



PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

**Lea County, NM (NAD27 NME)
Fez Federal Com
602H**

OH / 63923

Design: Surveys (McVay 8)

Standard Survey Report

02 January, 2019

HOBBS COG
JAN 09 2020
(RECEIVED)





Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 602H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3269.50usft (McVay 8)
Site:	Fez Federal Com	MD Reference:	RKB @ 3269.50usft (McVay 8)
Well:	602H	North Reference:	Grid
Wellbore:	OH / 63923	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	Fez Federal Com				
Site Position:		Northing:	415,342.20 usft	Latitude:	32° 8' 17.81002 N
From:	Map	Easting:	795,972.50 usft	Longitude:	103° 22' 37.73484 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.51 °

Well	602H				
Well Position	+N/-S	0.00 usft	Northing:	415,347.60 usft	Latitude: 32° 8' 17.80760 N
	+E/-W	0.00 usft	Easting:	796,607.50 usft	Longitude: 103° 22' 30.34989 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level: 3,243.50 usft

Wellbore	OH / 63923				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	12/31/2018	6.66	59.79	47,811.21792083

Design	Surveys (McVay 8)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	0.45	

Survey Program	Date 1/2/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	11,688.00	Scientific Gyro Surveys (OH / 63923)	NS-GYRO-MS	North sensing gyrocompassing m/s	
11,759.00	22,355.00	Phoenix MWD Surveys (OH / 63923)	MWD+HDGM	OWSG Rev.2 MWD + HDGM	

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	0.78	170.55	100.00	-0.67	0.11	-0.67	0.78	0.78	0.00	
125.00	0.99	169.22	124.99	-1.05	0.18	-1.05	0.84	0.84	-5.32	
150.00	1.03	185.54	149.99	-1.49	0.20	-1.49	1.16	0.16	65.28	
175.00	1.16	196.52	174.99	-1.95	0.11	-1.95	0.99	0.52	43.92	
200.00	1.40	191.96	199.98	-2.49	-0.03	-2.50	1.04	0.96	-18.24	
225.00	1.40	185.70	224.97	-3.10	-0.12	-3.10	0.61	0.00	-25.04	
250.00	1.37	188.89	249.96	-3.70	-0.20	-3.70	0.33	-0.12	12.76	
275.00	1.39	184.04	274.96	-4.29	-0.27	-4.30	0.47	0.08	-19.40	
300.00	1.38	188.01	299.95	-4.90	-0.33	-4.90	0.39	-0.04	15.88	

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Well:	602H	North Reference:	Grid
Wellbore:	OH / 63923	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
325.00	1.33	188.51	324.94	-5.48	-0.42	-5.48	0.21	-0.20	2.00
350.00	1.34	186.95	349.94	-6.06	-0.49	-6.06	0.15	0.04	-6.24
375.00	1.21	188.62	374.93	-6.61	-0.57	-6.61	0.54	-0.52	6.68
400.00	1.11	186.80	399.92	-7.11	-0.64	-7.11	0.43	-0.40	-7.28
425.00	0.96	188.86	424.92	-7.56	-0.70	-7.56	0.62	-0.60	8.24
450.00	0.97	189.06	449.92	-7.97	-0.76	-7.98	0.04	0.04	0.80
475.00	0.96	183.78	474.91	-8.39	-0.81	-8.40	0.36	-0.04	-21.12
500.00	0.86	176.85	499.91	-8.79	-0.81	-8.79	0.59	-0.40	-27.72
525.00	0.64	183.44	524.91	-9.11	-0.81	-9.12	0.94	-0.88	26.36
550.00	0.40	176.87	549.91	-9.34	-0.82	-9.35	0.99	-0.96	-26.28
575.00	0.30	186.80	574.91	-9.49	-0.82	-9.50	0.47	-0.40	39.72
600.00	0.23	184.15	599.91	-9.61	-0.83	-9.61	0.28	-0.28	-10.60
625.00	0.14	195.66	624.91	-9.69	-0.84	-9.69	0.39	-0.36	46.04
650.00	0.14	192.56	649.91	-9.75	-0.86	-9.75	0.03	0.00	-12.40
675.00	0.10	227.10	674.91	-9.79	-0.88	-9.80	0.32	-0.16	138.16
700.00	0.05	306.06	699.91	-9.80	-0.90	-9.81	0.41	-0.20	315.84
725.00	0.06	341.56	724.91	-9.78	-0.92	-9.79	0.14	0.04	142.00
750.00	0.10	349.70	749.91	-9.75	-0.93	-9.75	0.17	0.16	32.56
775.00	0.16	345.91	774.91	-9.69	-0.94	-9.70	0.24	0.24	-15.16
800.00	0.16	359.06	799.91	-9.62	-0.95	-9.63	0.15	0.00	52.60
825.00	0.18	351.31	824.91	-9.55	-0.95	-9.56	0.12	0.08	-31.00
850.00	0.23	353.68	849.91	-9.46	-0.97	-9.47	0.20	0.20	9.48
875.00	0.21	11.13	874.91	-9.37	-0.96	-9.37	0.28	-0.08	69.80
900.00	0.28	354.26	899.91	-9.26	-0.96	-9.27	0.40	0.28	-67.48
925.00	0.32	0.16	924.91	-9.13	-0.97	-9.14	0.20	0.16	23.60
950.00	0.31	0.49	949.90	-8.99	-0.96	-9.00	0.04	-0.04	1.32
975.00	0.31	359.29	974.90	-8.86	-0.96	-8.86	0.03	0.00	-4.80
1,000.00	0.34	354.66	999.90	-8.71	-0.97	-8.72	0.16	0.12	-18.52
1,025.00	0.33	358.06	1,024.90	-8.57	-0.98	-8.58	0.09	-0.04	13.60
1,050.00	0.30	1.40	1,049.90	-8.43	-0.98	-8.44	0.14	-0.12	13.36
1,075.00	0.31	346.72	1,074.90	-8.30	-1.00	-8.31	0.31	0.04	-58.72
1,100.00	0.26	343.86	1,099.90	-8.18	-1.03	-8.19	0.21	-0.20	-11.44
1,125.00	0.28	339.88	1,124.90	-8.07	-1.06	-8.08	0.11	0.08	-15.92
1,150.00	0.26	339.74	1,149.90	-7.96	-1.11	-7.97	0.08	-0.08	-0.56
1,175.00	0.31	341.81	1,174.90	-7.84	-1.15	-7.85	0.20	0.20	8.28
1,200.00	0.23	335.78	1,199.90	-7.73	-1.19	-7.74	0.34	-0.32	-24.12
1,225.00	0.23	337.40	1,224.90	-7.64	-1.23	-7.65	0.03	0.00	6.48
1,250.00	0.23	336.77	1,249.90	-7.55	-1.27	-7.56	0.01	0.00	-2.52
1,275.00	0.26	332.23	1,274.90	-7.45	-1.31	-7.46	0.14	0.12	-18.16
1,300.00	0.27	332.66	1,299.90	-7.35	-1.37	-7.36	0.04	0.04	1.72
1,325.00	0.22	328.46	1,324.90	-7.25	-1.42	-7.26	0.21	-0.20	-16.80
1,350.00	0.15	330.52	1,349.90	-7.18	-1.46	-7.20	0.28	-0.28	8.24
1,375.00	0.10	326.54	1,374.90	-7.14	-1.49	-7.15	0.20	-0.20	-15.92



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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	0.13	324.56	1,399.90	-7.10	-1.52	-7.11	0.12	0.12	-7.92
1,425.00	0.21	299.64	1,424.90	-7.05	-1.57	-7.06	0.43	0.32	-99.68
1,450.00	0.26	291.16	1,449.90	-7.01	-1.67	-7.02	0.24	0.20	-33.92
1,475.00	0.24	286.00	1,474.90	-6.97	-1.77	-6.99	0.12	-0.08	-20.64
1,500.00	0.23	288.21	1,499.90	-6.94	-1.87	-6.96	0.05	-0.04	8.84
1,525.00	0.25	286.23	1,524.90	-6.91	-1.97	-6.93	0.09	0.08	-7.92
1,550.00	0.30	288.60	1,549.90	-6.88	-2.08	-6.89	0.21	0.20	9.48
1,575.00	0.28	286.22	1,574.90	-6.84	-2.20	-6.85	0.09	-0.08	-9.52
1,600.00	0.29	290.39	1,599.90	-6.80	-2.32	-6.82	0.09	0.04	16.68
1,625.00	0.26	279.93	1,624.90	-6.77	-2.43	-6.79	0.23	-0.12	-41.84
1,650.00	0.26	280.51	1,649.90	-6.75	-2.55	-6.77	0.01	0.00	2.32
1,675.00	0.29	294.64	1,674.90	-6.71	-2.66	-6.73	0.30	0.12	56.52
1,700.00	0.26	280.09	1,699.90	-6.67	-2.77	-6.69	0.30	-0.12	-58.20
1,725.00	0.25	288.38	1,724.90	-6.65	-2.88	-6.67	0.15	-0.04	33.16
1,750.00	0.27	278.33	1,749.90	-6.62	-2.99	-6.64	0.20	0.08	-40.20
1,775.00	0.28	272.70	1,774.90	-6.61	-3.11	-6.63	0.12	0.04	-22.52
1,800.00	0.29	269.47	1,799.90	-6.61	-3.23	-6.63	0.08	0.04	-12.92
1,825.00	0.30	268.88	1,824.90	-6.61	-3.36	-6.63	0.04	0.04	-2.36
1,850.00	0.31	264.24	1,849.90	-6.62	-3.50	-6.64	0.11	0.04	-18.56
1,875.00	0.33	272.50	1,874.89	-6.62	-3.63	-6.65	0.20	0.08	33.04
1,900.00	0.39	282.49	1,899.89	-6.60	-3.79	-6.63	0.35	0.24	39.96
1,925.00	0.36	288.88	1,924.89	-6.55	-3.95	-6.59	0.21	-0.12	25.56
1,950.00	0.39	291.50	1,949.89	-6.50	-4.10	-6.53	0.14	0.12	10.48
1,975.00	0.28	293.54	1,974.89	-6.44	-4.24	-6.48	0.44	-0.44	8.16
2,000.00	0.24	289.41	1,999.89	-6.40	-4.34	-6.43	0.18	-0.16	-16.52
2,025.00	0.28	291.35	2,024.89	-6.36	-4.45	-6.40	0.16	0.16	7.76
2,050.00	0.20	286.57	2,049.89	-6.33	-4.55	-6.36	0.33	-0.32	-19.12
2,075.00	0.24	292.24	2,074.89	-6.29	-4.64	-6.33	0.18	0.16	22.68
2,100.00	0.27	294.36	2,099.89	-6.25	-4.74	-6.29	0.13	0.12	8.48
2,125.00	0.24	285.54	2,124.89	-6.21	-4.84	-6.25	0.20	-0.12	-35.28
2,150.00	0.38	290.93	2,149.89	-6.17	-4.97	-6.21	0.57	0.56	21.56
2,175.00	0.34	304.22	2,174.89	-6.10	-5.11	-6.14	0.37	-0.16	53.16
2,200.00	0.32	313.20	2,199.89	-6.01	-5.22	-6.05	0.22	-0.08	35.92
2,225.00	0.35	317.52	2,224.89	-5.90	-5.32	-5.94	0.16	0.12	17.28
2,250.00	0.28	333.16	2,249.89	-5.79	-5.40	-5.83	0.44	-0.28	62.56
2,275.00	0.31	336.51	2,274.89	-5.68	-5.46	-5.72	0.14	0.12	13.40
2,300.00	0.26	335.32	2,299.89	-5.56	-5.51	-5.61	0.20	-0.20	-4.76
2,325.00	0.25	342.77	2,324.89	-5.46	-5.55	-5.50	0.14	-0.04	29.80
2,350.00	0.20	328.26	2,349.89	-5.37	-5.59	-5.41	0.30	-0.20	-58.04
2,375.00	0.33	332.14	2,374.89	-5.27	-5.64	-5.31	0.52	0.52	15.52
2,400.00	0.39	346.01	2,399.89	-5.12	-5.70	-5.17	0.42	0.24	55.48
2,425.00	0.37	352.51	2,424.89	-4.96	-5.73	-5.00	0.19	-0.08	26.00
2,450.00	0.38	357.24	2,449.89	-4.80	-5.74	-4.84	0.13	0.04	18.92



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2,475.00	0.37	7.51	2,474.89	-4.63	-5.74	-4.68	0.27	-0.04	41.08
2,500.00	0.39	358.03	2,499.89	-4.47	-5.73	-4.51	0.26	0.08	-37.92
2,525.00	0.52	4.22	2,524.88	-4.27	-5.72	-4.32	0.56	0.52	24.76
2,550.00	0.56	16.50	2,549.88	-4.04	-5.68	-4.09	0.49	0.16	49.12
2,575.00	0.58	18.49	2,574.88	-3.80	-5.61	-3.85	0.11	0.08	7.96
2,600.00	0.64	27.90	2,599.88	-3.56	-5.50	-3.60	0.47	0.24	37.64
2,625.00	0.65	23.66	2,624.88	-3.31	-5.38	-3.35	0.20	0.04	-16.96
2,650.00	0.83	26.91	2,649.88	-3.02	-5.24	-3.06	0.74	0.72	13.00
2,675.00	0.85	28.04	2,674.87	-2.69	-5.07	-2.73	0.10	0.08	4.52
2,700.00	0.89	30.66	2,699.87	-2.36	-4.88	-2.40	0.23	0.16	10.48
2,725.00	0.93	33.77	2,724.87	-2.02	-4.67	-2.06	0.25	0.16	12.44
2,750.00	0.93	34.49	2,749.87	-1.69	-4.45	-1.72	0.05	0.00	2.88
2,775.00	1.22	33.86	2,774.86	-1.30	-4.18	-1.33	1.16	1.16	-2.52
2,800.00	1.18	41.69	2,799.86	-0.89	-3.86	-0.92	0.67	-0.16	31.32
2,825.00	1.21	40.47	2,824.85	-0.49	-3.52	-0.52	0.16	0.12	-4.88
2,850.00	1.16	42.40	2,849.84	-0.11	-3.18	-0.13	0.26	-0.20	7.72
2,875.00	1.16	40.10	2,874.84	0.27	-2.84	0.25	0.19	0.00	-9.20
2,900.00	1.26	36.61	2,899.83	0.69	-2.52	0.67	0.50	0.40	-13.96
2,925.00	1.32	39.43	2,924.83	1.13	-2.17	1.11	0.35	0.24	11.28
2,950.00	1.34	42.39	2,949.82	1.57	-1.79	1.56	0.29	0.08	11.84
2,975.00	1.39	42.19	2,974.81	2.01	-1.39	2.00	0.20	0.20	-0.80
3,000.00	1.46	39.31	2,999.81	2.48	-0.98	2.47	0.40	0.28	-11.52
3,025.00	1.42	40.61	3,024.80	2.96	-0.58	2.96	0.21	-0.16	5.20
3,050.00	1.37	37.42	3,049.79	3.44	-0.20	3.43	0.37	-0.20	-12.76
3,075.00	1.48	37.66	3,074.78	3.93	0.18	3.93	0.44	0.44	0.96
3,100.00	1.15	51.80	3,099.78	4.34	0.58	4.34	1.84	-1.32	56.56
3,125.00	0.84	72.89	3,124.77	4.55	0.95	4.56	1.90	-1.24	84.36
3,150.00	0.72	87.40	3,149.77	4.61	1.28	4.62	0.92	-0.48	58.04
3,175.00	0.68	92.33	3,174.77	4.61	1.58	4.62	0.29	-0.16	19.72
3,200.00	0.64	98.81	3,199.77	4.58	1.87	4.60	0.34	-0.16	25.92
3,225.00	0.64	96.73	3,224.77	4.55	2.15	4.56	0.09	0.00	-8.32
3,250.00	0.64	96.00	3,249.76	4.51	2.43	4.53	0.03	0.00	-2.92
3,275.00	0.54	92.50	3,274.76	4.49	2.68	4.52	0.43	-0.40	-14.00
3,300.00	0.60	87.87	3,299.76	4.49	2.93	4.52	0.30	0.24	-18.52
3,325.00	0.68	93.70	3,324.76	4.49	3.21	4.51	0.41	0.32	23.32
3,350.00	0.59	97.99	3,349.76	4.46	3.48	4.49	0.41	-0.36	17.16
3,375.00	0.52	91.90	3,374.76	4.44	3.73	4.47	0.37	-0.28	-24.36
3,400.00	0.44	83.47	3,399.76	4.45	3.93	4.48	0.43	-0.32	-33.72
3,425.00	0.48	82.12	3,424.76	4.47	4.13	4.51	0.17	0.16	-5.40
3,450.00	0.53	87.98	3,449.75	4.49	4.35	4.53	0.29	0.20	23.44
3,475.00	0.50	89.37	3,474.75	4.50	4.58	4.53	0.13	-0.12	5.56
3,500.00	0.49	84.33	3,499.75	4.51	4.79	4.55	0.18	-0.04	-20.16
3,525.00	0.45	75.06	3,524.75	4.54	4.99	4.58	0.34	-0.16	-37.08
3,550.00	0.54	71.55	3,549.75	4.61	5.20	4.65	0.38	0.36	-14.04

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 602H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3269.50usft (McVay 8)
Site:	Fez Federal Com	MD Reference:	RKB @ 3269.50usft (McVay 8)
Well:	602H	North Reference:	Grid
Wellbore:	OH / 63923	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	0.66	72.48	3,574.75	4.69	5.45	4.73	0.48	0.48	3.72
3,600.00	0.65	80.97	3,599.75	4.75	5.73	4.80	0.39	-0.04	33.96
3,625.00	0.57	75.41	3,624.75	4.81	5.99	4.85	0.40	-0.32	-22.24
3,650.00	0.57	69.57	3,649.74	4.88	6.22	4.93	0.23	0.00	-23.36
3,675.00	0.61	65.39	3,674.74	4.98	6.46	5.03	0.23	0.16	-16.72
3,700.00	0.66	77.02	3,699.74	5.07	6.72	5.12	0.55	0.20	46.52
3,725.00	0.60	78.68	3,724.74	5.13	6.99	5.18	0.25	-0.24	6.64
3,750.00	0.58	78.81	3,749.74	5.18	7.24	5.23	0.08	-0.08	0.52
3,775.00	0.66	66.55	3,774.74	5.26	7.50	5.32	0.62	0.32	-49.04
3,800.00	0.72	77.85	3,799.74	5.35	7.79	5.41	0.59	0.24	45.20
3,825.00	0.69	79.13	3,824.73	5.41	8.09	5.47	0.14	-0.12	5.12
3,850.00	0.72	78.81	3,849.73	5.47	8.39	5.53	0.12	0.12	-1.28
3,875.00	0.71	75.35	3,874.73	5.54	8.69	5.61	0.18	-0.04	-13.84
3,900.00	0.86	78.59	3,899.73	5.61	9.03	5.69	0.63	0.60	12.96
3,925.00	0.88	84.42	3,924.72	5.67	9.40	5.74	0.36	0.08	23.32
3,950.00	0.92	86.22	3,949.72	5.70	9.79	5.78	0.20	0.16	7.20
3,975.00	1.00	86.03	3,974.72	5.73	10.21	5.81	0.32	0.32	-0.76
4,000.00	0.97	77.42	3,999.71	5.79	10.64	5.88	0.60	-0.12	-34.44
4,025.00	1.04	81.44	4,024.71	5.87	11.07	5.96	0.40	0.28	16.08
4,050.00	0.88	85.12	4,049.71	5.92	11.48	6.01	0.69	-0.64	14.72
4,075.00	0.12	132.24	4,074.71	5.92	11.69	6.01	3.21	-3.04	188.48
4,100.00	0.56	246.54	4,099.71	5.85	11.60	5.95	2.48	1.76	457.20
4,125.00	0.46	235.56	4,124.70	5.75	11.41	5.84	0.56	-0.40	-43.92
4,150.00	0.45	228.01	4,149.70	5.63	11.25	5.71	0.24	-0.04	-30.20
4,175.00	0.44	239.85	4,174.70	5.51	11.09	5.60	0.37	-0.04	47.36
4,200.00	0.29	221.24	4,199.70	5.42	10.97	5.50	0.76	-0.60	-74.44
4,225.00	0.18	159.49	4,224.70	5.33	10.94	5.42	1.04	-0.44	-247.00
4,250.00	0.42	116.94	4,249.70	5.25	11.04	5.34	1.25	0.96	-170.20
4,275.00	0.75	103.90	4,274.70	5.17	11.28	5.26	1.42	1.32	-52.16
4,300.00	0.90	96.49	4,299.70	5.11	11.63	5.20	0.74	0.60	-29.64
4,325.00	0.97	97.10	4,324.70	5.06	12.04	5.16	0.28	0.28	2.44
4,350.00	0.93	98.61	4,349.69	5.01	12.45	5.10	0.19	-0.16	6.04
4,375.00	1.01	95.80	4,374.69	4.95	12.87	5.06	0.37	0.32	-11.24
4,400.00	0.92	102.49	4,399.68	4.89	13.28	4.99	0.58	-0.36	26.76
4,425.00	0.88	105.91	4,424.68	4.79	13.66	4.90	0.27	-0.16	13.68
4,450.00	0.62	131.40	4,449.68	4.65	13.95	4.76	1.67	-1.04	101.96
4,475.00	0.92	216.01	4,474.68	4.40	13.93	4.51	4.24	1.20	338.44
4,500.00	2.06	238.23	4,499.67	4.00	13.43	4.11	5.03	4.56	88.88
4,525.00	2.92	243.10	4,524.65	3.48	12.48	3.57	3.54	3.44	19.48
4,550.00	3.28	244.45	4,549.61	2.88	11.27	2.97	1.47	1.44	5.40
4,575.00	3.48	244.71	4,574.57	2.25	9.94	2.32	0.80	0.80	1.04
4,600.00	3.51	245.44	4,599.52	1.60	8.56	1.67	0.21	0.12	2.92
4,625.00	3.51	246.98	4,624.47	0.99	7.15	1.04	0.38	0.00	6.16



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
TVD Reference: RKB @ 3269.50usft (McVay 8)
MD Reference: RKB @ 3269.50usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	3.69	244.44	4,649.42	0.34	5.72	0.39	0.96	0.72	-10.16
4,675.00	3.71	245.55	4,674.37	-0.34	4.26	-0.31	0.30	0.08	4.44
4,700.00	3.94	243.55	4,699.31	-1.06	2.76	-1.04	1.06	0.92	-8.00
4,725.00	4.11	242.83	4,724.25	-1.85	1.19	-1.84	0.71	0.68	-2.88
4,750.00	4.06	243.81	4,749.19	-2.65	-0.40	-2.65	0.34	-0.20	3.92
4,775.00	4.04	243.38	4,774.13	-3.44	-1.98	-3.45	0.15	-0.08	-1.72
4,800.00	4.10	243.06	4,799.06	-4.24	-3.57	-4.26	0.26	0.24	-1.28
4,825.00	3.72	241.83	4,824.01	-5.02	-5.08	-5.06	1.56	-1.52	-4.92
4,850.00	2.93	234.25	4,848.96	-5.78	-6.31	-5.83	3.61	-3.16	-30.32
4,875.00	1.84	212.47	4,873.94	-6.49	-7.04	-6.55	5.60	-4.36	-87.12
4,900.00	1.62	189.38	4,898.93	-7.18	-7.32	-7.24	2.90	-0.88	-92.36
4,925.00	1.51	175.34	4,923.92	-7.86	-7.35	-7.91	1.59	-0.44	-56.16
4,950.00	1.55	170.12	4,948.91	-8.52	-7.26	-8.57	0.58	0.16	-20.88
4,975.00	1.51	170.95	4,973.90	-9.18	-7.15	-9.23	0.18	-0.16	3.32
5,000.00	1.53	166.26	4,998.90	-9.82	-7.02	-9.88	0.50	0.08	-18.76
5,025.00	1.51	168.14	5,023.89	-10.47	-6.88	-10.52	0.21	-0.08	7.52
5,050.00	1.55	162.63	5,048.88	-11.12	-6.71	-11.17	0.61	0.16	-22.04
5,075.00	1.54	164.54	5,073.87	-11.76	-6.52	-11.81	0.21	-0.04	7.64
5,100.00	1.43	158.70	5,098.86	-12.38	-6.31	-12.43	0.75	-0.44	-23.36
5,125.00	1.40	159.90	5,123.85	-12.95	-6.10	-13.00	0.17	-0.12	4.80
5,150.00	1.31	161.27	5,148.85	-13.51	-5.90	-13.56	0.38	-0.36	5.48
5,175.00	1.18	156.66	5,173.84	-14.02	-5.71	-14.06	0.66	-0.52	-18.44
5,200.00	1.32	160.69	5,198.83	-14.53	-5.51	-14.57	0.66	0.56	16.12
5,225.00	1.28	162.37	5,223.83	-15.06	-5.33	-15.11	0.22	-0.16	6.72
5,250.00	1.29	159.44	5,248.82	-15.59	-5.14	-15.63	0.27	0.04	-11.72
5,275.00	1.20	161.26	5,273.81	-16.11	-4.96	-16.14	0.39	-0.36	7.28
5,300.00	1.23	160.47	5,298.81	-16.61	-4.79	-16.64	0.14	0.12	-3.16
5,325.00	1.20	163.49	5,323.80	-17.11	-4.62	-17.15	0.28	-0.12	12.08
5,350.00	1.23	159.29	5,348.80	-17.61	-4.45	-17.65	0.38	0.12	-16.80
5,375.00	1.19	158.79	5,373.79	-18.11	-4.27	-18.14	0.17	-0.16	-2.00
5,400.00	1.20	160.14	5,398.79	-18.59	-4.08	-18.63	0.12	0.04	5.40
5,425.00	1.25	161.46	5,423.78	-19.10	-3.91	-19.13	0.23	0.20	5.28
5,450.00	1.23	160.46	5,448.78	-19.61	-3.73	-19.64	0.12	-0.08	-4.00
5,475.00	1.23	159.95	5,473.77	-20.11	-3.55	-20.14	0.04	0.00	-2.04
5,500.00	1.12	160.26	5,498.76	-20.60	-3.37	-20.62	0.44	-0.44	1.24
5,525.00	1.17	158.35	5,523.76	-21.06	-3.20	-21.09	0.25	0.20	-7.64
5,550.00	1.12	158.47	5,548.75	-21.53	-3.01	-21.55	0.20	-0.20	0.48
5,575.00	1.23	156.25	5,573.75	-22.00	-2.82	-22.02	0.48	0.44	-8.88
5,600.00	1.22	157.70	5,598.74	-22.49	-2.61	-22.51	0.13	-0.04	5.80
5,625.00	1.19	158.73	5,623.74	-22.98	-2.41	-23.00	0.15	-0.12	4.12
5,650.00	1.17	159.54	5,648.73	-23.46	-2.23	-23.48	0.10	-0.08	3.24
5,675.00	1.20	158.23	5,673.73	-23.94	-2.04	-23.96	0.16	0.12	-5.24
5,700.00	1.17	154.98	5,698.72	-24.42	-1.84	-24.43	0.29	-0.12	-13.00



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
TVD Reference: RKB @ 3269.50usft (McVay 8)
MD Reference: RKB @ 3269.50usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,725.00	1.25	151.78	5,723.72	-24.89	-1.60	-24.90	0.42	0.32	-12.80
5,750.00	1.27	154.86	5,748.71	-25.38	-1.35	-25.39	0.28	0.08	12.32
5,775.00	1.13	153.14	5,773.70	-25.85	-1.12	-25.86	0.58	-0.56	-6.88
5,800.00	1.29	153.49	5,798.70	-26.32	-0.89	-26.33	0.64	0.64	1.40
5,825.00	1.26	153.41	5,823.69	-26.82	-0.64	-26.83	0.12	-0.12	-0.32
5,850.00	1.22	151.68	5,848.69	-27.30	-0.39	-27.30	0.22	-0.16	-6.92
5,875.00	1.37	151.09	5,873.68	-27.80	-0.12	-27.80	0.60	0.60	-2.36
5,900.00	1.23	153.63	5,898.67	-28.30	0.14	-28.30	0.61	-0.56	10.16
5,925.00	1.30	150.57	5,923.67	-28.79	0.40	-28.78	0.39	0.28	-12.24
5,950.00	1.32	152.56	5,948.66	-29.29	0.67	-29.28	0.20	0.08	7.96
5,975.00	1.20	148.36	5,973.66	-29.77	0.94	-29.76	0.61	-0.48	-16.80
6,000.00	1.24	148.18	5,998.65	-30.22	1.22	-30.21	0.16	0.16	-0.72
6,025.00	1.36	147.10	6,023.64	-30.70	1.53	-30.69	0.49	0.48	-4.32
6,050.00	1.31	149.60	6,048.64	-31.20	1.83	-31.18	0.31	-0.20	10.00
6,075.00	1.24	143.92	6,073.63	-31.66	2.14	-31.64	0.58	-0.28	-22.72
6,100.00	1.38	145.91	6,098.62	-32.13	2.47	-32.11	0.59	0.56	7.96
6,125.00	1.26	146.18	6,123.62	-32.61	2.79	-32.58	0.48	-0.48	1.08
6,150.00	1.46	145.93	6,148.61	-33.10	3.12	-33.07	0.80	0.80	-1.00
6,175.00	1.33	146.04	6,173.60	-33.60	3.46	-33.57	0.52	-0.52	0.44
6,200.00	1.24	141.77	6,198.60	-34.06	3.79	-34.03	0.53	-0.36	-17.08
6,225.00	1.32	147.31	6,223.59	-34.51	4.11	-34.48	0.59	0.32	22.16
6,250.00	1.09	150.96	6,248.58	-34.96	4.38	-34.93	0.97	-0.92	14.60
6,275.00	0.84	169.68	6,273.58	-35.35	4.53	-35.31	1.60	-1.00	74.88
6,300.00	0.73	187.63	6,298.58	-35.69	4.54	-35.65	1.07	-0.44	71.80
6,325.00	0.77	194.97	6,323.58	-36.01	4.48	-35.97	0.42	0.16	29.36
6,350.00	0.75	199.96	6,348.57	-36.32	4.38	-36.29	0.28	-0.08	19.96
6,375.00	0.70	198.38	6,373.57	-36.62	4.28	-36.59	0.22	-0.20	-6.32
6,400.00	0.71	191.51	6,398.57	-36.92	4.20	-36.88	0.34	0.04	-27.48
6,425.00	0.82	196.62	6,423.57	-37.24	4.11	-37.21	0.52	0.44	20.44
6,450.00	0.72	197.23	6,448.57	-37.56	4.02	-37.53	0.40	-0.40	2.44
6,475.00	0.81	191.44	6,473.56	-37.89	3.94	-37.85	0.47	0.36	-23.16
6,500.00	0.80	202.14	6,498.56	-38.22	3.83	-38.19	0.60	-0.04	42.80
6,525.00	0.85	196.04	6,523.56	-38.56	3.72	-38.53	0.40	0.20	-24.40
6,550.00	0.82	201.55	6,548.56	-38.91	3.60	-38.88	0.34	-0.12	22.04
6,575.00	0.80	194.87	6,573.55	-39.24	3.49	-39.21	0.39	-0.08	-26.72
6,600.00	0.77	202.62	6,598.55	-39.57	3.38	-39.54	0.44	-0.12	31.00
6,625.00	0.89	199.77	6,623.55	-39.90	3.25	-39.88	0.51	0.48	-11.40
6,650.00	0.85	200.20	6,648.55	-40.26	3.12	-40.23	0.16	-0.16	1.72
6,675.00	0.80	201.98	6,673.54	-40.60	2.99	-40.57	0.22	-0.20	7.12
6,700.00	0.79	199.54	6,698.54	-40.92	2.87	-40.90	0.14	-0.04	-9.76
6,725.00	0.42	210.67	6,723.54	-41.16	2.76	-41.14	1.55	-1.48	44.52
6,750.00	0.14	261.87	6,748.54	-41.24	2.69	-41.22	1.40	-1.12	204.80
6,775.00	0.39	334.78	6,773.54	-41.17	2.62	-41.15	1.49	1.00	291.64
6,800.00	0.53	351.21	6,798.54	-40.98	2.57	-40.96	0.76	0.56	65.72



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
TVD Reference: RKB @ 3269.50usft (McVay 8)
MD Reference: RKB @ 3269.50usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	0.54	351.40	6,823.54	-40.75	2.53	-40.73	0.04	0.04	0.76
6,850.00	0.55	0.05	6,848.54	-40.51	2.51	-40.49	0.33	0.04	34.60
6,875.00	0.68	357.33	6,873.53	-40.24	2.51	-40.22	0.53	0.52	-10.88
6,900.00	0.51	2.89	6,898.53	-39.99	2.51	-39.96	0.72	-0.68	22.24
6,925.00	0.54	2.96	6,923.53	-39.76	2.52	-39.74	0.12	0.12	0.28
6,950.00	0.41	2.79	6,948.53	-39.55	2.53	-39.53	0.52	-0.52	-0.68
6,975.00	0.51	0.32	6,973.53	-39.35	2.53	-39.33	0.41	0.40	-9.88
7,000.00	0.53	4.16	6,998.53	-39.12	2.54	-39.10	0.16	0.08	15.36
7,025.00	0.61	7.22	7,023.53	-38.88	2.57	-38.85	0.34	0.32	12.24
7,050.00	0.57	4.20	7,048.53	-38.62	2.59	-38.60	0.20	-0.16	-12.08
7,075.00	0.56	3.59	7,073.53	-38.37	2.61	-38.35	0.05	-0.04	-2.44
7,100.00	0.62	6.97	7,098.52	-38.12	2.63	-38.10	0.28	0.24	13.52
7,125.00	0.69	359.78	7,123.52	-37.83	2.65	-37.81	0.43	0.28	-28.76
7,150.00	0.63	6.01	7,148.52	-37.54	2.66	-37.52	0.37	-0.24	24.92
7,175.00	0.65	358.44	7,173.52	-37.27	2.67	-37.24	0.35	0.08	-30.28
7,200.00	0.56	1.60	7,198.52	-37.00	2.67	-36.98	0.38	-0.36	12.64
7,225.00	0.78	356.80	7,223.52	-36.71	2.67	-36.69	0.91	0.88	-19.20
7,250.00	0.67	359.58	7,248.51	-36.39	2.66	-36.37	0.46	-0.44	11.12
7,275.00	0.83	357.32	7,273.51	-36.07	2.65	-36.05	0.65	0.64	-9.04
7,300.00	0.69	357.41	7,298.51	-35.74	2.63	-35.71	0.56	-0.56	0.36
7,325.00	0.70	358.58	7,323.51	-35.43	2.62	-35.41	0.07	0.04	4.68
7,350.00	0.64	354.46	7,348.51	-35.14	2.60	-35.12	0.31	-0.24	-16.48
7,375.00	0.78	350.90	7,373.50	-34.83	2.56	-34.81	0.59	0.56	-14.24
7,400.00	0.74	344.26	7,398.50	-34.51	2.49	-34.49	0.39	-0.16	-26.56
7,425.00	0.89	350.85	7,423.50	-34.16	2.42	-34.14	0.71	0.60	26.36
7,450.00	0.82	354.20	7,448.50	-33.79	2.37	-33.77	0.34	-0.28	13.40
7,475.00	0.89	347.39	7,473.49	-33.43	2.31	-33.41	0.49	0.28	-27.24
7,500.00	0.87	346.69	7,498.49	-33.05	2.22	-33.03	0.09	-0.08	-2.80
7,525.00	0.83	344.41	7,523.49	-32.69	2.13	-32.68	0.21	-0.16	-9.12
7,550.00	0.98	346.73	7,548.49	-32.31	2.03	-32.29	0.62	0.60	9.28
7,575.00	0.97	348.04	7,573.48	-31.90	1.94	-31.88	0.10	-0.04	5.24
7,600.00	0.94	345.99	7,598.48	-31.49	1.85	-31.47	0.18	-0.12	-8.20
7,625.00	0.87	343.62	7,623.48	-31.11	1.74	-31.09	0.32	-0.28	-9.48
7,650.00	0.74	343.56	7,648.47	-30.77	1.64	-30.76	0.52	-0.52	-0.24
7,675.00	0.78	334.41	7,673.47	-30.46	1.52	-30.45	0.51	0.16	-36.60
7,700.00	0.97	339.71	7,698.47	-30.11	1.38	-30.10	0.83	0.76	21.20
7,725.00	0.85	341.81	7,723.46	-29.74	1.25	-29.73	0.50	-0.48	8.40
7,750.00	0.79	337.87	7,748.46	-29.40	1.12	-29.39	0.33	-0.24	-15.76
7,775.00	0.72	333.96	7,773.46	-29.10	0.99	-29.09	0.35	-0.28	-15.64
7,800.00	0.72	325.76	7,798.46	-28.83	0.83	-28.82	0.41	0.00	-32.80
7,825.00	0.73	336.47	7,823.46	-28.55	0.68	-28.55	0.54	0.04	42.84
7,850.00	0.73	322.93	7,848.45	-28.28	0.52	-28.28	0.69	0.00	-54.16
7,875.00	0.76	322.50	7,873.45	-28.02	0.32	-28.02	0.12	0.12	-1.72



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
TVD Reference: RKB @ 3269.50usft (McVay 8)
MD Reference: RKB @ 3269.50usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	0.66	312.51	7,898.45	-27.79	0.12	-27.79	0.64	-0.40	-39.96
7,925.00	0.77	316.92	7,923.45	-27.57	-0.10	-27.57	0.49	0.44	17.64
7,950.00	0.68	305.71	7,948.45	-27.36	-0.34	-27.37	0.67	-0.36	-44.84
7,975.00	0.72	310.92	7,973.44	-27.17	-0.58	-27.18	0.30	0.16	20.84
8,000.00	0.65	308.33	7,998.44	-26.98	-0.81	-26.99	0.31	-0.28	-10.36
8,025.00	0.67	303.85	8,023.44	-26.81	-1.04	-26.82	0.22	0.08	-17.92
8,050.00	0.70	307.68	8,048.44	-26.64	-1.28	-26.65	0.22	0.12	15.32
8,075.00	0.68	306.50	8,073.44	-26.46	-1.52	-26.47	0.10	-0.08	-4.72
8,100.00	0.64	304.99	8,098.44	-26.29	-1.76	-26.30	0.17	-0.16	-6.04
8,125.00	0.61	295.83	8,123.43	-26.15	-1.99	-26.17	0.42	-0.12	-36.64
8,150.00	0.65	292.43	8,148.43	-26.04	-2.24	-26.06	0.22	0.16	-13.60
8,175.00	0.68	288.35	8,173.43	-25.94	-2.51	-25.96	0.22	0.12	-16.32
8,200.00	0.47	278.18	8,198.43	-25.88	-2.76	-25.90	0.93	-0.84	-40.68
8,225.00	0.62	270.45	8,223.43	-25.86	-2.99	-25.88	0.67	0.60	-30.92
8,250.00	0.57	272.35	8,248.43	-25.86	-3.25	-25.88	0.21	-0.20	7.60
8,275.00	0.53	257.08	8,273.43	-25.88	-3.49	-25.90	0.61	-0.16	-61.08
8,300.00	0.66	268.07	8,298.42	-25.91	-3.75	-25.94	0.69	0.52	43.96
8,325.00	0.63	268.70	8,323.42	-25.92	-4.03	-25.95	0.12	-0.12	2.52
8,350.00	0.56	264.72	8,348.42	-25.93	-4.29	-25.96	0.33	-0.28	-15.92
8,375.00	0.61	253.84	8,373.42	-25.98	-4.54	-26.01	0.49	0.20	-43.52
8,400.00	0.54	264.37	8,398.42	-26.03	-4.78	-26.06	0.51	-0.28	42.12
8,425.00	0.59	256.17	8,423.42	-26.07	-5.02	-26.11	0.38	0.20	-32.80
8,450.00	0.65	267.13	8,448.42	-26.11	-5.29	-26.15	0.53	0.24	43.84
8,475.00	0.59	271.59	8,473.41	-26.11	-5.56	-26.15	0.31	-0.24	17.84
8,500.00	0.64	259.82	8,498.41	-26.13	-5.83	-26.18	0.54	0.20	-47.08
8,525.00	0.69	270.74	8,523.41	-26.15	-6.11	-26.20	0.54	0.20	43.68
8,550.00	0.55	268.88	8,548.41	-26.15	-6.38	-26.20	0.57	-0.56	-7.44
8,575.00	0.60	277.54	8,573.41	-26.14	-6.63	-26.19	0.40	0.20	34.64
8,600.00	0.56	279.90	8,598.41	-26.10	-6.88	-26.15	0.19	-0.16	9.44
8,625.00	0.43	275.68	8,623.41	-26.07	-7.10	-26.13	0.54	-0.52	-16.88
8,650.00	0.62	277.47	8,648.41	-26.04	-7.33	-26.10	0.76	0.76	7.16
8,675.00	0.59	283.38	8,673.40	-26.00	-7.59	-26.06	0.28	-0.12	23.64
8,700.00	0.58	285.71	8,698.40	-25.93	-7.83	-25.99	0.10	-0.04	9.32
8,725.00	0.53	290.80	8,723.40	-25.86	-8.06	-25.92	0.28	-0.20	20.36
8,750.00	0.60	297.82	8,748.40	-25.76	-8.29	-25.82	0.39	0.28	28.08
8,775.00	0.34	280.63	8,773.40	-25.68	-8.47	-25.75	1.17	-1.04	-68.76
8,800.00	0.26	273.50	8,798.40	-25.66	-8.60	-25.73	0.35	-0.32	-28.52
8,825.00	0.31	274.26	8,823.40	-25.65	-8.73	-25.72	0.20	0.20	3.04
8,850.00	0.21	256.04	8,848.40	-25.66	-8.84	-25.73	0.51	-0.40	-72.88
8,875.00	0.22	269.95	8,873.40	-25.67	-8.93	-25.74	0.21	0.04	55.64
8,900.00	0.24	249.40	8,898.40	-25.69	-9.03	-25.76	0.34	0.08	-82.20
8,925.00	0.40	249.78	8,923.40	-25.74	-9.16	-25.81	0.64	0.64	1.52
8,950.00	0.31	224.28	8,948.40	-25.82	-9.29	-25.89	0.72	-0.36	-102.00



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
TVD Reference: RKB @ 3269.50usft (McVay 8)
MD Reference: RKB @ 3269.50usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	0.54	225.10	8,973.40	-25.95	-9.42	-26.02	0.92	0.92	3.28
9,000.00	0.68	212.04	8,998.40	-26.16	-9.58	-26.23	0.79	0.56	-52.24
9,025.00	0.69	209.99	9,023.39	-26.41	-9.74	-26.49	0.11	0.04	-8.20
9,050.00	0.75	214.93	9,048.39	-26.68	-9.91	-26.76	0.35	0.24	19.76
9,075.00	0.81	205.78	9,073.39	-26.97	-10.08	-27.05	0.55	0.24	-36.60
9,100.00	0.80	215.76	9,098.39	-27.27	-10.25	-27.35	0.56	-0.04	39.92
9,125.00	0.68	209.07	9,123.38	-27.54	-10.43	-27.63	0.59	-0.48	-26.76
9,150.00	0.88	212.58	9,148.38	-27.84	-10.60	-27.92	0.82	0.80	14.04
9,175.00	0.73	221.03	9,173.38	-28.12	-10.81	-28.20	0.76	-0.60	33.80
9,200.00	0.64	233.62	9,198.38	-28.32	-11.03	-28.41	0.70	-0.36	50.36
9,225.00	0.60	231.21	9,223.38	-28.49	-11.24	-28.57	0.19	-0.16	-9.64
9,250.00	0.51	233.65	9,248.38	-28.63	-11.44	-28.72	0.37	-0.36	9.76
9,275.00	0.42	243.08	9,273.37	-28.74	-11.61	-28.83	0.47	-0.36	37.72
9,300.00	0.42	243.48	9,298.37	-28.82	-11.77	-28.91	0.01	0.00	1.60
9,325.00	0.27	259.90	9,323.37	-28.87	-11.91	-28.97	0.71	-0.60	65.68
9,350.00	0.32	260.79	9,348.37	-28.90	-12.04	-28.99	0.20	0.20	3.56
9,375.00	0.35	272.80	9,373.37	-28.90	-12.18	-29.00	0.30	0.12	48.04
9,400.00	0.38	280.52	9,398.37	-28.88	-12.34	-28.98	0.23	0.12	30.88
9,425.00	0.25	269.38	9,423.37	-28.87	-12.48	-28.97	0.57	-0.52	-44.56
9,450.00	0.42	282.32	9,448.37	-28.85	-12.62	-28.95	0.74	0.68	51.76
9,475.00	0.42	274.83	9,473.37	-28.82	-12.80	-28.92	0.22	0.00	-29.96
9,500.00	0.39	290.15	9,498.37	-28.79	-12.97	-28.89	0.45	-0.12	61.28
9,525.00	0.51	289.87	9,523.37	-28.72	-13.16	-28.82	0.48	0.48	-1.12
9,550.00	0.55	310.30	9,548.37	-28.60	-13.35	-28.71	0.77	0.16	81.72
9,575.00	0.48	314.43	9,573.37	-28.45	-13.52	-28.56	0.32	-0.28	16.52
9,600.00	0.52	312.09	9,598.37	-28.30	-13.68	-28.41	0.18	0.16	-9.36
9,625.00	0.55	317.39	9,623.37	-28.14	-13.84	-28.25	0.23	0.12	21.20
9,650.00	0.60	327.02	9,648.36	-27.94	-14.00	-28.05	0.43	0.20	38.52
9,675.00	0.70	332.15	9,673.36	-27.70	-14.14	-27.81	0.46	0.40	20.52
9,700.00	0.65	335.09	9,698.36	-27.43	-14.27	-27.54	0.24	-0.20	11.76
9,725.00	0.70	332.28	9,723.36	-27.17	-14.40	-27.28	0.24	0.20	-11.24
9,750.00	0.86	336.27	9,748.36	-26.86	-14.55	-26.98	0.68	0.64	15.96
9,775.00	0.84	349.08	9,773.35	-26.51	-14.66	-26.62	0.76	-0.08	51.24
9,800.00	0.82	349.09	9,798.35	-26.15	-14.73	-26.27	0.08	-0.08	0.04
9,825.00	0.81	351.55	9,823.35	-25.80	-14.79	-25.92	0.15	-0.04	9.84
9,850.00	0.83	350.18	9,848.35	-25.45	-14.84	-25.57	0.11	0.08	-5.48
9,875.00	0.84	348.83	9,873.34	-25.09	-14.91	-25.21	0.09	0.04	-5.40
9,900.00	0.87	351.80	9,898.34	-24.73	-14.97	-24.84	0.21	0.12	11.88
9,925.00	0.83	349.73	9,923.34	-24.36	-15.03	-24.48	0.20	-0.16	-8.28
9,950.00	0.81	348.44	9,948.34	-24.01	-15.10	-24.13	0.11	-0.08	-5.16
9,975.00	0.89	349.63	9,973.33	-23.64	-15.17	-23.76	0.33	0.32	4.76
10,000.00	0.88	349.75	9,998.33	-23.26	-15.24	-23.38	0.04	-0.04	0.48
10,025.00	0.89	352.21	10,023.33	-22.88	-15.30	-23.00	0.16	0.04	9.84
10,050.00	0.86	350.00	10,048.32	-22.51	-15.36	-22.63	0.18	-0.12	-8.84

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 602H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3269.50usft (McVay 8)
Site:	Fez Federal Com	MD Reference:	RKB @ 3269.50usft (McVay 8)
Well:	602H	North Reference:	Grid
Wellbore:	OH / 63923	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	0.95	354.40	10,073.32	-22.11	-15.41	-22.23	0.45	0.36	17.60
10,100.00	0.79	354.15	10,098.32	-21.74	-15.45	-21.86	0.64	-0.64	-1.00
10,125.00	0.79	354.59	10,123.32	-21.39	-15.48	-21.51	0.02	0.00	1.76
10,150.00	0.62	359.44	10,148.31	-21.09	-15.50	-21.21	0.72	-0.68	19.40
10,175.00	0.43	0.17	10,173.31	-20.86	-15.50	-20.98	0.76	-0.76	2.92
10,200.00	0.21	5.93	10,198.31	-20.72	-15.50	-20.84	0.89	-0.88	23.04
10,225.00	0.06	137.74	10,223.31	-20.68	-15.48	-20.80	1.02	-0.60	527.24
10,250.00	0.38	175.38	10,248.31	-20.77	-15.47	-20.90	1.34	1.28	150.56
10,275.00	0.55	172.15	10,273.31	-20.98	-15.44	-21.10	0.69	0.68	-12.92
10,300.00	0.65	175.18	10,298.31	-21.24	-15.41	-21.36	0.42	0.40	12.12
10,325.00	0.77	176.75	10,323.31	-21.55	-15.39	-21.67	0.49	0.48	6.28
10,350.00	0.82	174.26	10,348.31	-21.89	-15.37	-22.01	0.24	0.20	-9.96
10,375.00	1.03	177.79	10,373.30	-22.29	-15.34	-22.41	0.87	0.84	14.12
10,400.00	1.05	178.67	10,398.30	-22.75	-15.33	-22.87	0.10	0.08	3.52
10,425.00	1.32	184.30	10,423.29	-23.26	-15.34	-23.38	1.17	1.08	22.52
10,450.00	1.68	179.61	10,448.28	-23.92	-15.36	-24.04	1.52	1.44	-18.76
10,475.00	2.03	180.63	10,473.27	-24.73	-15.36	-24.85	1.41	1.40	4.08
10,500.00	2.54	181.95	10,498.25	-25.72	-15.39	-25.84	2.05	2.04	5.28
10,525.00	2.63	182.25	10,523.23	-26.85	-15.43	-26.97	0.36	0.36	1.20
10,550.00	2.93	186.02	10,548.20	-28.06	-15.52	-28.18	1.40	1.20	15.08
10,575.00	3.06	186.41	10,573.16	-29.36	-15.66	-29.48	0.53	0.52	1.56
10,600.00	3.14	187.32	10,598.13	-30.70	-15.82	-30.82	0.38	0.32	3.64
10,625.00	3.32	188.21	10,623.09	-32.09	-16.01	-32.22	0.75	0.72	3.56
10,650.00	3.26	189.49	10,648.04	-33.51	-16.23	-33.64	0.38	-0.24	5.12
10,675.00	3.35	187.51	10,673.00	-34.94	-16.44	-35.07	0.58	0.36	-7.92
10,700.00	3.40	188.20	10,697.96	-36.40	-16.65	-36.52	0.26	0.20	2.76
10,725.00	3.41	188.21	10,722.92	-37.86	-16.86	-38.00	0.04	0.04	0.04
10,750.00	3.37	187.91	10,747.87	-39.33	-17.07	-39.46	0.18	-0.16	-1.20
10,775.00	3.34	187.34	10,772.83	-40.78	-17.26	-40.91	0.18	-0.12	-2.28
10,800.00	3.29	188.63	10,797.79	-42.21	-17.46	-42.35	0.36	-0.20	5.16
10,825.00	3.30	188.11	10,822.75	-43.63	-17.67	-43.77	0.13	0.04	-2.08
10,850.00	3.37	188.27	10,847.70	-45.07	-17.88	-45.21	0.28	0.28	0.64
10,875.00	3.41	187.72	10,872.66	-46.54	-18.08	-46.68	0.21	0.16	-2.20
10,900.00	3.41	188.21	10,897.62	-48.01	-18.29	-48.15	0.12	0.00	1.96
10,925.00	3.39	186.13	10,922.57	-49.48	-18.47	-49.62	0.50	-0.08	-8.32
10,950.00	3.36	186.24	10,947.53	-50.94	-18.63	-51.09	0.12	-0.12	0.44
10,975.00	3.38	184.81	10,972.48	-52.40	-18.77	-52.55	0.35	0.08	-5.72
11,000.00	3.49	184.78	10,997.44	-53.90	-18.90	-54.04	0.44	0.44	-0.12
11,025.00	3.53	185.21	11,022.39	-55.42	-19.03	-55.57	0.19	0.16	1.72
11,050.00	3.60	185.20	11,047.34	-56.97	-19.17	-57.12	0.28	0.28	-0.04
11,075.00	3.47	187.79	11,072.30	-58.50	-19.35	-58.65	0.82	-0.52	10.36
11,100.00	3.40	191.28	11,097.25	-59.98	-19.59	-60.13	0.88	-0.28	13.96
11,125.00	3.38	202.09	11,122.21	-61.39	-20.02	-61.54	2.55	-0.08	43.24



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
TVD Reference: RKB @ 3269.50usft (McVay 8)
MD Reference: RKB @ 3269.50usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	3.45	216.72	11,147.16	-62.67	-20.74	-62.83	3.49	0.28	58.52
11,175.00	3.86	232.62	11,172.11	-63.79	-21.86	-63.96	4.36	1.64	63.60
11,200.00	4.43	241.98	11,197.05	-64.75	-23.38	-64.93	3.53	2.28	37.44
11,225.00	4.83	247.16	11,221.97	-65.61	-25.20	-65.81	2.31	1.60	20.72
11,250.00	5.26	252.10	11,246.87	-66.37	-27.27	-66.59	2.44	1.72	19.76
11,275.00	5.70	255.91	11,271.76	-67.03	-29.56	-67.26	2.28	1.76	15.24
11,300.00	6.11	259.75	11,296.62	-67.57	-32.07	-67.82	2.28	1.64	15.36
11,325.00	6.69	264.63	11,321.47	-67.94	-34.83	-68.21	3.18	2.32	19.52
11,350.00	7.22	268.20	11,346.28	-68.13	-37.85	-68.42	2.73	2.12	14.28
11,375.00	7.57	270.27	11,371.08	-68.17	-41.07	-68.49	1.76	1.40	8.28
11,400.00	7.90	272.26	11,395.85	-68.09	-44.43	-68.44	1.70	1.32	7.96
11,425.00	7.89	274.11	11,420.61	-67.90	-47.86	-68.28	1.02	-0.04	7.40
11,450.00	7.83	275.89	11,445.38	-67.60	-51.27	-68.01	1.00	-0.24	7.12
11,475.00	7.70	274.87	11,470.15	-67.29	-54.63	-67.71	0.76	-0.52	-4.08
11,500.00	7.66	272.90	11,494.92	-67.06	-57.96	-67.51	1.07	-0.16	-7.88
11,525.00	7.48	273.17	11,519.71	-66.89	-61.25	-67.37	0.73	-0.72	1.08
11,550.00	7.32	273.12	11,544.50	-66.71	-64.47	-67.21	0.64	-0.64	-0.20
11,575.00	7.27	272.81	11,569.30	-66.55	-67.64	-67.08	0.25	-0.20	-1.24
11,600.00	7.13	271.92	11,594.10	-66.42	-70.77	-66.97	0.72	-0.56	-3.56
11,625.00	6.99	271.16	11,618.91	-66.33	-73.84	-66.91	0.67	-0.56	-3.04
11,650.00	6.84	270.02	11,643.73	-66.30	-76.85	-66.90	0.81	-0.60	-4.56
11,675.00	6.70	267.69	11,668.55	-66.36	-79.79	-66.99	1.23	-0.56	-9.32
11,688.00	6.60	268.36	11,681.47	-66.41	-81.30	-67.05	0.97	-0.77	5.15
Tie In									
11,759.00	6.48	264.01	11,752.00	-66.95	-89.36	-67.65	0.72	-0.17	-6.13
First Phoenix MWD Survey									
11,854.00	7.15	272.86	11,846.33	-67.21	-100.60	-68.00	1.31	0.71	9.32
11,886.00	11.05	292.29	11,877.93	-65.95	-105.43	-66.77	15.35	12.19	60.72
11,918.00	14.00	298.78	11,909.17	-62.92	-111.66	-63.80	10.20	9.22	20.28
11,950.00	16.76	310.67	11,940.03	-58.05	-118.55	-58.98	13.05	8.63	37.16
11,982.00	20.57	321.99	11,970.35	-50.61	-125.52	-51.59	16.38	11.91	35.38
12,013.00	24.49	332.42	11,998.99	-40.61	-131.85	-41.65	18.01	12.65	33.65
12,045.00	28.01	341.74	12,027.70	-27.59	-137.28	-28.67	16.91	11.00	29.13
12,077.00	30.03	351.39	12,055.69	-12.53	-140.84	-13.63	15.91	6.31	30.16
12,109.00	32.10	357.10	12,083.11	3.89	-142.47	2.77	11.25	6.47	17.84
12,140.00	33.84	3.27	12,109.12	20.74	-142.39	19.62	12.19	5.61	19.90
12,172.00	36.45	8.96	12,135.29	39.03	-140.40	37.93	13.08	8.16	17.78
12,188.81	37.24	10.62	12,148.75	48.96	-138.69	47.87	7.56	4.69	9.88
HL: 12189' MD									
12,204.00	37.97	12.07	12,160.78	58.05	-136.86	56.97	7.56	4.82	9.54
12,236.00	37.99	15.17	12,186.01	77.18	-132.23	76.14	5.96	0.06	9.69
12,268.00	40.27	20.28	12,210.83	96.40	-126.06	95.40	12.34	7.13	15.97
12,300.00	42.28	23.12	12,234.89	116.00	-118.25	115.07	8.59	6.28	8.88
12,331.00	44.37	23.34	12,257.44	135.55	-109.86	134.68	6.76	6.74	0.71



Survey Report



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Wellbore: OH / 63923
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Local Co-ordinate Reference: Well 602H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
12,363.00	48.15	25.04	12,279.56	156.63	-100.38	155.83	12.42	11.81	5.31
12,395.00	53.64	26.15	12,299.73	179.01	-89.65	178.30	17.37	17.16	3.47
12,426.00	58.72	26.57	12,316.98	202.08	-78.21	201.45	16.43	16.39	1.35
12,457.00	61.13	26.15	12,332.52	226.11	-66.30	225.58	7.86	7.77	-1.35
12,488.00	64.37	25.36	12,346.71	250.93	-54.33	250.50	10.69	10.45	-2.55
12,519.00	67.13	24.42	12,359.44	276.57	-42.44	276.23	9.32	8.90	-3.03
12,551.00	70.23	23.95	12,371.07	303.76	-30.23	303.51	9.78	9.69	-1.47
12,583.00	71.42	23.21	12,381.58	331.46	-18.14	331.31	4.31	3.72	-2.31
12,615.00	73.30	22.00	12,391.28	359.61	-6.42	359.55	6.89	5.88	-3.78
12,647.00	75.62	22.30	12,399.85	388.16	5.20	388.19	7.31	7.25	0.94
12,679.00	79.47	21.65	12,406.75	417.13	16.89	417.25	12.19	12.03	-2.03
12,711.00	82.05	20.14	12,411.89	446.64	28.15	446.85	9.31	8.06	-4.72
12,742.00	85.12	18.36	12,415.35	475.72	38.31	476.01	11.43	9.90	-5.74
12,806.00	90.22	15.13	12,417.96	536.93	56.72	537.36	9.43	7.97	-5.05
12,819.00	90.50	14.04	12,417.87	549.51	59.99	549.96	8.66	2.15	-8.38
12,915.00	91.99	12.30	12,415.79	642.95	81.86	643.58	2.39	1.55	-1.81
13,009.00	92.16	11.77	12,412.39	734.83	101.45	735.60	0.59	0.18	-0.56
13,105.00	90.92	11.68	12,409.81	828.79	120.95	829.71	1.30	-1.29	-0.09
13,200.00	90.53	10.33	12,408.60	922.03	139.08	923.10	1.48	-0.41	-1.42
13,294.00	89.30	7.15	12,408.74	1,014.93	153.36	1,016.10	3.63	-1.31	-3.38
13,390.00	88.40	3.12	12,410.67	1,110.50	161.95	1,111.74	4.30	-0.94	-4.20
13,485.00	87.79	359.20	12,413.83	1,205.41	163.87	1,206.66	4.17	-0.64	-4.13
13,580.00	89.38	358.73	12,416.18	1,300.36	162.16	1,301.60	1.75	1.67	-0.49
13,676.00	90.53	0.27	12,416.25	1,396.35	161.32	1,397.58	2.00	1.20	1.60
13,771.00	90.08	355.93	12,415.74	1,491.28	158.17	1,492.47	4.59	-0.47	-4.57
13,867.00	88.77	353.58	12,416.71	1,586.86	149.40	1,587.99	2.80	-1.36	-2.45
13,962.00	89.38	352.01	12,418.24	1,681.10	137.48	1,682.12	1.77	0.64	-1.65
14,057.00	90.59	353.02	12,418.27	1,775.28	125.11	1,776.21	1.66	1.27	1.06
14,152.00	89.44	356.72	12,418.24	1,869.89	116.62	1,870.74	4.08	-1.21	3.89
14,248.00	90.53	358.41	12,418.27	1,965.79	112.54	1,966.62	2.09	1.14	1.76
14,343.00	90.53	1.73	12,417.39	2,060.78	112.65	2,061.60	3.49	0.00	3.49
14,438.00	87.98	1.43	12,418.62	2,155.72	115.27	2,156.56	2.70	-2.68	-0.32
14,533.00	88.68	1.63	12,421.39	2,250.65	117.81	2,251.51	0.77	0.74	0.21
14,629.00	88.18	1.23	12,424.02	2,346.58	120.20	2,347.45	0.67	-0.52	-0.42
14,723.00	89.61	0.98	12,425.83	2,440.55	122.01	2,441.43	1.54	1.52	-0.27
14,818.00	90.36	0.35	12,425.86	2,535.54	123.12	2,536.43	1.03	0.79	-0.66
14,914.00	90.84	359.00	12,424.85	2,631.53	122.57	2,632.41	1.49	0.50	-1.41
15,009.00	93.00	359.69	12,421.67	2,726.46	121.49	2,727.33	2.39	2.27	0.73
15,105.00	93.16	359.48	12,416.51	2,822.32	120.79	2,823.18	0.27	0.17	-0.22
15,200.00	92.63	1.40	12,411.71	2,917.19	121.52	2,918.06	2.09	-0.56	2.02
15,294.00	92.72	1.88	12,407.33	3,011.05	124.21	3,011.93	0.52	0.10	0.51
15,390.00	91.43	0.89	12,403.85	3,106.96	126.53	3,107.86	1.69	-1.34	-1.03
15,486.00	91.01	0.50	12,401.81	3,202.93	127.69	3,203.83	0.60	-0.44	-0.41



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 602H
Wellbore: OH / 63923
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 602H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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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)
15,581.00	91.62	0.48	12,399.63	3,297.90	128.50	3,298.81	0.64	0.64	-0.02
15,677.00	91.96	0.16	12,396.63	3,393.85	129.04	3,394.76	0.49	0.35	-0.33
15,772.00	92.41	0.36	12,393.01	3,488.78	129.47	3,489.69	0.52	0.47	0.21
15,867.00	91.54	359.48	12,389.73	3,583.72	129.34	3,584.63	1.30	-0.92	-0.93
15,963.00	91.18	359.17	12,387.45	3,679.69	128.21	3,680.58	0.49	-0.38	-0.32
16,058.00	91.76	359.36	12,385.02	3,774.65	126.99	3,775.53	0.64	0.61	0.20
16,152.00	93.39	359.91	12,380.79	3,868.55	126.39	3,869.42	1.83	1.73	0.59
16,248.00	91.20	0.18	12,376.95	3,964.47	126.47	3,965.34	2.30	-2.28	0.28
16,343.00	88.12	359.08	12,377.51	4,059.45	125.85	4,060.31	3.44	-3.24	-1.16
16,438.00	88.40	359.44	12,380.40	4,154.40	124.63	4,155.25	0.48	0.29	0.38
16,534.00	89.27	0.05	12,382.35	4,250.37	124.20	4,251.22	1.11	0.91	0.64
16,629.00	89.13	0.28	12,383.68	4,345.36	124.47	4,346.21	0.28	-0.15	0.24
16,724.00	88.60	0.41	12,385.56	4,440.34	125.04	4,441.19	0.57	-0.56	0.14
16,819.00	88.99	0.01	12,387.56	4,535.32	125.39	4,536.17	0.59	0.41	-0.43
16,914.00	91.54	359.57	12,387.12	4,630.31	125.04	4,631.15	2.72	2.68	-0.46
17,009.00	92.52	359.46	12,383.75	4,725.25	124.23	4,726.08	1.04	1.03	-0.12
17,105.00	93.19	359.45	12,378.97	4,821.12	123.32	4,821.94	0.70	0.70	-0.01
17,199.00	93.25	359.53	12,373.69	4,914.97	122.49	4,915.78	0.11	0.06	0.09
17,294.00	92.27	0.49	12,369.12	5,009.86	122.50	5,010.67	1.44	-1.03	1.01
17,389.00	90.92	0.01	12,366.47	5,104.82	122.91	5,105.63	1.51	-1.42	-0.51
17,484.00	90.64	359.44	12,365.18	5,199.81	122.45	5,200.61	0.66	-0.29	-0.59
17,578.00	89.83	358.80	12,364.79	5,293.80	121.01	5,294.58	1.10	-0.86	-0.68
17,673.00	91.62	358.99	12,363.59	5,388.77	119.18	5,389.54	1.89	1.88	0.20
17,767.00	92.63	0.43	12,360.11	5,482.70	118.70	5,483.46	1.87	1.07	1.53
17,865.00	91.46	1.90	12,356.61	5,580.61	120.69	5,581.39	1.92	-1.19	1.50
17,959.00	92.13	2.77	12,353.66	5,674.48	124.52	5,675.29	1.17	0.71	0.93
18,053.00	91.65	2.12	12,350.56	5,768.35	128.53	5,769.18	0.86	-0.51	-0.69
18,148.00	93.59	3.67	12,346.22	5,863.12	133.32	5,863.99	2.61	2.04	1.63
18,242.00	90.53	1.49	12,342.84	5,956.95	137.55	5,957.84	4.00	-3.26	-2.32
18,336.00	89.78	359.81	12,342.59	6,050.94	138.61	6,051.84	1.96	-0.80	-1.79
18,431.00	87.98	359.70	12,344.44	6,145.91	138.21	6,146.81	1.90	-1.89	-0.12
18,526.00	87.70	359.34	12,348.02	6,240.84	137.41	6,241.73	0.48	-0.29	-0.38
18,621.00	87.93	358.63	12,351.65	6,335.76	135.73	6,336.63	0.79	0.24	-0.75
18,717.00	92.32	359.15	12,351.44	6,431.72	133.87	6,432.57	4.60	4.57	0.54
18,811.00	90.95	359.73	12,348.76	6,525.67	132.95	6,526.51	1.58	-1.46	0.62
18,906.00	89.02	359.12	12,348.78	6,620.66	132.00	6,621.49	2.13	-2.03	-0.64
19,001.00	87.39	358.74	12,351.76	6,715.59	130.23	6,716.41	1.76	-1.72	-0.40
19,097.00	87.45	358.68	12,356.08	6,811.47	128.07	6,812.27	0.09	0.06	-0.06
19,192.00	87.42	358.70	12,360.33	6,906.35	125.90	6,907.13	0.04	-0.03	0.02
19,288.00	87.81	359.04	12,364.32	7,002.25	124.00	7,003.01	0.54	0.41	0.35
19,383.00	87.90	359.35	12,367.88	7,097.17	122.67	7,097.92	0.34	0.09	0.33
19,478.00	87.73	359.39	12,371.50	7,192.10	121.63	7,192.83	0.18	-0.18	0.04
19,573.00	88.32	359.80	12,374.78	7,287.04	120.96	7,287.76	0.76	0.62	0.43



Survey Report



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Local Co-ordinate Reference: Well 602H
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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)
19,668.00	88.57	359.86	12,377.35	7,382.00	120.67	7,382.72	0.27	0.26	0.06
19,763.00	88.80	358.59	12,379.53	7,476.97	119.39	7,477.68	1.36	0.24	-1.34
19,859.00	89.13	358.00	12,381.27	7,572.91	116.53	7,573.59	0.70	0.34	-0.61
19,954.00	88.85	357.04	12,382.94	7,667.80	112.42	7,668.45	1.05	-0.29	-1.01
20,050.00	88.40	356.22	12,385.25	7,763.61	106.78	7,764.21	0.97	-0.47	-0.85
20,145.00	88.35	355.89	12,387.94	7,858.35	100.25	7,858.89	0.35	-0.05	-0.35
20,241.00	88.85	356.09	12,390.29	7,954.08	93.54	7,954.57	0.56	0.52	0.21
20,336.00	87.98	355.20	12,392.91	8,048.77	86.33	8,049.20	1.31	-0.92	-0.94
20,431.00	88.12	357.22	12,396.15	8,143.50	80.05	8,143.88	2.13	0.15	2.13
20,527.00	87.11	357.79	12,400.14	8,239.33	75.88	8,239.67	1.21	-1.05	0.59
20,622.00	86.41	357.65	12,405.51	8,334.10	72.10	8,334.41	0.75	-0.74	-0.15
20,718.00	85.99	357.63	12,411.87	8,429.81	68.16	8,430.08	0.44	-0.44	-0.02
20,812.00	85.32	358.36	12,418.99	8,523.48	64.88	8,523.72	1.05	-0.71	0.78
20,907.00	84.87	359.16	12,427.12	8,618.11	62.83	8,618.33	0.96	-0.47	0.84
21,002.00	86.61	359.73	12,434.17	8,712.84	61.91	8,713.05	1.93	1.83	0.60
21,098.00	87.03	1.22	12,439.50	8,808.68	62.71	8,808.90	1.61	0.44	1.55
21,192.00	85.54	0.46	12,445.59	8,902.47	64.08	8,902.70	1.78	-1.59	-0.81
21,287.00	84.81	1.11	12,453.58	8,997.12	65.38	8,997.36	1.03	-0.77	0.68
21,381.00	88.04	3.77	12,459.44	9,090.84	69.38	9,091.10	4.45	3.44	2.83
21,476.00	89.33	4.17	12,461.62	9,185.58	75.95	9,185.89	1.42	1.36	0.42
21,572.00	89.92	3.49	12,462.25	9,281.36	82.37	9,281.72	0.94	0.61	-0.71
21,667.00	91.23	4.01	12,461.30	9,376.15	88.58	9,376.56	1.48	1.38	0.55
21,763.00	92.32	4.27	12,458.32	9,471.85	95.50	9,472.31	1.17	1.14	0.27
21,858.00	92.16	3.81	12,454.61	9,566.55	102.19	9,567.05	0.51	-0.17	-0.48
21,934.00	92.47	3.66	12,451.54	9,642.32	107.14	9,642.87	0.45	0.41	-0.20
22,028.00	92.75	3.30	12,447.26	9,736.05	112.84	9,736.64	0.48	0.30	-0.38
22,123.00	93.17	3.38	12,442.35	9,830.76	118.37	9,831.39	0.45	0.44	0.08
22,216.00	93.81	2.99	12,436.69	9,923.45	123.52	9,924.11	0.81	0.69	-0.42
22,267.83	93.70	2.77	12,433.30	9,975.10	126.12	9,975.78	0.47	-0.21	-0.42
LTP: 22268' MD									
22,297.00	93.64	2.65	12,431.43	10,004.20	127.47	10,004.87	0.47	-0.21	-0.42
Final Phoenix MWD Survey									
22,355.00	93.64	2.65	12,427.75	10,062.02	130.15	10,062.71	0.00	0.00	0.00
Projection to TD									



Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 602H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3269.50usft (McVay 8)
Site:	Fez Federal Com	MD Reference:	RKB @ 3269.50usft (McVay 8)
Well:	602H	North Reference:	Grid
Wellbore:	OH / 63923	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 8)	Database:	USA Compass

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,688.00	11,681.47	-66.41	-81.30	Tie In
11,759.00	11,752.00	-66.95	-89.36	First Phoenix MWD Survey
12,188.81	12,148.75	48.96	-138.69	HL: 12189' MD
22,267.83	12,433.30	9,975.10	126.12	LTP: 22268' MD
22,297.00	12,431.43	10,004.18	127.50	Final Phoenix MWD Survey
22,355.00	12,427.75	10,062.00	130.18	Projection to TD