37	44.81	0.66	-0.44	16.52	
2,500.00	1.70	202.12	2,499.00	-45.37	14.07	45.48	0.51	0.12	-16.72	
2,525.00	1.72	201.99	2,523.99	-46.06	13.79	46.16	0.08	0.08	-0.52	
2,550.00	1.83	203.30	2,548.98	-46.78	13.49	46.88	0.47	0.44	5.24	
2,575.00	1.66	205.16	2,573.97	-47.47	13.18	47.57	0.72	-0.68	7.44	
2,600.00	1.60	199.80	2,598.96	-48.13	12.91	48.22	0.66	-0.24	-21.44	
2,625.00	1.34	188.74	2,623.95	-48.75	12.74	48.84	1.53	-1.04	-44.24	
2,650.00	0.75	156.26	2,648.95	-49.19	12.76	49.28	3.26	-2.36	-129.92	
2,675.00	0.62	112.13	2,673.94	-49.39	12.96	49.48	2.11	-0.52	-176.52	
2,700.00	0.78	112.08	2,698.94	-49.50	13.24	49.60	0.64	0.64	-0.20	
2,725.00	0.79	111.82	2,723.94	-49.63	13.56	49.73	0.04	0.04	-1.04	
2,750.00	0.88	115.27	2,748.94	-49.78	13.89	49.88	0.41	0.36	13.80	
2,775.00	0.82	116.46	2,773.93	-49.94	14.22	50.04	0.25	-0.24	4.76	
2,800.00	1.00	109.13	2,798.93	-50.09	14.59	50.19	0.86	0.72	-29.32	
2,825.00	1.57	119.52	2,823.92	-50.33	15.09	50.44	2.45	2.28	41.56	
2,850.00	1.95	126.77	2,848.91	-50.75	15.73	50.87	1.76	1.52	29.00	
2,875.00	2.08	128.85	2,873.90	-51.29	16.43	51.41	0.60	0.52	8.32	
2,900.00	2.15	128.04	2,898.88	-51.86	17.15	51.99	0.30	0.28	-3.24	
2,925.00	2.26	124.22	2,923.86	-52.43	17.93	52.56	0.73	0.44	-15.28	
2,950.00	2.33	123.15	2,948.84	-52.99	18.76	53.12	0.33	0.28	-4.28	
2,975.00	2.53	124.08	2,973.82	-53.57	19.64	53.72	0.82	0.80	3.72	
3,000.00	2.60	124.02	2,998.79	-54.20	20.57	54.35	0.28	0.28	-0.24	
3,025.00	2.60	121.66	3,023.77	-54.81	21.52	54.97	0.43	0.00	-9.44	
3,050.00	2.60	122.15	3,048.74	-55.41	22.48	55.58	0.09	0.00	1.96	
3,075.00	2.58	125.95	3,073.72	-56.05	23.42	56.22	0.69	-0.08	15.20	
3,100.00	2.36	130.64	3,098.69	-56.71	24.27	56.89	1.19	-0.88	18.76	
3,125.00	2.35	129.55	3,123.67	-57.37	25.05	57.56	0.18	-0.04	-4.36	
3,150.00	2.37	129.98	3,148.65	-58.03	25.84	58.22	0.11	0.08	1.72	
3,175.00	2.27	134.17	3,173.63	-58.71	26.59	58.90	0.79	-0.40	16.76	
3,200.00	1.44	137.21	3,198.62	-59.28	27.16	59.48	3.34	-3.32	12.16	
3,225.00	1.12	136.66	3,223.61	-59.69	27.54	59.89	1.28	-1.28	-2.20	
3,250.00	1.01	139.68	3,248.61	-60.04	27.85	60.24	0.49	-0.44	12.08	
3,275.00	0.89	143.43	3,273.60	-60.36	28.11	60.57	0.54	-0.48	15.00	
3,300.00	0.77	130.82	3,298.60	-60.63	28.36	60.83	0.87	-0.48	-50.44	
3,325.00	0.90	122.93	3,323.60	-60.84	28.65	61.05	0.69	0.52	-31.56	
3,350.00	0.89	122.54	3,348.60	-61.06	28.98	61.27	0.05	-0.04	-1.56	
3,375.00	0.82	105.87	3,373.59	-61.21	29.31	61.42	1.03	-0.28	-66.68	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
3,400.00	1.05	97.92	3,398.59	-61.29	29.71	61.51	1.05	0.92	-31.80	
3,425.00	1.16	97.74	3,423.58	-61.36	30.19	61.57	0.44	0.44	-0.72	
3,450.00	1.14	90.61	3,448.58	-61.39	30.69	61.62	0.58	-0.08	-28.52	
3,475.00	1.39	85.72	3,473.57	-61.37	31.24	61.60	1.09	1.00	-19.56	
3,500.00	1.37	91.85	3,498.57	-61.36	31.84	61.59	0.60	-0.08	24.52	
3,525.00	1.44	85.10	3,523.56	-61.34	32.45	61.58	0.72	0.28	-27.00	
3,550.00	1.81	78.81	3,548.55	-61.24	33.15	61.48	1.64	1.48	-25.16	
3,575.00	1.88	83.03	3,573.54	-61.11	33.95	61.36	0.61	0.28	16.88	
3,600.00	1.86	79.23	3,598.52	-60.99	34.75	61.24	0.50	-0.08	-15.20	
3,625.00	2.00	75.32	3,623.51	-60.80	35.57	61.06	0.77	0.56	-15.64	
3,650.00	2.10	77.07	3,648.49	-60.59	36.44	60.85	0.47	0.40	7.00	
3,675.00	2.00	79.67	3,673.48	-60.41	37.32	60.68	0.55	-0.40	10.40	
3,700.00	1.98	74.29	3,698.46	-60.21	38.16	60.49	0.75	-0.08	-21.52	
3,725.00	2.08	73.79	3,723.45	-59.97	39.01	60.25	0.41	0.40	-2.00	
3,750.00	1.83	74.20	3,748.43	-59.73	39.83	60.02	1.00	-1.00	1.64	
3,775.00	0.57	57.54	3,773.43	-59.56	40.32	59.85	5.18	-5.04	-66.64	
3,800.00	0.54	0.51	3,798.42	-59.37	40.43	59.67	2.12	-0.12	-228.12	
3,825.00	0.64	348.22	3,823.42	-59.12	40.40	59.41	0.64	0.40	-49.16	
3,850.00	0.73	327.63	3,848.42	-58.85	40.29	59.14	1.04	0.36	-82.36	
3,875.00	0.90	324.33	3,873.42	-58.55	40.09	58.84	0.71	0.68	-13.20	
3,900.00	1.02	329.83	3,898.42	-58.20	39.86	58.49	0.60	0.48	22.00	
3,925.00	0.96	331.60	3,923.41	-57.82	39.65	58.11	0.27	-0.24	7.08	
3,950.00	0.99	320.36	3,948.41	-57.47	39.41	57.76	0.77	0.12	-44.96	
3,975.00	1.23	318.20	3,973.40	-57.11	39.09	57.39	0.97	0.96	-8.64	
4,000.00	1.33	319.58	3,998.40	-56.69	38.73	56.97	0.42	0.40	5.52	
4,025.00	1.30	318.92	4,023.39	-56.25	38.35	56.53	0.13	-0.12	-2.64	
4,050.00	1.28	313.49	4,048.38	-55.85	37.96	56.12	0.50	-0.08	-21.72	
4,075.00	1.35	309.72	4,073.38	-55.47	37.53	55.74	0.45	0.28	-15.08	
4,100.00	1.43	311.44	4,098.37	-55.07	37.07	55.34	0.36	0.32	6.88	
4,125.00	1.49	311.18	4,123.36	-54.65	36.60	54.92	0.24	0.24	-1.04	
4,150.00	1.51	316.98	4,148.35	-54.20	36.13	54.46	0.61	0.08	23.20	
4,175.00	1.46	317.75	4,173.34	-53.72	35.69	53.98	0.22	-0.20	3.08	
4,200.00	1.49	318.52	4,198.34	-53.24	35.26	53.50	0.14	0.12	3.08	
4,225.00	1.61	316.92	4,223.33	-52.74	34.80	52.99	0.51	0.48	-6.40	
4,250.00	1.60	321.43	4,248.32	-52.21	34.35	52.46	0.51	-0.04	18.04	
4,275.00	1.57	320.80	4,273.31	-51.67	33.91	51.92	0.14	-0.12	-2.52	
4,300.00	1.60	316.36	4,298.30	-51.15	33.45	51.40	0.51	0.12	-17.76	
4,325.00	1.74	323.17	4,323.29	-50.60	32.99	50.84	0.97	0.56	27.24	
4,350.00	1.61	323.06	4,348.28	-50.01	32.55	50.25	0.52	-0.52	-0.44	
4,375.00	1.64	320.01	4,373.27	-49.46	32.11	49.69	0.37	0.12	-12.20	
4,400.00	1.76	325.42	4,398.26	-48.87	31.66	49.10	0.80	0.48	21.64	
4,425.00	1.63	328.93	4,423.25	-48.25	31.26	48.48	0.67	-0.52	14.04	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
4,450.00	1.57	328.36	4,448.24	-47.65	30.89	47.88	0.25	-0.24	-2.28	
4,475.00	1.61	333.59	4,473.23	-47.04	30.56	47.27	0.60	0.16	20.92	
4,500.00	1.43	343.29	4,498.22	-46.43	30.31	46.65	1.25	-0.72	38.80	
4,525.00	1.41	341.58	4,523.21	-45.84	30.13	46.06	0.19	-0.08	-6.84	
4,550.00	1.51	349.74	4,548.20	-45.23	29.97	45.44	0.92	0.40	32.64	
4,575.00	1.44	356.83	4,573.19	-44.59	29.89	44.81	0.78	-0.28	28.36	
4,600.00	1.28	355.97	4,598.19	-44.00	29.86	44.21	0.65	-0.64	-3.44	
4,625.00	1.31	12.09	4,623.18	-43.44	29.90	43.66	1.46	0.12	64.48	
4,650.00	1.24	29.20	4,648.17	-42.92	30.09	43.14	1.54	-0.28	68.44	
4,675.00	1.52	42.78	4,673.17	-42.44	30.45	42.66	1.71	1.12	54.32	
4,700.00	1.67	59.27	4,698.16	-42.01	30.98	42.24	1.92	0.60	65.96	
4,725.00	2.04	76.53	4,723.14	-41.72	31.73	41.95	2.66	1.48	69.04	
4,750.00	2.45	79.97	4,748.12	-41.53	32.69	41.76	1.73	1.64	13.76	
4,775.00	2.90	87.26	4,773.10	-41.40	33.85	41.65	2.25	1.80	29.16	
4,800.00	3.20	91.42	4,798.06	-41.39	35.18	41.65	1.49	1.20	16.64	
4,825.00	3.55	92.53	4,823.02	-41.44	36.65	41.71	1.42	1.40	4.44	
4,850.00	3.87	94.25	4,847.97	-41.54	38.26	41.82	1.36	1.28	6.88	
4,875.00	3.91	96.44	4,872.91	-41.70	39.95	41.99	0.62	0.16	8.76	
4,900.00	3.55	103.06	4,897.86	-41.97	41.55	42.27	2.24	-1.44	26.48	
4,925.00	3.45	106.76	4,922.81	-42.36	43.02	42.67	0.99	-0.40	14.80	
4,950.00	3.16	111.61	4,947.77	-42.83	44.39	43.15	1.61	-1.16	19.40	
4,975.00	2.74	114.56	4,972.73	-43.33	45.57	43.66	1.79	-1.68	11.80	
5,000.00	2.57	121.25	4,997.71	-43.87	46.59	44.21	1.41	-0.68	26.76	
5,025.00	2.48	121.24	5,022.68	-44.44	47.53	44.79	0.36	-0.36	-0.04	
5,050.00	2.75	122.72	5,047.66	-45.05	48.50	45.40	1.11	1.08	5.92	
5,075.00	2.97	124.52	5,072.63	-45.74	49.54	46.10	0.95	0.88	7.20	
5,100.00	3.47	125.78	5,097.59	-46.55	50.69	46.92	2.02	2.00	5.04	
5,125.00	3.95	126.30	5,122.53	-47.50	51.99	47.88	1.92	1.92	2.08	
5,150.00	4.03	126.95	5,147.47	-48.54	53.39	48.93	0.37	0.32	2.60	
5,175.00	4.18	126.66	5,172.41	-49.61	54.82	50.01	0.61	0.60	-1.16	
5,200.00	4.29	130.65	5,197.34	-50.76	56.26	51.17	1.26	0.44	15.96	
5,225.00	4.10	131.29	5,222.27	-51.96	57.64	52.38	0.78	-0.76	2.56	
5,250.00	4.12	132.35	5,247.21	-53.16	58.98	53.59	0.31	0.08	4.24	
5,275.00	4.00	134.26	5,272.15	-54.37	60.27	54.81	0.72	-0.48	7.64	
5,300.00	3.91	133.64	5,297.09	-55.57	61.51	56.02	0.40	-0.36	-2.48	
5,325.00	3.91	133.13	5,322.03	-56.74	62.75	57.20	0.14	0.00	-2.04	
5,350.00	3.20	135.60	5,346.98	-57.82	63.86	58.28	2.90	-2.84	9.88	
5,375.00	1.98	133.63	5,371.96	-58.61	64.66	59.09	4.89	-4.88	-7.88	
5,400.00	1.52	140.34	5,396.94	-59.17	65.18	59.64	2.01	-1.84	26.84	
5,425.00	1.06	167.56	5,421.94	-59.65	65.45	60.13	3.02	-1.84	108.88	
5,450.00	0.88	193.46	5,446.93	-60.06	65.45	60.54	1.88	-0.72	103.60	
5,475.00	0.83	195.89	5,471.93	-60.42	65.36	60.90	0.25	-0.20	9.72	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
5,500.00	0.87	193.85	5,496.93	-60.78	65.26	61.26	0.20	0.16	-8.16	
5,525.00	0.93	187.83	5,521.93	-61.17	65.19	61.64	0.45	0.24	-24.08	
5,550.00	1.07	187.72	5,546.92	-61.60	65.13	62.07	0.56	0.56	-0.44	
5,575.00	1.15	191.14	5,571.92	-62.08	65.05	62.55	0.42	0.32	13.68	
5,600.00	1.16	190.10	5,596.91	-62.57	64.96	63.05	0.09	0.04	-4.16	
5,625.00	1.21	197.75	5,621.91	-63.07	64.83	63.55	0.66	0.20	30.60	
5,650.00	1.13	196.64	5,646.90	-63.56	64.68	64.03	0.33	-0.32	-4.44	
5,675.00	1.12	190.09	5,671.90	-64.04	64.57	64.51	0.52	-0.04	-26.20	
5,700.00	1.17	189.18	5,696.89	-64.53	64.48	65.00	0.21	0.20	-3.64	
5,725.00	1.07	192.66	5,721.89	-65.01	64.39	65.48	0.48	-0.40	13.92	
5,750.00	1.23	192.22	5,746.88	-65.50	64.28	65.97	0.64	0.64	-1.76	
5,775.00	1.18	193.96	5,771.88	-66.01	64.16	66.48	0.25	-0.20	6.96	
5,800.00	1.11	188.84	5,796.87	-66.50	64.07	66.97	0.50	-0.28	-20.48	
5,825.00	1.23	188.93	5,821.87	-67.00	63.99	67.47	0.48	0.48	0.36	
5,850.00	1.15	194.56	5,846.86	-67.51	63.88	67.98	0.57	-0.32	22.52	
5,875.00	1.13	189.28	5,871.86	-68.00	63.78	68.46	0.43	-0.08	-21.12	
5,900.00	1.22	193.07	5,896.85	-68.50	63.68	68.97	0.48	0.36	15.16	
5,925.00	1.19	194.23	5,921.84	-69.01	63.56	69.48	0.15	-0.12	4.64	
5,950.00	1.13	190.97	5,946.84	-69.50	63.44	69.97	0.36	-0.24	-13.04	
5,975.00	1.21	190.22	5,971.83	-70.01	63.35	70.47	0.33	0.32	-3.00	
6,000.00	1.14	194.69	5,996.83	-70.51	63.24	70.97	0.46	-0.28	17.88	
6,025.00	0.72	189.25	6,021.83	-70.90	63.15	71.36	1.71	-1.68	-21.76	
6,050.00	0.32	186.06	6,046.82	-71.13	63.12	71.59	1.60	-1.60	-12.76	
6,075.00	0.15	207.88	6,071.82	-71.23	63.10	71.69	0.76	-0.68	87.28	
6,100.00	0.21	159.79	6,096.82	-71.30	63.10	71.76	0.63	0.24	-192.36	
6,125.00	0.29	196.86	6,121.82	-71.40	63.10	71.86	0.70	0.32	148.28	
6,150.00	0.17	221.67	6,146.82	-71.49	63.05	71.95	0.61	-0.48	99.24	
6,175.00	0.23	180.48	6,171.82	-71.57	63.03	72.03	0.61	0.24	-164.76	
6,200.00	0.29	199.13	6,196.82	-71.68	63.01	72.14	0.41	0.24	74.60	
6,225.00	0.13	152.62	6,221.82	-71.76	63.00	72.22	0.89	-0.64	-186.04	
6,250.00	0.30	155.90	6,246.82	-71.85	63.04	72.31	0.68	0.68	13.12	
6,275.00	0.22	142.24	6,271.82	-71.94	63.09	72.41	0.40	-0.32	-54.64	
6,300.00	0.34	122.78	6,296.82	-72.02	63.19	72.48	0.61	0.48	-77.84	
6,325.00	0.35	134.48	6,321.82	-72.12	63.30	72.58	0.28	0.04	46.80	
6,350.00	0.34	103.06	6,346.82	-72.19	63.43	72.65	0.75	-0.04	-125.68	
6,375.00	0.45	119.42	6,371.82	-72.25	63.59	72.72	0.63	0.44	65.44	
6,400.00	0.33	116.73	6,396.82	-72.33	63.74	72.80	0.49	-0.48	-10.76	
6,425.00	0.44	102.00	6,421.82	-72.38	63.90	72.85	0.59	0.44	-58.92	
6,450.00	0.44	120.90	6,446.82	-72.45	64.07	72.92	0.58	0.00	75.60	
6,475.00	0.35	104.18	6,471.82	-72.52	64.23	72.99	0.58	-0.36	-66.88	
6,500.00	0.38	116.46	6,496.82	-72.58	64.38	73.05	0.33	0.12	49.12	
6,525.00	0.19	173.82	6,521.82	-72.66	64.45	73.13	1.28	-0.76	229.44	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)
6,550.00	0.20	248.43	6,546.82	-72.71	64.42	73.18	0.95	0.04	298.44
6,575.00	0.18	216.20	6,571.82	-72.76	64.35	73.23	0.43	-0.08	-128.92
6,600.00	0.29	224.06	6,596.82	-72.84	64.29	73.31	0.46	0.44	31.44
6,625.00	0.32	243.40	6,621.82	-72.91	64.18	73.38	0.43	0.12	77.36
6,650.00	0.23	252.61	6,646.82	-72.96	64.07	73.43	0.40	-0.36	36.84
6,675.00	0.27	259.63	6,671.82	-72.99	63.97	73.45	0.20	0.16	28.08
6,700.00	0.24	246.81	6,696.82	-73.02	63.86	73.48	0.26	-0.12	-51.28
6,725.00	0.29	235.38	6,721.82	-73.07	63.76	73.54	0.29	0.20	-45.72
6,750.00	0.36	249.66	6,746.82	-73.14	63.63	73.60	0.43	0.28	57.12
6,775.00	0.28	274.24	6,771.82	-73.16	63.50	73.62	0.63	-0.32	98.32
6,800.00	0.26	232.04	6,796.82	-73.19	63.39	73.65	0.78	-0.08	-168.80
6,825.00	0.29	258.37	6,821.81	-73.24	63.29	73.70	0.51	0.12	105.32
6,850.00	0.20	264.02	6,846.81	-73.26	63.18	73.72	0.37	-0.36	22.60
6,875.00	0.30	241.29	6,871.81	-73.29	63.08	73.75	0.56	0.40	-90.92
6,900.00	0.30	256.51	6,896.81	-73.34	62.96	73.80	0.32	0.00	60.88
6,925.00	0.24	263.35	6,921.81	-73.36	62.84	73.82	0.27	-0.24	27.36
6,950.00	0.33	269.51	6,946.81	-73.37	62.72	73.82	0.38	0.36	24.64
6,975.00	0.24	283.60	6,971.81	-73.35	62.60	73.81	0.45	-0.36	56.36
7,000.00	0.32	270.41	6,996.81	-73.34	62.48	73.80	0.41	0.32	-52.76
7,025.00	0.33	296.49	7,021.81	-73.31	62.34	73.76	0.59	0.04	104.32
7,050.00	0.28	282.68	7,046.81	-73.26	62.22	73.72	0.35	-0.20	-55.24
7,075.00	0.26	307.09	7,071.81	-73.22	62.11	73.67	0.46	-0.08	97.64
7,100.00	0.40	277.37	7,096.81	-73.17	61.98	73.62	0.87	0.56	-118.88
7,125.00	0.35	299.92	7,121.81	-73.12	61.83	73.57	0.62	-0.20	90.20
7,150.00	0.20	290.42	7,146.81	-73.07	61.72	73.52	0.63	-0.60	-38.00
7,175.00	0.37	283.30	7,171.81	-73.03	61.60	73.48	0.69	0.68	-28.48
7,200.00	0.32	307.37	7,196.81	-72.97	61.47	73.42	0.61	-0.20	96.28
7,225.00	0.32	284.31	7,221.81	-72.91	61.34	73.36	0.51	0.00	-92.24
7,250.00	0.38	292.40	7,246.81	-72.86	61.20	73.31	0.31	0.24	32.36
7,275.00	0.21	293.60	7,271.81	-72.81	61.08	73.26	0.68	-0.68	4.80
7,300.00	0.36	280.83	7,296.81	-72.78	60.96	73.23	0.65	0.60	-51.08
7,325.00	0.36	304.22	7,321.81	-72.72	60.82	73.17	0.58	0.00	93.56
7,350.00	0.24	285.59	7,346.81	-72.66	60.71	73.11	0.61	-0.48	-74.52
7,375.00	0.31	292.87	7,371.81	-72.62	60.59	73.07	0.31	0.28	29.12
7,400.00	0.23	311.94	7,396.81	-72.56	60.49	73.01	0.48	-0.32	76.28
7,425.00	0.34	287.40	7,421.81	-72.51	60.38	72.95	0.65	0.44	-98.16
7,450.00	0.28	304.21	7,446.81	-72.45	60.26	72.89	0.43	-0.24	67.24
7,475.00	0.34	280.54	7,471.81	-72.40	60.14	72.84	0.56	0.24	-94.68
7,500.00	0.32	300.58	7,496.81	-72.36	60.01	72.79	0.47	-0.08	80.16
7,525.00	0.23	286.79	7,521.81	-72.31	59.90	72.74	0.44	-0.36	-55.16
7,550.00	0.40	297.37	7,546.80	-72.25	59.77	72.69	0.72	0.68	42.32
7,575.00	0.28	294.65	7,571.80	-72.18	59.64	72.62	0.48	-0.48	-10.88

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)
7,600.00	0.42	283.43	7,596.80	-72.14	59.50	72.57	0.62	0.56	-44.88
7,625.00	0.36	296.94	7,621.80	-72.08	59.34	72.51	0.44	-0.24	54.04
7,650.00	0.35	278.95	7,646.80	-72.03	59.19	72.47	0.45	-0.04	-71.96
7,675.00	0.39	286.31	7,671.80	-72.00	59.03	72.43	0.25	0.16	29.44
7,700.00	0.20	302.26	7,696.80	-71.95	58.92	72.38	0.82	-0.76	63.80
7,725.00	0.29	271.98	7,721.80	-71.93	58.82	72.35	0.62	0.36	-121.12
7,750.00	0.30	281.96	7,746.80	-71.91	58.69	72.34	0.21	0.04	39.92
7,775.00	0.18	266.87	7,771.80	-71.90	58.58	72.33	0.54	-0.48	-60.36
7,800.00	0.38	264.22	7,796.80	-71.91	58.46	72.34	0.80	0.80	-10.60
7,825.00	0.28	285.28	7,821.80	-71.90	58.32	72.33	0.62	-0.40	84.24
7,850.00	0.32	266.71	7,846.80	-71.89	58.19	72.31	0.42	0.16	-74.28
7,875.00	0.37	285.30	7,871.80	-71.87	58.05	72.30	0.49	0.20	74.36
7,900.00	0.27	271.20	7,896.80	-71.85	57.91	72.27	0.51	-0.40	-56.40
7,925.00	0.36	273.02	7,921.80	-71.84	57.77	72.27	0.36	0.36	7.28
7,950.00	0.22	287.40	7,946.80	-71.83	57.65	72.25	0.63	-0.56	57.52
7,975.00	0.25	253.15	7,971.80	-71.83	57.55	72.25	0.57	0.12	-137.00
8,000.00	0.25	270.70	7,996.80	-71.84	57.44	72.26	0.31	0.00	70.20
8,025.00	0.18	230.86	8,021.80	-71.87	57.36	72.28	0.64	-0.28	-159.36
8,050.00	0.20	251.37	8,046.80	-71.90	57.29	72.32	0.28	0.08	82.04
8,075.00	0.18	265.19	8,071.80	-71.92	57.21	72.34	0.20	-0.08	55.28
8,100.00	0.26	183.82	8,096.80	-71.98	57.16	72.40	1.17	0.32	-325.48
8,125.00	0.23	177.93	8,121.80	-72.09	57.16	72.51	0.16	-0.12	-23.56
8,150.00	0.25	147.33	8,146.80	-72.18	57.19	72.60	0.51	0.08	-122.40
8,175.00	0.47	153.55	8,171.80	-72.32	57.27	72.74	0.89	0.88	24.88
8,200.00	0.47	168.72	8,196.80	-72.51	57.33	72.93	0.50	0.00	60.68
8,225.00	0.53	147.34	8,221.80	-72.71	57.41	73.13	0.78	0.24	-85.52
8,250.00	0.56	157.02	8,246.79	-72.92	57.52	73.34	0.39	0.12	38.72
8,275.00	0.48	148.08	8,271.79	-73.12	57.63	73.54	0.45	-0.32	-35.76
8,300.00	0.73	148.38	8,296.79	-73.35	57.77	73.77	1.00	1.00	1.20
8,325.00	0.69	146.25	8,321.79	-73.61	57.93	74.03	0.19	-0.16	-8.52
8,350.00	0.81	133.36	8,346.79	-73.86	58.15	74.28	0.83	0.48	-51.56
8,375.00	0.93	137.71	8,371.78	-74.13	58.41	74.55	0.55	0.48	17.40
8,400.00	1.03	128.67	8,396.78	-74.42	58.72	74.85	0.74	0.40	-36.16
8,425.00	1.15	122.66	8,421.78	-74.69	59.11	75.12	0.66	0.48	-24.04
8,450.00	1.24	129.43	8,446.77	-75.00	59.53	75.43	0.67	0.36	27.08
8,475.00	1.10	127.76	8,471.77	-75.32	59.93	75.76	0.58	-0.56	-6.68
8,500.00	1.12	123.58	8,496.76	-75.60	60.32	76.04	0.33	0.08	-16.72
8,525.00	1.17	129.25	8,521.76	-75.90	60.72	76.34	0.50	0.20	22.68
8,550.00	1.10	129.55	8,546.75	-76.21	61.11	76.66	0.28	-0.28	1.20
8,575.00	1.22	132.15	8,571.75	-76.54	61.49	76.99	0.52	0.48	10.40
8,600.00	1.16	135.51	8,596.74	-76.90	61.86	77.35	0.37	-0.24	13.44
8,625.00	1.12	127.60	8,621.74	-77.23	62.23	77.69	0.65	-0.16	-31.64

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
8,650.00	1.16	130.69	8,646.73	-77.55	62.62	78.00	0.29	0.16	12.36	
8,675.00	1.12	127.62	8,671.73	-77.86	63.00	78.32	0.29	-0.16	-12.28	
8,700.00	1.26	135.64	8,696.72	-78.21	63.39	78.67	0.87	0.56	32.08	
8,725.00	1.19	129.39	8,721.71	-78.57	63.78	79.03	0.60	-0.28	-25.00	
8,750.00	1.27	131.89	8,746.71	-78.92	64.19	79.39	0.39	0.32	10.00	
8,775.00	1.16	133.56	8,771.70	-79.28	64.58	79.75	0.46	-0.44	6.68	
8,800.00	1.28	128.18	8,796.70	-79.62	64.98	80.10	0.66	0.48	-21.52	
8,825.00	1.32	131.82	8,821.69	-79.99	65.42	80.47	0.37	0.16	14.56	
8,850.00	1.26	130.00	8,846.68	-80.36	65.84	80.84	0.29	-0.24	-7.28	
8,875.00	1.40	127.43	8,871.68	-80.72	66.29	81.20	0.61	0.56	-10.28	
8,900.00	1.27	132.88	8,896.67	-81.09	66.74	81.58	0.73	-0.52	21.80	
8,925.00	1.30	126.48	8,921.67	-81.45	67.17	81.94	0.59	0.12	-25.60	
8,950.00	1.39	128.94	8,946.66	-81.81	67.63	82.30	0.43	0.36	9.84	
8,975.00	1.24	131.22	8,971.65	-82.18	68.07	82.68	0.64	-0.60	9.12	
9,000.00	1.25	127.38	8,996.65	-82.52	68.49	83.02	0.34	0.04	-15.36	
9,025.00	1.26	129.93	9,021.64	-82.86	68.92	83.37	0.23	0.04	10.20	
9,050.00	1.09	134.18	9,046.63	-83.21	69.30	83.71	0.76	-0.68	17.00	
9,075.00	0.85	132.98	9,071.63	-83.50	69.61	84.01	0.96	-0.96	-4.80	
9,100.00	0.84	126.85	9,096.63	-83.73	69.89	84.24	0.36	-0.04	-24.52	
9,125.00	0.83	131.52	9,121.63	-83.96	70.17	84.48	0.28	-0.04	18.68	
9,150.00	0.90	133.97	9,146.62	-84.22	70.45	84.74	0.32	0.28	9.80	
9,175.00	0.84	137.05	9,171.62	-84.49	70.72	85.01	0.30	-0.24	12.32	
9,200.00	0.79	129.45	9,196.62	-84.73	70.97	85.25	0.48	-0.20	-30.40	
9,225.00	0.81	155.32	9,221.61	-85.01	71.18	85.52	1.43	0.08	103.48	
9,250.00	0.74	163.67	9,246.61	-85.32	71.30	85.84	0.53	-0.28	33.40	
9,275.00	0.59	183.35	9,271.61	-85.60	71.34	86.12	1.08	-0.60	78.72	
9,300.00	0.64	169.59	9,296.61	-85.87	71.36	86.39	0.62	0.20	-55.04	
9,325.00	0.71	177.91	9,321.61	-86.16	71.39	86.68	0.48	0.28	33.28	
9,350.00	1.03	193.25	9,346.60	-86.54	71.34	87.06	1.57	1.28	61.36	
9,375.00	1.02	197.55	9,371.60	-86.97	71.22	87.49	0.31	-0.04	17.20	
9,400.00	1.28	193.06	9,396.60	-87.45	71.09	87.97	1.10	1.04	-17.96	
9,425.00	1.38	192.85	9,421.59	-88.02	70.96	88.53	0.40	0.40	-0.84	
9,450.00	1.38	194.27	9,446.58	-88.60	70.82	89.12	0.14	0.00	5.68	
9,475.00	1.39	193.05	9,471.57	-89.19	70.68	89.70	0.12	0.04	-4.88	
9,500.00	1.52	195.80	9,496.57	-89.80	70.52	90.32	0.59	0.52	11.00	
9,525.00	1.57	195.78	9,521.56	-90.45	70.34	90.96	0.20	0.20	-0.08	
9,550.00	1.59	195.24	9,546.55	-91.12	70.15	91.63	0.10	0.08	-2.16	
9,575.00	1.63	199.69	9,571.54	-91.79	69.94	92.30	0.52	0.16	17.80	
9,600.00	1.72	203.56	9,596.53	-92.46	69.67	92.97	0.58	0.36	15.48	
9,625.00	1.82	205.86	9,621.52	-93.16	69.35	93.67	0.49	0.40	9.20	
9,650.00	1.85	210.45	9,646.50	-93.87	68.97	94.37	0.60	0.12	18.36	
9,675.00	1.79	214.61	9,671.49	-94.54	68.54	95.04	0.58	-0.24	16.64	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
9,700.00	1.89	213.13	9,696.48	-95.21	68.10	95.70	0.44	0.40	-5.92	
9,725.00	1.83	213.73	9,721.46	-95.88	67.65	96.38	0.25	-0.24	2.40	
9,750.00	1.87	211.85	9,746.45	-96.56	67.21	97.05	0.29	0.16	-7.52	
9,775.00	1.90	207.55	9,771.44	-97.28	66.81	97.76	0.58	0.12	-17.20	
9,800.00	1.86	213.21	9,796.42	-97.98	66.39	98.47	0.76	-0.16	22.64	
9,825.00	1.75	213.89	9,821.41	-98.64	65.96	99.12	0.45	-0.44	2.72	
9,850.00	1.71	214.51	9,846.40	-99.26	65.53	99.74	0.18	-0.16	2.48	
9,875.00	1.65	210.56	9,871.39	-99.88	65.14	100.36	0.52	-0.24	-15.80	
9,900.00	1.80	208.64	9,896.38	-100.53	64.77	101.01	0.64	0.60	-7.68	
9,925.00	1.82	215.17	9,921.37	-101.20	64.35	101.67	0.83	0.08	26.12	
9,950.00	1.79	211.70	9,946.35	-101.86	63.92	102.33	0.45	-0.12	-13.88	
9,975.00	1.98	203.01	9,971.34	-102.59	63.54	103.05	1.37	0.76	-34.76	
10,000.00	2.14	204.25	9,996.32	-103.41	63.18	103.87	0.66	0.64	4.96	
10,025.00	2.02	203.97	10,021.31	-104.24	62.81	104.70	0.48	-0.48	-1.12	
10,050.00	1.95	198.95	10,046.29	-105.05	62.49	105.50	0.75	-0.28	-20.08	
10,075.00	1.77	184.73	10,071.28	-105.83	62.32	106.29	1.98	-0.72	-56.88	
10,100.00	1.75	159.61	10,096.27	-106.58	62.43	107.03	3.06	-0.08	-100.48	
10,125.00	2.15	152.59	10,121.25	-107.35	62.78	107.81	1.86	1.60	-28.08	
10,150.00	2.36	152.39	10,146.23	-108.22	63.23	108.68	0.84	0.84	-0.80	
10,175.00	2.38	150.61	10,171.21	-109.13	63.72	109.60	0.31	0.08	-7.12	
10,200.00	2.34	142.96	10,196.19	-109.99	64.28	110.46	1.27	-0.16	-30.60	
10,225.00	2.23	140.28	10,221.17	-110.77	64.90	111.25	0.61	-0.44	-10.72	
10,250.00	2.11	137.27	10,246.15	-111.48	65.53	111.96	0.66	-0.48	-12.04	
10,275.00	1.27	126.64	10,271.14	-111.99	66.06	112.47	3.57	-3.36	-42.52	
10,300.00	0.63	104.77	10,296.14	-112.19	66.42	112.67	2.90	-2.56	-87.48	
10,325.00	0.58	98.57	10,321.14	-112.24	66.67	112.73	0.33	-0.20	-24.80	
10,350.00	0.68	100.92	10,346.14	-112.29	66.94	112.78	0.41	0.40	9.40	
10,375.00	0.60	98.04	10,371.13	-112.34	67.22	112.83	0.34	-0.32	-11.52	
10,400.00	0.67	94.83	10,396.13	-112.37	67.50	112.86	0.31	0.28	-12.84	
10,425.00	0.63	94.97	10,421.13	-112.39	67.78	112.88	0.16	-0.16	0.56	
10,450.00	0.66	90.44	10,446.13	-112.40	68.06	112.90	0.24	0.12	-18.12	
10,475.00	0.71	75.55	10,471.13	-112.37	68.35	112.86	0.74	0.20	-59.56	
10,500.00	0.60	64.15	10,496.13	-112.27	68.62	112.77	0.68	-0.44	-45.60	
10,525.00	0.30	356.89	10,521.13	-112.15	68.73	112.65	2.23	-1.20	-269.04	
10,550.00	0.49	283.54	10,546.13	-112.06	68.63	112.56	1.98	0.76	-293.40	
10,575.00	0.62	270.34	10,571.12	-112.03	68.39	112.53	0.73	0.52	-52.80	
10,600.00	0.73	272.10	10,596.12	-112.02	68.09	112.52	0.45	0.44	7.04	
10,625.00	0.96	273.89	10,621.12	-112.00	67.73	112.50	0.93	0.92	7.16	
10,650.00	0.86	270.03	10,646.12	-111.99	67.33	112.48	0.47	-0.40	-15.44	
10,675.00	0.79	275.75	10,671.11	-111.97	66.97	112.46	0.43	-0.28	22.88	
10,700.00	0.93	277.39	10,696.11	-111.93	66.60	112.41	0.57	0.56	6.56	
10,725.00	0.85	267.42	10,721.11	-111.91	66.21	112.39	0.70	-0.32	-39.88	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
10,750.00	0.64	279.60	10,746.11	-111.90	65.89	112.38	1.05	-0.84	48.72	
10,775.00	0.38	263.36	10,771.11	-111.88	65.67	112.36	1.18	-1.04	-64.96	
10,800.00	0.28	331.76	10,796.10	-111.84	65.56	112.32	1.52	-0.40	273.60	
10,825.00	0.21	11.62	10,821.10	-111.74	65.54	112.22	0.72	-0.28	159.44	
10,850.00	0.33	34.36	10,846.10	-111.64	65.59	112.11	0.63	0.48	90.96	
10,875.00	0.39	72.56	10,871.10	-111.55	65.71	112.03	0.97	0.24	152.80	
10,900.00	0.31	64.54	10,896.10	-111.50	65.85	111.98	0.37	-0.32	-32.08	
10,925.00	0.37	88.55	10,921.10	-111.47	65.99	111.95	0.61	0.24	96.04	
10,950.00	0.41	76.28	10,946.10	-111.44	66.16	111.92	0.37	0.16	-49.08	
10,975.00	0.27	55.87	10,971.10	-111.39	66.30	111.87	0.73	-0.56	-81.64	
11,000.00	0.41	72.47	10,996.10	-111.33	66.43	111.81	0.68	0.56	66.40	
11,025.00	0.37	48.63	11,021.10	-111.25	66.58	111.73	0.66	-0.16	-95.36	
11,050.00	0.53	50.95	11,046.10	-111.12	66.73	111.61	0.64	0.64	9.28	
11,075.00	0.81	61.33	11,071.10	-110.96	66.97	111.45	1.22	1.12	41.52	
11,100.00	1.01	58.39	11,096.10	-110.76	67.31	111.25	0.82	0.80	-11.76	
11,125.00	1.40	43.99	11,121.09	-110.43	67.71	110.92	1.96	1.56	-57.60	
11,150.00	1.67	44.34	11,146.08	-109.95	68.18	110.44	1.08	1.08	1.40	
11,175.00	1.68	46.74	11,171.07	-109.44	68.70	109.94	0.28	0.04	9.60	
11,200.00	1.63	45.14	11,196.06	-108.93	69.22	109.44	0.27	-0.20	-6.40	
11,225.00	1.62	44.84	11,221.05	-108.43	69.72	108.94	0.05	-0.04	-1.20	
11,250.00	1.39	47.37	11,246.04	-107.98	70.19	108.49	0.96	-0.92	10.12	
11,275.00	1.28	48.51	11,271.03	-107.59	70.63	108.10	0.45	-0.44	4.56	
11,300.00	1.13	50.74	11,296.03	-107.25	71.03	107.76	0.63	-0.60	8.92	
11,325.00	0.92	42.84	11,321.02	-106.94	71.35	107.46	1.01	-0.84	-31.60	
11,350.00	0.77	35.96	11,346.02	-106.66	71.59	107.18	0.72	-0.60	-27.52	
11,375.00	0.54	16.70	11,371.02	-106.41	71.72	106.93	1.26	-0.92	-77.04	
11,400.00	0.30	333.37	11,396.02	-106.24	71.73	106.76	1.53	-0.96	-173.32	
11,425.00	0.51	297.34	11,421.02	-106.13	71.60	106.65	1.28	0.84	-144.12	
11,450.00	0.91	280.69	11,446.02	-106.04	71.30	106.56	1.78	1.60	-66.60	
11,475.00	1.32	275.02	11,471.01	-105.98	70.82	106.50	1.70	1.64	-22.68	
11,500.00	1.30	268.03	11,496.01	-105.96	70.25	106.48	0.64	-0.08	-27.96	
11,525.00	1.16	260.62	11,521.00	-106.02	69.72	106.52	0.85	-0.56	-29.64	
11,550.00	0.88	262.73	11,546.00	-106.08	69.28	106.59	1.13	-1.12	8.44	
11,575.00	0.67	255.76	11,570.99	-106.14	68.95	106.64	0.92	-0.84	-27.88	
11,600.00	0.57	261.68	11,595.99	-106.20	68.68	106.70	0.47	-0.40	23.68	
11,625.00	0.57	227.48	11,620.99	-106.30	68.47	106.80	1.34	0.00	-136.80	
11,650.00	0.66	224.88	11,645.99	-106.48	68.27	106.98	0.38	0.36	-10.40	
11,675.00	0.96	218.47	11,670.99	-106.75	68.04	107.25	1.25	1.20	-25.64	
11,700.00	1.47	215.89	11,695.98	-107.17	67.72	107.67	2.05	2.04	-10.32	
11,725.00	1.82	230.39	11,720.97	-107.69	67.23	108.18	2.16	1.40	58.00	
11,750.00	2.24	231.88	11,745.96	-108.24	66.54	108.73	1.69	1.68	5.96	
11,775.00	2.53	236.77	11,770.93	-108.84	65.69	109.32	1.42	1.16	19.56	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)
11,782.00	2.58	238.94	11,777.93	-109.01	65.43	109.49	1.56	0.71	31.00
11,808.00	2.86	242.98	11,803.90	-109.61	64.35	110.08	1.30	1.08	15.54
11,850.00	2.58	242.89	11,845.85	-110.51	62.58	110.97	0.67	-0.67	-0.21
11,946.00	1.92	244.27	11,941.78	-112.20	59.20	112.63	0.69	-0.69	1.44
12,040.00	3.95	185.69	12,035.66	-116.10	57.46	116.52	3.59	2.16	-62.32
12,134.00	3.16	186.20	12,129.48	-121.90	56.86	122.31	0.84	-0.84	0.54
12,197.00	3.12	189.93	12,192.39	-125.32	56.38	125.73	0.33	-0.06	5.92
12,229.00	5.84	192.08	12,224.29	-127.77	55.89	128.17	8.51	8.50	6.72
12,260.00	11.36	190.41	12,254.93	-132.31	55.01	132.71	17.82	17.81	-5.39
12,291.00	16.43	189.72	12,285.01	-139.64	53.71	140.03	16.36	16.35	-2.23
12,323.00	19.14	192.90	12,315.48	-149.22	51.78	149.59	8.99	8.47	9.94
12,355.00	23.95	191.04	12,345.23	-160.71	49.36	161.07	15.18	15.03	-5.81
12,386.00	27.90	188.15	12,373.11	-174.08	47.13	174.42	13.37	12.74	-9.32
12,418.00	31.94	186.37	12,400.84	-189.91	45.13	190.23	12.93	12.63	-5.56
12,449.00	36.46	184.21	12,426.47	-207.25	43.54	207.57	15.10	14.58	-6.97
12,481.00	41.05	182.71	12,451.42	-227.24	42.34	227.55	14.64	14.34	-4.69
12,512.00	44.20	182.29	12,474.23	-248.21	41.43	248.51	10.20	10.16	-1.35
12,544.00	45.85	181.05	12,496.85	-270.84	40.77	271.13	5.84	5.16	-3.88
12,575.00	47.78	180.59	12,518.06	-293.44	40.45	293.73	6.32	6.23	-1.48
12,606.00	48.88	180.92	12,538.67	-316.59	40.15	316.88	3.64	3.55	1.06
12,638.00	48.96	180.59	12,559.70	-340.71	39.83	340.99	0.82	0.25	-1.03
12,669.00	49.49	180.09	12,579.94	-364.19	39.69	364.47	2.10	1.71	-1.61
12,700.00	50.11	179.78	12,599.95	-387.86	39.72	388.14	2.14	2.00	-1.00
12,732.00	50.18	179.25	12,620.46	-412.43	39.92	412.71	1.29	0.22	-1.66
12,761.00	49.71	178.75	12,639.12	-434.62	40.31	434.91	2.09	-1.62	-1.72
12,793.00	48.89	178.33	12,659.99	-458.87	40.93	459.16	2.75	-2.56	-1.31
12,824.00	49.68	178.60	12,680.21	-482.36	41.56	482.65	2.63	2.55	0.87
12,855.00	52.17	179.12	12,699.75	-506.42	42.04	506.72	8.14	8.03	1.68
12,887.00	55.86	179.19	12,718.55	-532.31	42.42	532.60	11.53	11.53	0.22
12,918.00	59.01	179.50	12,735.23	-558.43	42.71	558.73	10.20	10.16	1.00
12,950.00	60.15	179.52	12,751.44	-586.02	42.95	586.32	3.56	3.56	0.06
12,982.00	62.57	179.61	12,766.77	-614.10	43.16	614.40	7.57	7.56	0.28
13,014.00	65.23	179.43	12,780.85	-642.84	43.40	643.14	8.33	8.31	-0.56
13,045.00	67.94	179.66	12,793.17	-671.28	43.63	671.58	8.77	8.74	0.74
13,076.00	69.96	179.38	12,804.30	-700.21	43.87	700.51	6.57	6.52	-0.90
13,107.00	72.03	178.33	12,814.40	-729.51	44.46	729.82	7.41	6.68	-3.39
13,139.00	73.96	179.08	12,823.75	-760.10	45.15	760.41	6.43	6.03	2.34
13,170.00	75.31	179.82	12,831.97	-789.99	45.44	790.30	4.93	4.35	2.39
13,201.00	77.88	180.90	12,839.15	-820.14	45.25	820.45	8.96	8.29	3.48
13,232.00	81.16	180.97	12,844.79	-850.62	44.75	850.92	10.58	10.58	0.23
13,263.00	84.22	182.03	12,848.74	-881.35	43.94	881.65	10.44	9.87	3.42
13,357.00	83.39	181.30	12,858.88	-974.76	41.23	975.04	1.17	-0.88	-0.78

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
13,488.00	86.38	180.33	12,870.56	-1,105.21	39.37	1,105.47	2.40	2.28	-0.74	
13,582.00	89.85	181.00	12,873.65	-1,199.14	38.28	1,199.39	3.76	3.69	0.71	
13,677.00	90.64	182.40	12,873.24	-1,294.09	35.46	1,294.32	1.69	0.83	1.47	
13,771.00	91.55	184.26	12,871.45	-1,387.91	30.01	1,388.10	2.20	0.97	1.98	
13,866.00	90.79	182.64	12,869.51	-1,482.72	24.29	1,482.86	1.88	-0.80	-1.71	
13,960.00	91.52	182.26	12,867.61	-1,576.61	20.27	1,576.72	0.88	0.78	-0.40	
14,055.00	89.60	180.25	12,866.68	-1,671.57	18.19	1,671.66	2.93	-2.02	-2.12	
14,149.00	89.35	179.80	12,867.55	-1,765.57	18.15	1,765.66	0.55	-0.27	-0.48	
14,243.00	90.83	181.64	12,867.40	-1,859.56	16.97	1,859.63	2.51	1.57	1.96	
14,336.00	89.91	179.47	12,866.80	-1,952.54	16.07	1,952.61	2.53	-0.99	-2.33	
14,431.00	88.63	177.70	12,868.01	-2,047.50	18.42	2,047.58	2.30	-1.35	-1.86	
14,526.00	88.41	177.80	12,870.46	-2,142.40	22.14	2,142.50	0.25	-0.23	0.11	
14,620.00	90.04	178.32	12,871.73	-2,236.33	25.33	2,236.46	1.82	1.73	0.55	
14,713.00	90.32	178.31	12,871.44	-2,329.29	28.06	2,329.43	0.30	0.30	-0.01	
14,808.00	88.41	176.45	12,872.49	-2,424.18	32.40	2,424.35	2.81	-2.01	-1.96	
14,902.00	88.17	176.44	12,875.30	-2,517.95	38.23	2,518.17	0.26	-0.26	-0.01	
14,996.00	88.74	175.72	12,877.83	-2,611.70	44.65	2,611.95	0.98	0.61	-0.77	
15,092.00	91.01	178.85	12,878.04	-2,707.57	49.20	2,707.86	4.03	2.36	3.26	
15,186.00	90.27	178.48	12,876.99	-2,801.54	51.39	2,801.84	0.88	-0.79	-0.39	
15,281.00	88.73	177.28	12,877.82	-2,896.47	54.90	2,896.79	2.06	-1.62	-1.26	
15,375.00	90.68	180.10	12,878.31	-2,990.43	57.05	2,990.76	3.65	2.07	3.00	
15,470.00	88.28	176.87	12,879.17	-3,085.37	59.56	3,085.72	4.24	-2.53	-3.40	
15,564.00	90.91	178.90	12,879.83	-3,179.29	63.03	3,179.67	3.53	2.80	2.16	
15,659.00	89.81	180.18	12,879.24	-3,274.28	63.79	3,274.66	1.78	-1.16	1.35	
15,753.00	86.41	176.66	12,882.34	-3,368.17	66.38	3,368.56	5.20	-3.62	-3.74	
15,848.00	86.15	177.03	12,888.50	-3,462.82	71.60	3,463.25	0.48	-0.27	0.39	
15,942.00	89.97	178.87	12,891.68	-3,556.69	74.95	3,557.14	4.51	4.06	1.96	
16,037.00	88.94	177.93	12,892.58	-3,651.64	77.61	3,652.11	1.47	-1.08	-0.99	
16,131.00	89.70	176.68	12,893.70	-3,745.53	82.03	3,746.03	1.56	0.81	-1.33	
16,226.00	92.73	178.92	12,891.69	-3,840.42	85.67	3,840.95	3.97	3.19	2.36	
16,321.00	93.12	181.49	12,886.84	-3,935.29	85.33	3,935.81	2.73	0.41	2.71	
16,415.00	92.48	181.84	12,882.25	-4,029.14	82.61	4,029.63	0.78	-0.68	0.37	
16,509.00	91.46	181.44	12,879.01	-4,123.04	79.92	4,123.52	1.17	-1.09	-0.43	
16,603.00	89.20	181.04	12,878.47	-4,217.01	77.88	4,217.47	2.44	-2.40	-0.43	
16,698.00	90.06	182.09	12,879.09	-4,311.97	75.29	4,312.41	1.43	0.91	1.11	
16,792.00	88.56	180.27	12,880.22	-4,405.94	73.35	4,406.36	2.51	-1.60	-1.94	
16,885.00	91.08	181.99	12,880.51	-4,498.91	71.52	4,499.31	3.28	2.71	1.85	
16,979.00	91.39	182.56	12,878.48	-4,592.81	67.79	4,593.19	0.69	0.33	0.61	
17,073.00	91.43	182.26	12,876.17	-4,686.70	63.84	4,687.04	0.32	0.04	-0.32	
17,168.00	91.69	181.76	12,873.59	-4,781.61	60.51	4,781.92	0.59	0.27	-0.53	
17,263.00	91.97	182.47	12,870.55	-4,876.49	57.00	4,876.78	0.80	0.29	0.75	
17,357.00	91.64	182.57	12,867.59	-4,970.35	52.87	4,970.61	0.37	-0.35	0.11	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
17,449.00	90.92	181.41	12,865.54	-5,062.27	49.68	5,062.50	1.48	-0.78	-1.26	
17,544.00	90.66	180.40	12,864.23	-5,157.25	48.18	5,157.47	1.10	-0.27	-1.06	
17,638.00	90.82	180.12	12,863.01	-5,251.24	47.75	5,251.45	0.34	0.17	-0.30	
17,732.00	90.73	179.91	12,861.74	-5,345.23	47.73	5,345.44	0.24	-0.10	-0.22	
17,826.00	90.27	179.33	12,860.92	-5,439.23	48.35	5,439.44	0.79	-0.49	-0.62	
17,921.00	89.55	178.37	12,861.07	-5,534.21	50.26	5,534.43	1.26	-0.76	-1.01	
18,016.00	90.24	179.37	12,861.24	-5,629.19	52.13	5,629.42	1.28	0.73	1.05	
18,110.00	90.00	179.21	12,861.05	-5,723.18	53.29	5,723.42	0.31	-0.26	-0.17	
18,205.00	89.33	179.09	12,861.60	-5,818.17	54.70	5,818.41	0.72	-0.71	-0.13	
18,299.00	89.81	179.08	12,862.31	-5,912.15	56.20	5,912.40	0.51	0.51	-0.01	
18,394.00	90.92	184.66	12,861.70	-6,007.06	53.11	6,007.29	5.99	1.17	5.87	
18,491.00	89.53	183.87	12,861.32	-6,103.79	45.89	6,103.96	1.65	-1.43	-0.81	
18,586.00	91.91	182.62	12,860.13	-6,198.62	40.52	6,198.75	2.83	2.51	-1.32	
18,681.00	91.37	179.46	12,857.41	-6,293.55	38.79	6,293.67	3.37	-0.57	-3.33	
18,776.00	93.66	177.07	12,853.24	-6,388.40	41.66	6,388.54	3.48	2.41	-2.52	
18,869.00	93.87	176.47	12,847.13	-6,481.06	46.89	6,481.23	0.68	0.23	-0.65	
18,964.00	93.96	175.55	12,840.65	-6,575.60	53.49	6,575.82	0.97	0.09	-0.97	
19,059.00	92.31	177.57	12,835.45	-6,670.28	59.18	6,670.54	2.74	-1.74	2.13	
19,153.00	91.94	180.45	12,831.96	-6,764.19	60.80	6,764.46	3.09	-0.39	3.06	
19,247.00	90.91	180.03	12,829.63	-6,858.16	60.41	6,858.42	1.18	-1.10	-0.45	
19,342.00	90.66	179.62	12,828.32	-6,953.15	60.70	6,953.41	0.51	-0.26	-0.43	
19,436.00	90.40	180.79	12,827.45	-7,047.15	60.36	7,047.40	1.27	-0.28	1.24	
19,531.00	88.68	178.56	12,828.22	-7,142.13	60.90	7,142.39	2.96	-1.81	-2.35	
19,626.00	91.29	178.81	12,828.24	-7,237.10	63.08	7,237.37	2.76	2.75	0.26	
19,720.00	91.84	179.66	12,825.68	-7,331.05	64.33	7,331.33	1.08	0.59	0.90	
19,814.00	90.76	178.19	12,823.54	-7,425.01	66.10	7,425.29	1.94	-1.15	-1.56	
19,909.00	91.12	180.05	12,821.98	-7,519.98	67.56	7,520.27	1.99	0.38	1.96	
20,004.00	91.54	182.17	12,819.78	-7,614.93	65.72	7,615.21	2.27	0.44	2.23	
20,099.00	90.84	180.97	12,817.81	-7,709.87	63.11	7,710.13	1.46	-0.74	-1.26	
20,193.00	92.33	182.74	12,815.21	-7,803.78	60.07	7,804.01	2.46	1.59	1.88	
20,288.00	91.38	181.71	12,812.13	-7,898.66	56.39	7,898.86	1.47	-1.00	-1.08	
20,383.00	90.68	181.53	12,810.42	-7,993.60	53.70	7,993.78	0.76	-0.74	-0.19	
20,477.00	90.09	181.84	12,809.79	-8,087.56	50.94	8,087.72	0.71	-0.63	0.33	
20,572.00	88.44	178.54	12,811.01	-8,182.54	50.62	8,182.69	3.88	-1.74	-3.47	
20,667.00	91.67	181.07	12,810.92	-8,277.51	50.95	8,277.67	4.32	3.40	2.66	
20,761.00	91.64	180.68	12,808.20	-8,371.46	49.51	8,371.60	0.42	-0.03	-0.41	
20,856.00	91.32	180.22	12,805.75	-8,466.43	48.76	8,466.56	0.59	-0.34	-0.48	
20,950.00	90.35	179.59	12,804.38	-8,560.42	48.92	8,560.55	1.23	-1.03	-0.67	
21,044.00	89.21	178.85	12,804.74	-8,654.41	50.20	8,654.54	1.45	-1.21	-0.79	
21,139.00	88.02	177.89	12,807.04	-8,749.34	52.90	8,749.49	1.61	-1.25	-1.01	
21,233.00	88.74	180.06	12,809.69	-8,843.28	54.58	8,843.44	2.43	0.77	2.31	
21,327.00	88.73	181.42	12,811.77	-8,937.25	53.37	8,937.40	1.45	-0.01	1.45	

LEAM Drilling Systems

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #707H
Project:	Lea County, NM (NAD 27 NME)	TVD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

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)	
21,422.00	91.99	183.73	12,811.17	-9,032.13	49.10	9,032.25	4.21	3.43	2.43	
21,516.00	91.56	182.78	12,808.26	-9,125.93	43.77	9,126.01	1.11	-0.46	-1.01	
21,611.00	91.49	182.53	12,805.73	-9,220.79	39.37	9,220.84	0.27	-0.07	-0.26	
21,705.00	91.57	182.60	12,803.22	-9,314.67	35.16	9,314.67	0.11	0.09	0.07	
21,800.00	92.73	180.98	12,799.66	-9,409.55	32.20	9,409.53	2.10	1.22	-1.71	
21,894.00	92.30	180.57	12,795.53	-9,503.45	30.93	9,503.42	0.63	-0.46	-0.44	
21,988.00	91.16	180.43	12,792.70	-9,597.40	30.11	9,597.36	1.22	-1.21	-0.15	
22,082.00	90.49	180.53	12,791.34	-9,691.39	29.32	9,691.34	0.72	-0.71	0.11	
22,177.00	88.47	179.54	12,792.21	-9,786.38	29.26	9,786.33	2.37	-2.13	-1.04	
22,271.00	87.29	178.77	12,795.68	-9,880.30	30.65	9,880.26	1.50	-1.26	-0.82	
22,366.00	91.04	177.66	12,797.07	-9,975.23	33.61	9,975.20	4.12	3.95	-1.17	
22,461.00	91.35	177.58	12,795.09	-10,070.12	37.55	10,070.13	0.34	0.33	-0.08	
22,556.00	90.21	176.97	12,793.79	-10,165.01	42.07	10,165.04	1.36	-1.20	-0.64	
22,650.00	90.31	175.16	12,793.37	-10,258.78	48.52	10,258.86	1.93	0.11	-1.93	
22,744.00	92.11	175.11	12,791.38	-10,352.42	56.49	10,352.55	1.92	1.91	-0.05	
22,839.00	91.90	173.76	12,788.06	-10,446.91	65.69	10,447.11	1.44	-0.22	-1.42	
22,933.00	91.71	174.12	12,785.10	-10,540.34	75.61	10,540.61	0.43	-0.20	0.38	
23,028.00	91.33	172.98	12,782.58	-10,634.70	86.28	10,635.05	1.26	-0.40	-1.20	
23,115.00	89.89	171.18	12,781.65	-10,720.86	98.27	10,721.29	2.65	-1.66	-2.07	
23,172.00	89.89	171.19	12,781.76	-10,777.19	107.00	10,777.68	0.02	0.00	0.02	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
SHL(Stove Pipe Federal - hit/miss target - Shape - Point	0.00	0.00	0.00	0.00	0.00	425,816.30	784,611.50	32° 10' 2.432 N	103° 24' 48.812 W	
PBHL(Stove Pipe Feder: - actual wellpath misses target center by 28.48usft at 23171.95usft MD (12781.76 TVD, -10777.14 N, 106.99 E) - Rectangle (sides W60.00 H0.00 D5,382.40)	90.00	179.59	12,780.00	-10,781.50	78.90	415,034.80	784,690.40	32° 8' 15.741 N	103° 24' 48.965 W	
LTP (Stove Pipe Federal - actual wellpath misses target center by 32.33usft at 23115.00usft MD (12781.65 TVD, -10720.86 N, 98.27 E) - Point	0.00	0.00	12,805.00	-10,731.50	78.60	415,084.80	784,690.10	32° 8' 16.235 N	103° 24' 48.964 W	
FTP(Stove Pipe Federal - actual wellpath misses target center by 213.63usft at 12849.55usft MD (12696.39 TVD, -502.13 N, 41.97 E) - Point	0.00	0.00	12,860.00	-370.00	4.40	425,446.30	784,615.90	32° 9' 58.771 N	103° 24' 48.797 W	
TGT#1(Stove Pipe Fede - actual wellpath misses target center by 22.62usft at 18156.64usft MD (12861.18 TVD, -5769.82 N, 53.96 E) - Rectangle (sides W60.00 H0.00 D5,030.00)	90.00	179.59	12,880.90	-5,769.86	43.04	420,046.44	784,654.54	32° 9' 5.335 N	103° 24' 48.885 W	

LEAM Drilling Systems

Survey Report

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Site:	Stove Pipe Federal Com	MD Reference:	GE 3348.5' + KB 31 @ 3379.50usft (Precision 106)
Well:	#707H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	LEAM Multi_User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
12,676.28	12,584.67	-369.73	39.68	100' Heel HL Crossing
23,125.62	12,781.67	-10,731.35	99.89	100' Toe HL Crossing
23,172.00	12,781.76	-10,777.19	107.00	BHL - Projection

Checked By: _____ Approved By: _____ Date: _____