



PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

**Lea County, NM (NAD27 NME)
Fez Federal Com
603H**

OH / 64149

Design: Surveys (Precision 595)

Standard Survey Report

16 May, 2019





Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	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
From:	Map	Easting:	795,972.50 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 8' 17.8100 N
		Longitude:	103° 22' 37.7348 W
		Grid Convergence:	0.51 °

Well	603H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 8' 17.8100 N
		Longitude:	103° 22' 37.7348 W
		Ground Level:	3,251.70 usft

Wellbore	OH / 64149				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	2/23/2019	6.64	59.79	47,793.75873240

Design	Surveys (Precision 595)				
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	359.66	

Survey Program	Date 5/16/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	11,440.00	SDI Gyros (OH / 64149)	NS-GYRO-MS	North sensing gyrocompassing m/s
11,604.00	22,333.00	Phoenix MWD Surveys (OH / 64149)	MWD+HRGM	OWSG MWD + HRGM

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.20	181.36	100.00	-0.17	0.00	-0.17	0.20	0.20	0.00	
125.00	0.24	191.49	125.00	-0.27	-0.02	-0.27	0.22	0.16	40.52	
150.00	0.24	200.18	150.00	-0.37	-0.04	-0.37	0.15	0.00	34.76	
175.00	0.29	203.91	175.00	-0.48	-0.09	-0.48	0.21	0.20	14.92	
200.00	0.23	179.22	200.00	-0.58	-0.11	-0.58	0.50	-0.24	-98.76	
225.00	0.15	205.44	225.00	-0.66	-0.13	-0.66	0.46	-0.32	104.88	
250.00	0.24	203.38	250.00	-0.74	-0.16	-0.74	0.36	0.36	-8.24	
275.00	0.29	193.72	275.00	-0.85	-0.20	-0.85	0.27	0.20	-38.64	
300.00	0.24	190.83	300.00	-0.96	-0.22	-0.96	0.21	-0.20	-11.56	

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Well: 603H
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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)
325.00	0.19	181.65	325.00	-1.06	-0.23	-1.06	0.24	-0.20	-36.72
350.00	0.20	213.20	350.00	-1.14	-0.26	-1.13	0.43	0.04	126.20
375.00	0.33	216.65	375.00	-1.23	-0.32	-1.23	0.52	0.52	13.80
400.00	0.28	190.36	400.00	-1.35	-0.38	-1.35	0.59	-0.20	-105.16
425.00	0.23	208.14	425.00	-1.45	-0.41	-1.45	0.37	-0.20	71.12
450.00	0.34	227.87	450.00	-1.55	-0.49	-1.54	0.58	0.44	78.92
475.00	0.46	218.41	475.00	-1.67	-0.61	-1.67	0.55	0.48	-37.84
500.00	0.48	226.04	500.00	-1.83	-0.75	-1.82	0.26	0.08	30.52
525.00	0.53	226.66	524.99	-1.98	-0.91	-1.97	0.20	0.20	2.48
550.00	0.50	240.10	549.99	-2.11	-1.09	-2.10	0.50	-0.12	53.76
575.00	0.64	241.06	574.99	-2.23	-1.30	-2.23	0.56	0.56	3.84
600.00	0.55	235.69	599.99	-2.37	-1.52	-2.36	0.42	-0.36	-21.48
625.00	0.59	235.26	624.99	-2.51	-1.73	-2.50	0.16	0.16	-1.72
650.00	0.74	244.09	649.99	-2.65	-1.98	-2.64	0.72	0.60	35.32
675.00	0.79	231.59	674.99	-2.83	-2.26	-2.82	0.70	0.20	-50.00
700.00	0.81	228.75	699.98	-3.05	-2.53	-3.04	0.18	0.08	-11.36
725.00	0.74	242.28	724.98	-3.25	-2.80	-3.23	0.78	-0.28	54.12
750.00	0.83	243.83	749.98	-3.40	-3.11	-3.38	0.37	0.36	6.20
775.00	0.83	237.39	774.98	-3.58	-3.42	-3.56	0.37	0.00	-25.76
800.00	0.86	244.13	799.97	-3.76	-3.74	-3.74	0.42	0.12	26.96
825.00	0.81	241.30	824.97	-3.92	-4.07	-3.90	0.26	-0.20	-11.32
850.00	1.03	240.76	849.97	-4.12	-4.42	-4.09	0.88	0.88	-2.16
875.00	0.90	245.25	874.96	-4.31	-4.79	-4.28	0.60	-0.52	17.96
900.00	0.98	245.26	899.96	-4.48	-5.17	-4.45	0.32	0.32	0.04
925.00	1.09	246.23	924.96	-4.67	-5.58	-4.63	0.45	0.44	3.88
950.00	0.97	242.79	949.95	-4.86	-5.98	-4.82	0.54	-0.48	-13.76
975.00	1.00	243.68	974.95	-5.05	-6.37	-5.02	0.13	0.12	3.56
1,000.00	0.97	243.56	999.94	-5.25	-6.75	-5.20	0.12	-0.12	-0.48
1,025.00	1.06	242.43	1,024.94	-5.45	-7.15	-5.40	0.37	0.36	-4.52
1,050.00	0.98	244.43	1,049.94	-5.65	-7.55	-5.60	0.35	-0.32	8.00
1,075.00	0.98	248.67	1,074.93	-5.82	-7.94	-5.77	0.29	0.00	16.96
1,100.00	0.94	252.08	1,099.93	-5.96	-8.33	-5.91	0.28	-0.16	13.64
1,125.00	1.00	243.46	1,124.93	-6.12	-8.72	-6.06	0.63	0.24	-34.48
1,150.00	1.02	244.91	1,149.92	-6.31	-9.12	-6.25	0.13	0.08	5.80
1,175.00	0.91	246.90	1,174.92	-6.48	-9.50	-6.42	0.46	-0.44	7.96
1,200.00	0.99	242.39	1,199.92	-6.66	-9.88	-6.60	0.44	0.32	-18.04
1,225.00	0.93	243.03	1,224.91	-6.85	-10.25	-6.79	0.24	-0.24	2.56
1,250.00	0.96	244.70	1,249.91	-7.03	-10.62	-6.97	0.16	0.12	6.68
1,275.00	0.95	250.72	1,274.90	-7.19	-11.00	-7.12	0.40	-0.04	24.08
1,300.00	0.86	237.26	1,299.90	-7.36	-11.36	-7.29	0.92	-0.36	-53.84
1,325.00	0.88	241.54	1,324.90	-7.55	-11.68	-7.48	0.27	0.08	17.12
1,350.00	0.82	240.67	1,349.90	-7.73	-12.01	-7.66	0.25	-0.24	-3.48
1,375.00	0.86	221.99	1,374.89	-7.96	-12.29	-7.89	1.10	0.16	-74.72

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1,400.00	1.15	181.73	1,399.89	-8.35	-12.42	-8.28	2.97	1.16	-161.04
1,425.00	1.38	174.06	1,424.88	-8.90	-12.40	-8.83	1.14	0.92	-30.68
1,450.00	2.19	166.81	1,449.87	-9.66	-12.26	-9.59	3.36	3.24	-29.00
1,475.00	2.69	160.05	1,474.85	-10.68	-11.95	-10.61	2.30	2.00	-27.04
1,500.00	3.02	157.06	1,499.82	-11.84	-11.49	-11.77	1.45	1.32	-11.96
1,525.00	3.07	158.26	1,524.78	-13.07	-10.99	-13.00	0.32	0.20	4.80
1,550.00	3.28	158.00	1,549.74	-14.35	-10.47	-14.29	0.84	0.84	-1.04
1,575.00	3.25	155.53	1,574.70	-15.66	-9.91	-15.60	0.58	-0.12	-9.88
1,600.00	3.28	154.19	1,599.66	-16.95	-9.31	-16.89	0.33	0.12	-5.36
1,625.00	3.35	155.86	1,624.62	-18.26	-8.70	-18.21	0.48	0.28	6.68
1,650.00	3.41	153.32	1,649.58	-19.59	-8.06	-19.54	0.65	0.24	-10.16
1,675.00	3.35	155.38	1,674.53	-20.92	-7.43	-20.87	0.54	-0.24	8.24
1,700.00	3.50	153.70	1,699.49	-22.27	-6.78	-22.23	0.72	0.60	-6.72
1,725.00	3.44	154.41	1,724.44	-23.63	-6.12	-23.59	0.30	-0.24	2.84
1,750.00	3.59	153.19	1,749.40	-25.00	-5.44	-24.97	0.67	0.60	-4.88
1,775.00	3.62	154.37	1,774.35	-26.41	-4.75	-26.38	0.32	0.12	4.72
1,800.00	3.87	152.79	1,799.29	-27.88	-4.02	-27.85	1.08	1.00	-6.32
1,825.00	4.10	152.75	1,824.23	-29.42	-3.23	-29.40	0.92	0.92	-0.16
1,850.00	4.46	151.24	1,849.16	-31.07	-2.35	-31.05	1.51	1.44	-6.04
1,875.00	4.81	151.89	1,874.08	-32.84	-1.39	-32.83	1.42	1.40	2.60
1,900.00	4.66	151.90	1,899.00	-34.66	-0.42	-34.66	0.60	-0.60	0.04
1,925.00	4.74	151.90	1,923.91	-36.47	0.55	-36.47	0.32	0.32	0.00
1,950.00	4.71	152.79	1,948.83	-38.29	1.50	-38.30	0.32	-0.12	3.56
1,975.00	4.81	151.98	1,973.74	-40.13	2.47	-40.15	0.48	0.40	-3.24
2,000.00	4.78	153.00	1,998.65	-41.99	3.43	-42.01	0.36	-0.12	4.08
2,025.00	4.88	151.49	2,023.56	-43.85	4.41	-43.87	0.65	0.40	-6.04
2,050.00	4.90	151.01	2,048.47	-45.72	5.44	-45.75	0.18	0.08	-1.92
2,075.00	4.92	150.78	2,073.38	-47.59	6.48	-47.62	0.11	0.08	-0.92
2,100.00	4.87	151.29	2,098.29	-49.45	7.51	-49.50	0.27	-0.20	2.04
2,125.00	5.28	151.46	2,123.19	-51.39	8.57	-51.44	1.64	1.64	0.68
2,150.00	5.58	151.07	2,148.08	-53.47	9.71	-53.53	1.21	1.20	-1.56
2,175.00	5.82	153.65	2,172.96	-55.67	10.86	-55.73	1.40	0.96	10.32
2,200.00	6.07	155.82	2,197.82	-58.01	11.96	-58.08	1.34	1.00	8.68
2,225.00	6.38	157.87	2,222.68	-60.50	13.03	-60.58	1.53	1.24	8.20
2,250.00	6.63	161.05	2,247.51	-63.15	14.02	-63.24	1.75	1.00	12.72
2,275.00	6.72	162.10	2,272.35	-65.91	14.94	-66.00	0.61	0.36	4.20
2,300.00	6.69	164.83	2,297.17	-68.71	15.77	-68.80	1.28	-0.12	10.92
2,325.00	6.96	166.84	2,322.00	-71.59	16.49	-71.69	1.44	1.08	8.04
2,350.00	6.97	165.54	2,346.81	-74.53	17.22	-74.63	0.63	0.04	-5.20
2,375.00	6.99	166.01	2,371.63	-77.48	17.96	-77.58	0.24	0.08	1.88
2,400.00	6.75	167.44	2,396.45	-80.39	18.65	-80.50	1.18	-0.96	5.72
2,425.00	6.56	169.35	2,421.28	-83.23	19.23	-83.34	1.17	-0.76	7.64
2,450.00	6.09	173.27	2,446.13	-85.95	19.65	-86.06	2.55	-1.88	15.68

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2,475.00	5.91	172.55	2,470.99	-88.54	19.98	-88.66	0.78	-0.72	-2.88
2,500.00	5.73	173.64	2,495.86	-91.06	20.28	-91.18	0.84	-0.72	4.36
2,525.00	5.62	174.28	2,520.74	-93.51	20.54	-93.64	0.51	-0.44	2.56
2,550.00	5.81	174.52	2,545.61	-95.99	20.78	-96.11	0.77	0.76	0.96
2,575.00	5.70	173.40	2,570.49	-98.48	21.05	-98.61	0.63	-0.44	-4.48
2,600.00	5.89	173.96	2,595.36	-100.99	21.32	-101.12	0.79	0.76	2.24
2,625.00	5.70	174.36	2,620.23	-103.50	21.58	-103.63	0.78	-0.76	1.60
2,650.00	5.66	173.02	2,645.11	-105.96	21.85	-106.09	0.55	-0.16	-5.36
2,675.00	5.63	174.67	2,669.99	-108.41	22.12	-108.54	0.66	-0.12	6.60
2,700.00	5.40	176.25	2,694.87	-110.80	22.31	-110.93	1.10	-0.92	6.32
2,725.00	5.44	176.65	2,719.76	-113.16	22.45	-113.29	0.22	0.16	1.60
2,750.00	5.36	178.12	2,744.65	-115.51	22.56	-115.64	0.64	-0.32	5.88
2,775.00	5.44	177.26	2,769.54	-117.86	22.66	-117.99	0.46	0.32	-3.44
2,800.00	5.48	177.60	2,794.43	-120.24	22.76	-120.37	0.21	0.16	1.36
2,825.00	5.34	177.03	2,819.31	-122.59	22.87	-122.73	0.60	-0.56	-2.28
2,850.00	5.21	174.99	2,844.21	-124.88	23.03	-125.02	0.91	-0.52	-8.16
2,875.00	5.27	175.39	2,869.10	-127.16	23.22	-127.30	0.28	0.24	1.60
2,900.00	5.21	175.37	2,894.00	-129.43	23.41	-129.57	0.24	-0.24	-0.08
2,925.00	5.24	176.17	2,918.90	-131.71	23.58	-131.84	0.32	0.12	3.20
2,950.00	5.28	175.66	2,943.79	-133.99	23.74	-134.13	0.25	0.16	-2.04
2,975.00	5.54	178.68	2,968.68	-136.34	23.85	-136.49	1.54	1.04	12.08
3,000.00	5.66	180.38	2,993.56	-138.78	23.87	-138.92	0.82	0.48	6.80
3,025.00	5.78	182.29	3,018.44	-141.27	23.82	-141.41	0.90	0.48	7.64
3,050.00	5.92	182.01	3,043.31	-143.82	23.72	-143.96	0.57	0.56	-1.12
3,075.00	5.84	182.84	3,068.17	-146.38	23.61	-146.52	0.47	-0.32	3.32
3,100.00	5.91	182.93	3,093.04	-148.94	23.48	-149.07	0.28	0.28	0.36
3,125.00	5.87	182.62	3,117.91	-151.50	23.36	-151.64	0.20	-0.16	-1.24
3,150.00	5.88	182.34	3,142.78	-154.05	23.25	-154.19	0.12	0.04	-1.12
3,175.00	5.92	182.83	3,167.65	-156.62	23.13	-156.76	0.26	0.16	1.96
3,200.00	5.66	182.99	3,192.52	-159.14	23.00	-159.28	1.04	-1.04	0.64
3,225.00	5.61	183.72	3,217.40	-161.59	22.86	-161.72	0.35	-0.20	2.92
3,250.00	5.52	183.67	3,242.28	-164.01	22.70	-164.14	0.36	-0.36	-0.20
3,275.00	5.52	184.42	3,267.16	-166.41	22.53	-166.54	0.29	0.00	3.00
3,300.00	5.41	183.75	3,292.05	-168.78	22.37	-168.91	0.51	-0.44	-2.68
3,325.00	5.35	182.91	3,316.94	-171.12	22.23	-171.25	0.40	-0.24	-3.36
3,350.00	5.22	182.98	3,341.83	-173.42	22.11	-173.55	0.52	-0.52	0.28
3,375.00	5.15	182.19	3,366.73	-175.68	22.01	-175.81	0.40	-0.28	-3.16
3,400.00	5.15	181.17	3,391.63	-177.92	21.94	-178.05	0.37	0.00	-4.08
3,425.00	5.11	182.32	3,416.53	-180.16	21.87	-180.29	0.44	-0.16	4.60
3,450.00	5.23	184.94	3,441.43	-182.41	21.73	-182.53	1.06	0.48	10.48
3,475.00	5.14	181.35	3,466.33	-184.66	21.61	-184.79	1.35	-0.36	-14.36
3,500.00	5.23	182.73	3,491.23	-186.92	21.53	-187.04	0.62	0.36	5.52
3,525.00	5.34	182.51	3,516.12	-189.22	21.42	-189.34	0.45	0.44	-0.88
3,550.00	5.47	183.10	3,541.01	-191.57	21.31	-191.69	0.57	0.52	2.36

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH / 64149
Design: Surveys (Precision 595)

Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
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)
3,575.00	5.41	182.05	3,565.90	-193.94	21.20	-194.06	0.46	-0.24	-4.20
3,600.00	5.39	182.26	3,590.78	-196.29	21.11	-196.41	0.11	-0.08	0.84
3,625.00	5.39	182.42	3,615.67	-198.64	21.01	-198.76	0.06	0.00	0.64
3,650.00	5.33	182.39	3,640.56	-200.97	20.92	-201.09	0.24	-0.24	-0.12
3,675.00	5.35	182.30	3,665.46	-203.29	20.82	-203.41	0.09	0.08	-0.36
3,700.00	5.16	181.84	3,690.35	-205.58	20.74	-205.70	0.78	-0.76	-1.84
3,725.00	5.29	180.83	3,715.25	-207.86	20.69	-207.98	0.64	0.52	-4.04
3,750.00	5.22	182.54	3,740.14	-210.15	20.62	-210.27	0.69	-0.28	6.84
3,775.00	5.25	182.21	3,765.04	-212.42	20.52	-212.54	0.17	0.12	-1.32
3,800.00	5.13	182.83	3,789.94	-214.68	20.43	-214.80	0.53	-0.48	2.48
3,825.00	5.12	183.31	3,814.84	-216.91	20.31	-217.03	0.18	-0.04	1.92
3,850.00	5.09	184.79	3,839.74	-219.13	20.15	-219.25	0.54	-0.12	5.92
3,875.00	4.68	184.09	3,864.65	-221.26	19.98	-221.37	1.66	-1.64	-2.80
3,900.00	4.55	185.24	3,889.56	-223.26	19.82	-223.37	0.64	-0.52	4.60
3,925.00	3.96	184.71	3,914.50	-225.11	19.66	-225.22	2.37	-2.36	-2.12
3,950.00	3.81	185.93	3,939.44	-226.79	19.50	-226.91	0.69	-0.60	4.88
3,975.00	3.41	184.46	3,964.39	-228.36	19.36	-228.47	1.64	-1.60	-5.88
4,000.00	3.46	183.06	3,989.34	-229.86	19.26	-229.97	0.39	0.20	-5.60
4,025.00	3.02	179.37	4,014.30	-231.27	19.23	-231.38	1.95	-1.76	-14.76
4,050.00	2.76	170.82	4,039.27	-232.52	19.33	-232.63	2.01	-1.04	-34.20
4,075.00	2.07	159.31	4,064.25	-233.54	19.59	-233.65	3.36	-2.76	-46.04
4,100.00	1.87	147.29	4,089.23	-234.30	19.97	-234.42	1.83	-0.80	-48.08
4,125.00	1.79	141.19	4,114.22	-234.95	20.43	-235.07	0.84	-0.32	-24.40
4,150.00	1.68	140.84	4,139.21	-235.54	20.91	-235.66	0.44	-0.44	-1.40
4,175.00	1.69	134.78	4,164.20	-236.08	21.40	-236.21	0.71	0.04	-24.24
4,200.00	1.66	137.37	4,189.19	-236.61	21.91	-236.74	0.33	-0.12	10.36
4,225.00	1.71	134.47	4,214.18	-237.14	22.42	-237.27	0.40	0.20	-11.60
4,250.00	1.55	118.56	4,239.17	-237.56	22.98	-237.69	1.91	-0.64	-63.64
4,275.00	1.51	111.21	4,264.16	-237.84	23.59	-237.98	0.80	-0.16	-29.40
4,300.00	1.61	109.36	4,289.15	-238.08	24.22	-238.22	0.45	0.40	-7.40
4,325.00	1.65	107.42	4,314.14	-238.30	24.90	-238.45	0.27	0.16	-7.76
4,350.00	1.72	108.83	4,339.13	-238.53	25.60	-238.68	0.33	0.28	5.64
4,375.00	1.70	104.86	4,364.12	-238.75	26.31	-238.90	0.48	-0.08	-15.88
4,400.00	1.85	103.45	4,389.11	-238.93	27.06	-239.09	0.62	0.60	-5.64
4,425.00	1.77	105.51	4,414.09	-239.13	27.83	-239.29	0.41	-0.32	8.24
4,450.00	1.73	103.72	4,439.08	-239.32	28.57	-239.49	0.27	-0.16	-7.16
4,475.00	1.73	104.82	4,464.07	-239.51	29.30	-239.68	0.13	0.00	4.40
4,500.00	1.58	103.62	4,489.06	-239.69	30.00	-239.86	0.62	-0.60	-4.80
4,525.00	1.42	100.36	4,514.05	-239.82	30.64	-240.00	0.73	-0.64	-13.04
4,550.00	1.21	98.44	4,539.04	-239.92	31.20	-240.10	0.86	-0.84	-7.68
4,575.00	1.26	98.01	4,564.04	-240.00	31.74	-240.18	0.20	0.20	-1.72
4,600.00	0.72	76.06	4,589.04	-240.00	32.16	-240.19	2.60	-2.16	-87.80
4,625.00	0.50	75.06	4,614.03	-239.93	32.42	-240.12	0.88	-0.88	-4.00

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,650.00	0.51	79.47	4,639.03	-239.88	32.63	-240.07	0.16	0.04	17.64
4,675.00	0.60	89.07	4,664.03	-239.86	32.87	-240.05	0.52	0.36	38.40
4,700.00	0.57	81.86	4,689.03	-239.84	33.13	-240.03	0.32	-0.12	-28.84
4,725.00	0.97	73.59	4,714.03	-239.76	33.45	-239.96	1.66	1.60	-33.08
4,750.00	1.10	67.27	4,739.02	-239.61	33.88	-239.81	0.69	0.52	-25.28
4,775.00	1.48	51.60	4,764.02	-239.32	34.35	-239.52	2.06	1.52	-62.68
4,800.00	2.00	49.84	4,789.01	-238.83	34.94	-239.04	2.09	2.08	-7.04
4,825.00	1.98	48.54	4,813.99	-238.27	35.59	-238.48	0.20	-0.08	-5.20
4,850.00	2.09	49.88	4,838.98	-237.69	36.27	-237.90	0.48	0.44	5.36
4,875.00	2.04	49.28	4,863.96	-237.10	36.95	-237.32	0.22	-0.20	-2.40
4,900.00	1.67	44.48	4,888.95	-236.55	37.55	-236.77	1.60	-1.48	-19.20
4,925.00	1.02	43.06	4,913.94	-236.13	37.95	-236.35	2.60	-2.60	-5.68
4,950.00	0.89	33.78	4,938.94	-235.81	38.21	-236.03	0.81	-0.52	-37.12
4,975.00	0.80	32.54	4,963.93	-235.50	38.41	-235.72	0.37	-0.36	-4.96
5,000.00	0.86	31.50	4,988.93	-235.19	38.61	-235.42	0.25	0.24	-4.16
5,025.00	0.76	9.79	5,013.93	-234.87	38.73	-235.10	1.28	-0.40	-86.84
5,050.00	1.16	304.21	5,038.92	-234.56	38.55	-234.79	4.37	1.60	-262.32
5,075.00	1.89	292.24	5,063.92	-234.26	37.96	-234.49	3.17	2.92	-47.88
5,100.00	2.11	289.91	5,088.90	-233.95	37.15	-234.17	0.94	0.88	-9.32
5,125.00	2.24	287.41	5,113.88	-233.65	36.25	-233.86	0.64	0.52	-10.00
5,150.00	2.19	291.04	5,138.86	-233.33	35.34	-233.54	0.60	-0.20	14.52
5,175.00	2.16	287.17	5,163.85	-233.02	34.44	-233.22	0.60	-0.12	-15.48
5,200.00	2.07	287.18	5,188.83	-232.75	33.56	-232.94	0.36	-0.36	0.04
5,225.00	1.91	284.27	5,213.81	-232.51	32.72	-232.70	0.76	-0.64	-11.64
5,250.00	1.94	286.51	5,238.80	-232.29	31.91	-232.48	0.32	0.12	8.96
5,275.00	1.86	284.87	5,263.79	-232.06	31.12	-232.25	0.39	-0.32	-6.56
5,300.00	1.85	282.55	5,288.77	-231.87	30.33	-232.05	0.30	-0.04	-9.28
5,325.00	1.84	280.77	5,313.76	-231.71	29.54	-231.88	0.23	-0.04	-7.12
5,350.00	1.82	282.98	5,338.75	-231.55	28.76	-231.71	0.29	-0.08	8.84
5,375.00	1.74	281.91	5,363.73	-231.38	28.00	-231.54	0.35	-0.32	-4.28
5,400.00	1.66	277.68	5,388.72	-231.25	27.27	-231.41	0.60	-0.32	-16.92
5,425.00	1.75	280.60	5,413.71	-231.13	26.54	-231.29	0.50	0.36	11.68
5,450.00	1.75	281.47	5,438.70	-230.99	25.79	-231.14	0.11	0.00	3.48
5,475.00	1.80	281.06	5,463.69	-230.84	25.03	-230.98	0.21	0.20	-1.64
5,500.00	1.74	281.76	5,488.68	-230.68	24.27	-230.82	0.26	-0.24	2.80
5,525.00	1.74	278.41	5,513.67	-230.55	23.52	-230.69	0.41	0.00	-13.40
5,550.00	1.71	281.76	5,538.65	-230.42	22.78	-230.55	0.42	-0.12	13.40
5,575.00	1.39	281.03	5,563.65	-230.28	22.12	-230.41	1.28	-1.28	-2.92
5,600.00	0.96	308.52	5,588.64	-230.10	21.66	-230.22	2.79	-1.72	109.96
5,625.00	0.89	327.42	5,613.64	-229.80	21.39	-229.93	1.25	-0.28	75.60
5,650.00	0.88	359.30	5,638.63	-229.45	21.28	-229.57	1.94	-0.04	127.52
5,675.00	0.86	10.88	5,663.63	-229.07	21.32	-229.19	0.71	-0.08	46.32
5,700.00	0.98	4.65	5,688.63	-228.67	21.37	-228.80	0.62	0.48	-24.92

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH / 64149
Design: Surveys (Precision 595)

Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
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	0.82	7.93	5,713.62	-228.28	21.41	-228.41	0.67	-0.64	13.12
5,750.00	1.05	5.88	5,738.62	-227.88	21.46	-228.00	0.93	0.92	-8.20
5,775.00	1.01	3.49	5,763.62	-227.43	21.50	-227.55	0.23	-0.16	-9.56
5,800.00	0.99	12.17	5,788.61	-227.00	21.56	-227.12	0.61	-0.08	34.72
5,825.00	0.91	11.95	5,813.61	-226.59	21.64	-226.72	0.32	-0.32	-0.88
5,850.00	0.92	13.64	5,838.61	-226.20	21.73	-226.33	0.12	0.04	6.76
5,875.00	1.00	15.26	5,863.60	-225.80	21.84	-225.93	0.34	0.32	6.48
5,900.00	0.98	9.86	5,888.60	-225.38	21.93	-225.51	0.38	-0.08	-21.60
5,925.00	0.98	12.22	5,913.60	-224.96	22.01	-225.09	0.16	0.00	9.44
5,950.00	0.92	11.22	5,938.59	-224.55	22.10	-224.68	0.25	-0.24	-4.00
5,975.00	0.94	14.04	5,963.59	-224.16	22.19	-224.29	0.20	0.08	11.28
6,000.00	0.73	7.39	5,988.59	-223.80	22.26	-223.93	0.92	-0.84	-26.60
6,025.00	0.75	11.86	6,013.58	-223.48	22.31	-223.61	0.24	0.08	17.88
6,050.00	0.53	3.79	6,038.58	-223.21	22.35	-223.34	0.95	-0.88	-32.28
6,075.00	0.25	3.51	6,063.58	-223.04	22.36	-223.17	1.12	-1.12	-1.12
6,100.00	0.34	339.14	6,088.58	-222.91	22.34	-223.04	0.61	0.36	-97.48
6,125.00	0.32	339.38	6,113.58	-222.78	22.29	-222.91	0.08	-0.08	0.96
6,150.00	0.27	342.97	6,138.58	-222.66	22.25	-222.79	0.21	-0.20	14.36
6,175.00	0.27	329.13	6,163.58	-222.55	22.20	-222.68	0.26	0.00	-55.36
6,200.00	0.37	341.14	6,188.58	-222.42	22.14	-222.55	0.48	0.40	48.04
6,225.00	0.13	304.00	6,213.58	-222.33	22.09	-222.46	1.11	-0.96	-148.56
6,250.00	0.25	345.81	6,238.58	-222.26	22.06	-222.39	0.70	0.48	167.24
6,275.00	0.21	2.41	6,263.58	-222.16	22.04	-222.29	0.31	-0.16	66.40
6,300.00	0.12	345.63	6,288.58	-222.09	22.04	-222.22	0.40	-0.36	-67.12
6,325.00	0.12	317.07	6,313.58	-222.05	22.02	-222.17	0.24	0.00	-114.24
6,350.00	0.26	4.28	6,338.58	-221.97	22.00	-222.10	0.80	0.56	188.84
6,375.00	0.23	322.87	6,363.58	-221.87	21.98	-222.00	0.70	-0.12	-165.64
6,400.00	0.21	349.69	6,388.58	-221.79	21.94	-221.92	0.42	-0.08	107.28
6,425.00	0.33	317.26	6,413.58	-221.69	21.88	-221.82	0.76	0.48	-129.72
6,450.00	0.24	2.09	6,438.58	-221.59	21.83	-221.71	0.93	-0.36	179.32
6,475.00	0.25	302.30	6,463.58	-221.50	21.79	-221.63	0.98	0.04	-239.16
6,500.00	0.21	345.77	6,488.58	-221.43	21.73	-221.56	0.70	-0.16	173.88
6,525.00	0.39	336.15	6,513.58	-221.31	21.69	-221.44	0.75	0.72	-38.48
6,550.00	0.26	336.69	6,538.58	-221.18	21.63	-221.30	0.52	-0.52	2.16
6,575.00	0.17	302.25	6,563.58	-221.11	21.58	-221.23	0.61	-0.36	-137.76
6,600.00	0.18	344.27	6,588.58	-221.05	21.53	-221.17	0.50	0.04	168.08
6,625.00	0.24	354.37	6,613.58	-220.96	21.52	-221.08	0.28	0.24	40.40
6,650.00	0.26	330.52	6,638.58	-220.86	21.48	-220.98	0.42	0.08	-95.40
6,675.00	0.24	358.70	6,663.58	-220.76	21.46	-220.88	0.49	-0.08	112.72
6,700.00	0.29	338.63	6,688.58	-220.65	21.43	-220.77	0.42	0.20	-80.28
6,725.00	0.19	334.47	6,713.58	-220.55	21.39	-220.67	0.41	-0.40	-16.64
6,750.00	0.25	354.00	6,738.58	-220.46	21.37	-220.58	0.38	0.24	78.12
6,775.00	0.21	329.27	6,763.58	-220.36	21.34	-220.49	0.42	-0.16	-98.92
6,800.00	0.28	352.86	6,788.58	-220.26	21.31	-220.39	0.49	0.28	94.36

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH / 64149
Design: Surveys (Precision 595)

Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
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	0.23	347.11	6,813.58	-220.15	21.29	-220.28	0.22	-0.20	-23.00
6,850.00	0.10	338.30	6,838.58	-220.09	21.27	-220.21	0.53	-0.52	-35.24
6,875.00	0.21	352.35	6,863.58	-220.02	21.25	-220.14	0.46	0.44	56.20
6,900.00	0.13	284.60	6,888.58	-219.97	21.22	-220.09	0.80	-0.32	-271.00
6,925.00	0.16	139.19	6,913.58	-219.99	21.22	-220.11	1.11	0.12	-581.64
6,950.00	0.44	172.66	6,938.58	-220.11	21.25	-220.23	1.28	1.12	133.88
6,975.00	0.39	152.43	6,963.57	-220.28	21.30	-220.40	0.62	-0.20	-80.92
7,000.00	0.73	169.20	6,988.57	-220.51	21.37	-220.63	1.50	1.36	67.08
7,025.00	0.68	164.91	7,013.57	-220.81	21.44	-220.93	0.29	-0.20	-17.16
7,050.00	0.75	173.12	7,038.57	-221.12	21.50	-221.24	0.50	0.28	32.84
7,075.00	0.72	170.77	7,063.57	-221.43	21.54	-221.56	0.17	-0.12	-9.40
7,100.00	0.77	166.82	7,088.57	-221.75	21.61	-221.88	0.29	0.20	-15.80
7,125.00	0.81	172.51	7,113.56	-222.09	21.67	-222.22	0.35	0.16	22.76
7,150.00	0.86	170.88	7,138.56	-222.45	21.72	-222.58	0.22	0.20	-6.52
7,175.00	0.75	171.74	7,163.56	-222.80	21.77	-222.92	0.44	-0.44	3.44
7,200.00	0.74	167.98	7,188.56	-223.12	21.83	-223.24	0.20	-0.04	-15.04
7,225.00	0.75	166.52	7,213.55	-223.43	21.90	-223.56	0.09	0.04	-5.84
7,250.00	0.67	164.43	7,238.55	-223.73	21.98	-223.86	0.34	-0.32	-8.36
7,275.00	0.83	171.11	7,263.55	-224.05	22.05	-224.18	0.73	0.64	26.72
7,300.00	0.79	170.25	7,288.55	-224.40	22.10	-224.53	0.17	-0.16	-3.44
7,325.00	0.78	178.79	7,313.54	-224.74	22.14	-224.87	0.47	-0.04	34.16
7,350.00	0.78	170.83	7,338.54	-225.08	22.17	-225.21	0.43	0.00	-31.84
7,375.00	0.84	168.60	7,363.54	-225.43	22.23	-225.56	0.27	0.24	-8.92
7,400.00	0.79	169.36	7,388.54	-225.78	22.30	-225.91	0.20	-0.20	3.04
7,425.00	0.72	169.29	7,413.54	-226.10	22.36	-226.23	0.28	-0.28	-0.28
7,450.00	0.54	176.29	7,438.53	-226.37	22.40	-226.50	0.78	-0.72	28.00
7,475.00	0.10	155.45	7,463.53	-226.51	22.41	-226.64	1.79	-1.76	-83.36
7,500.00	0.20	260.18	7,488.53	-226.54	22.38	-226.67	0.98	0.40	418.92
7,525.00	0.16	309.60	7,513.53	-226.52	22.31	-226.65	0.62	-0.16	197.68
7,550.00	0.24	316.27	7,538.53	-226.46	22.25	-226.59	0.33	0.32	26.68
7,575.00	0.26	313.78	7,563.53	-226.39	22.17	-226.52	0.09	0.08	-9.96
7,600.00	0.31	314.92	7,588.53	-226.30	22.08	-226.43	0.20	0.20	4.56
7,625.00	0.32	316.09	7,613.53	-226.20	21.98	-226.33	0.05	0.04	4.68
7,650.00	0.35	311.46	7,638.53	-226.10	21.88	-226.23	0.16	0.12	-18.52
7,675.00	0.38	312.11	7,663.53	-225.99	21.76	-226.12	0.12	0.12	2.60
7,700.00	0.29	301.38	7,688.53	-225.91	21.65	-226.03	0.44	-0.36	-42.92
7,725.00	0.32	306.16	7,713.53	-225.83	21.53	-225.96	0.16	0.12	19.12
7,750.00	0.36	285.46	7,738.53	-225.77	21.40	-225.89	0.51	0.16	-82.80
7,775.00	0.44	303.71	7,763.53	-225.70	21.25	-225.82	0.60	0.32	73.00
7,800.00	0.35	310.54	7,788.53	-225.59	21.11	-225.71	0.41	-0.36	27.32
7,825.00	0.40	309.02	7,813.53	-225.49	20.98	-225.61	0.20	0.20	-6.08
7,850.00	0.39	304.16	7,838.53	-225.39	20.85	-225.51	0.14	-0.04	-19.44
7,875.00	0.53	307.85	7,863.53	-225.27	20.68	-225.39	0.57	0.56	14.76

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH / 64149
Design: Surveys (Precision 595)

Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
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	0.51	297.75	7,888.53	-225.14	20.49	-225.26	0.37	-0.08	-40.40
7,925.00	0.45	300.45	7,913.52	-225.04	20.31	-225.16	0.26	-0.24	10.80
7,950.00	0.56	292.56	7,938.52	-224.95	20.11	-225.06	0.52	0.44	-31.56
7,975.00	0.57	287.85	7,963.52	-224.86	19.88	-224.98	0.19	0.04	-18.84
8,000.00	0.46	291.21	7,988.52	-224.79	19.67	-224.90	0.46	-0.44	13.44
8,025.00	0.49	286.43	8,013.52	-224.72	19.47	-224.83	0.20	0.12	-19.12
8,050.00	0.52	296.15	8,038.52	-224.64	19.27	-224.75	0.36	0.12	38.88
8,075.00	0.44	301.71	8,063.52	-224.54	19.09	-224.65	0.37	-0.32	22.24
8,100.00	0.44	289.73	8,088.52	-224.46	18.91	-224.57	0.37	0.00	-47.92
8,125.00	0.46	274.91	8,113.52	-224.41	18.72	-224.52	0.47	0.08	-59.28
8,150.00	0.40	269.05	8,138.52	-224.41	18.54	-224.51	0.30	-0.24	-23.44
8,175.00	0.56	286.54	8,163.52	-224.37	18.33	-224.48	0.86	0.64	69.96
8,200.00	0.49	280.10	8,188.51	-224.32	18.11	-224.43	0.37	-0.28	-25.76
8,225.00	0.50	284.05	8,213.51	-224.28	17.90	-224.38	0.14	0.04	15.80
8,250.00	0.55	272.70	8,238.51	-224.24	17.67	-224.35	0.46	0.20	-45.40
8,275.00	0.63	279.41	8,263.51	-224.22	17.42	-224.32	0.42	0.32	26.84
8,300.00	0.52	284.58	8,288.51	-224.16	17.17	-224.26	0.49	-0.44	20.68
8,325.00	0.55	285.72	8,313.51	-224.10	16.95	-224.20	0.13	0.12	4.56
8,350.00	0.57	279.71	8,338.51	-224.05	16.71	-224.15	0.25	0.08	-24.04
8,375.00	0.44	275.95	8,363.51	-224.02	16.49	-224.11	0.54	-0.52	-15.04
8,400.00	0.49	290.67	8,388.51	-223.97	16.30	-224.06	0.52	0.20	58.88
8,425.00	0.49	291.34	8,413.51	-223.89	16.10	-223.99	0.02	0.00	2.68
8,450.00	0.48	296.80	8,438.50	-223.81	15.90	-223.90	0.19	-0.04	21.84
8,475.00	0.39	271.72	8,463.50	-223.76	15.72	-223.85	0.83	-0.36	-100.32
8,500.00	0.53	269.85	8,488.50	-223.76	15.52	-223.85	0.56	0.56	-7.48
8,525.00	0.37	280.76	8,513.50	-223.74	15.33	-223.83	0.72	-0.64	43.64
8,550.00	0.41	286.19	8,538.50	-223.70	15.16	-223.79	0.22	0.16	21.72
8,575.00	0.61	277.01	8,563.50	-223.66	14.95	-223.75	0.86	0.80	-36.72
8,600.00	0.41	279.40	8,588.50	-223.63	14.73	-223.71	0.80	-0.80	9.56
8,625.00	0.31	272.92	8,613.50	-223.61	14.57	-223.69	0.43	-0.40	-25.92
8,650.00	0.49	271.56	8,638.50	-223.61	14.39	-223.69	0.72	0.72	-5.44
8,675.00	0.48	273.35	8,663.50	-223.60	14.18	-223.68	0.07	-0.04	7.16
8,700.00	0.43	268.91	8,688.50	-223.59	13.99	-223.67	0.24	-0.20	-17.76
8,725.00	0.56	274.70	8,713.50	-223.58	13.77	-223.66	0.56	0.52	23.16
8,750.00	0.40	277.58	8,738.49	-223.56	13.56	-223.64	0.65	-0.64	11.52
8,775.00	0.40	266.46	8,763.49	-223.56	13.39	-223.63	0.31	0.00	-44.48
8,800.00	0.44	276.76	8,788.49	-223.55	13.21	-223.63	0.34	0.16	41.20
8,825.00	0.43	285.00	8,813.49	-223.51	13.02	-223.59	0.25	-0.04	32.96
8,850.00	0.53	268.69	8,838.49	-223.49	12.81	-223.57	0.67	0.40	-65.24
8,875.00	0.42	277.92	8,863.49	-223.48	12.61	-223.55	0.53	-0.44	36.92
8,900.00	0.49	273.78	8,888.49	-223.46	12.41	-223.53	0.31	0.28	-16.56
8,925.00	0.45	278.07	8,913.49	-223.44	12.21	-223.51	0.21	-0.16	17.16
8,950.00	0.55	274.05	8,938.49	-223.42	11.99	-223.49	0.42	0.40	-16.08

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	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	0.57	265.65	8,963.49	-223.42	11.74	-223.49	0.34	0.08	-33.60
9,000.00	0.51	263.50	8,988.49	-223.44	11.51	-223.51	0.25	-0.24	-8.60
9,025.00	0.54	272.70	9,013.49	-223.45	11.28	-223.51	0.36	0.12	36.80
9,050.00	0.58	261.95	9,038.48	-223.46	11.04	-223.52	0.45	0.16	-43.00
9,075.00	0.65	262.73	9,063.48	-223.50	10.77	-223.56	0.28	0.28	3.12
9,100.00	0.67	258.89	9,088.48	-223.54	10.49	-223.60	0.19	0.08	-15.36
9,125.00	0.79	258.54	9,113.48	-223.61	10.18	-223.66	0.48	0.48	-1.40
9,150.00	0.90	259.57	9,138.48	-223.68	9.81	-223.73	0.44	0.44	4.12
9,175.00	0.92	258.05	9,163.47	-223.75	9.43	-223.81	0.13	0.08	-6.08
9,200.00	1.19	256.05	9,188.47	-223.86	8.98	-223.91	1.09	1.08	-8.00
9,225.00	1.28	256.11	9,213.46	-223.99	8.45	-224.03	0.36	0.36	0.24
9,250.00	1.34	252.64	9,238.46	-224.14	7.90	-224.18	0.40	0.24	-13.88
9,275.00	1.22	255.96	9,263.45	-224.29	7.37	-224.33	0.56	-0.48	13.28
9,300.00	1.45	255.55	9,288.44	-224.44	6.80	-224.47	0.92	0.92	-1.64
9,325.00	1.29	254.29	9,313.44	-224.59	6.23	-224.63	0.65	-0.64	-5.04
9,350.00	1.42	258.81	9,338.43	-224.73	5.65	-224.76	0.67	0.52	18.08
9,375.00	1.44	256.73	9,363.42	-224.86	5.04	-224.89	0.22	0.08	-8.32
9,400.00	1.32	259.49	9,388.41	-224.98	4.45	-225.01	0.55	-0.48	11.04
9,425.00	1.34	256.51	9,413.41	-225.11	3.88	-225.12	0.29	0.08	-11.92
9,450.00	1.37	256.30	9,438.40	-225.24	3.31	-225.26	0.12	0.12	-0.84
9,475.00	1.32	254.45	9,463.39	-225.39	2.74	-225.41	0.26	-0.20	-7.40
9,500.00	1.28	247.76	9,488.39	-225.58	2.21	-225.58	0.63	-0.16	-26.76
9,525.00	1.28	253.56	9,513.38	-225.76	1.68	-225.77	0.52	0.00	23.20
9,550.00	1.41	249.06	9,538.37	-225.95	1.12	-225.95	0.67	0.52	-18.00
9,575.00	1.51	245.18	9,563.37	-226.20	0.54	-226.20	0.56	0.40	-15.52
9,600.00	1.48	245.17	9,588.36	-226.47	-0.05	-226.47	0.12	-0.12	-0.04
9,625.00	1.57	245.61	9,613.35	-226.75	-0.66	-226.74	0.36	0.36	1.76
9,650.00	1.50	246.67	9,638.34	-227.02	-1.27	-227.01	0.30	-0.28	4.24
9,675.00	1.40	241.44	9,663.33	-227.29	-1.84	-227.28	0.66	-0.40	-20.92
9,700.00	1.64	246.91	9,688.32	-227.58	-2.44	-227.56	1.12	0.96	21.88
9,725.00	1.73	252.20	9,713.31	-227.84	-3.13	-227.81	0.72	0.36	21.16
9,750.00	1.76	249.36	9,738.30	-228.09	-3.84	-228.06	0.37	0.12	-11.36
9,775.00	1.68	251.10	9,763.29	-228.34	-4.55	-228.31	0.38	-0.32	6.96
9,800.00	1.91	253.38	9,788.28	-228.58	-5.30	-228.54	0.96	0.92	9.12
9,825.00	1.87	250.34	9,813.26	-228.84	-6.08	-228.80	0.43	-0.16	-12.16
9,850.00	2.00	250.05	9,838.25	-229.12	-6.87	-229.08	0.52	0.52	-1.16
9,875.00	2.07	249.80	9,863.23	-229.43	-7.71	-229.38	0.28	0.28	-1.00
9,900.00	1.99	248.62	9,888.22	-229.74	-8.53	-229.69	0.36	-0.32	-4.72
9,925.00	2.09	249.17	9,913.20	-230.06	-9.37	-230.00	0.41	0.40	2.20
9,950.00	2.12	246.14	9,938.18	-230.41	-10.21	-230.34	0.46	0.12	-12.12
9,975.00	1.83	242.57	9,963.17	-230.78	-10.99	-230.71	1.26	-1.16	-14.28
10,000.00	1.51	229.70	9,988.16	-231.18	-11.60	-231.10	1.96	-1.28	-51.48
10,025.00	1.36	216.60	10,013.15	-231.63	-12.02	-231.55	1.44	-0.60	-52.40
10,050.00	1.17	216.25	10,038.15	-232.07	-12.35	-232.00	0.76	-0.76	-1.40

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,075.00	1.21	208.73	10,063.14	-232.51	-12.63	-232.43	0.64	0.16	-30.08
10,100.00	1.19	210.36	10,088.13	-232.97	-12.89	-232.88	0.16	-0.08	6.52
10,125.00	1.20	214.30	10,113.13	-233.41	-13.17	-233.32	0.33	0.04	15.76
10,150.00	1.37	208.66	10,138.12	-233.88	-13.46	-233.80	0.85	0.68	-22.56
10,175.00	1.21	213.15	10,163.12	-234.37	-13.75	-234.28	0.76	-0.64	17.96
10,200.00	1.34	214.28	10,188.11	-234.83	-14.05	-234.74	0.53	0.52	4.52
10,225.00	1.05	211.80	10,213.10	-235.27	-14.34	-235.18	1.18	-1.16	-9.92
10,250.00	0.24	109.47	10,238.10	-235.48	-14.41	-235.39	4.50	-3.24	-409.32
10,275.00	0.76	50.01	10,263.10	-235.39	-14.24	-235.30	2.68	2.08	-237.84
10,300.00	1.05	43.47	10,288.10	-235.12	-13.95	-235.03	1.23	1.16	-26.16
10,325.00	1.12	41.98	10,313.09	-234.77	-13.63	-234.68	0.30	0.28	-5.96
10,350.00	1.26	42.48	10,338.09	-234.38	-13.28	-234.30	0.56	0.56	2.00
10,375.00	1.15	48.73	10,363.08	-234.02	-12.91	-233.94	0.68	-0.44	25.00
10,400.00	1.20	41.66	10,388.08	-233.66	-12.54	-233.58	0.61	0.20	-28.28
10,425.00	1.41	40.78	10,413.07	-233.23	-12.17	-233.15	0.84	0.84	-3.52
10,450.00	1.30	39.82	10,438.07	-232.78	-11.79	-232.70	0.45	-0.44	-3.84
10,475.00	1.39	45.44	10,463.06	-232.35	-11.39	-232.27	0.64	0.36	22.48
10,500.00	1.41	42.00	10,488.05	-231.90	-10.97	-231.83	0.35	0.08	-13.76
10,525.00	1.56	49.31	10,513.04	-231.45	-10.50	-231.39	0.97	0.60	29.24
10,550.00	1.68	50.16	10,538.03	-231.00	-9.96	-230.93	0.49	0.48	3.40
10,575.00	1.53	60.60	10,563.02	-230.60	-9.39	-230.54	1.31	-0.60	41.76
10,600.00	1.72	62.93	10,588.01	-230.26	-8.77	-230.21	0.80	0.76	9.32
10,625.00	1.78	70.78	10,613.00	-229.97	-8.07	-229.91	0.99	0.24	31.40
10,650.00	1.87	73.31	10,637.99	-229.72	-7.31	-229.67	0.48	0.36	10.12
10,675.00	1.93	88.99	10,662.97	-229.60	-6.50	-229.55	2.09	0.24	62.72
10,700.00	2.00	87.04	10,687.96	-229.57	-5.64	-229.53	0.39	0.28	-7.80
10,725.00	2.18	90.70	10,712.94	-229.55	-4.73	-229.52	0.90	0.72	14.64
10,750.00	2.22	90.82	10,737.93	-229.56	-3.77	-229.54	0.16	0.16	0.48
10,775.00	2.18	93.83	10,762.91	-229.60	-2.81	-229.58	0.49	-0.16	12.04
10,800.00	2.21	97.30	10,787.89	-229.69	-1.86	-229.68	0.54	0.12	13.88
10,825.00	2.27	95.94	10,812.87	-229.81	-0.89	-229.80	0.32	0.24	-5.44
10,850.00	2.31	97.37	10,837.85	-229.92	0.10	-229.92	0.28	0.16	5.72
10,875.00	2.27	101.02	10,862.83	-230.08	1.09	-230.08	0.60	-0.16	14.60
10,900.00	2.31	106.90	10,887.81	-230.32	2.06	-230.33	0.95	0.16	23.52
10,925.00	2.27	109.26	10,912.79	-230.63	3.01	-230.65	0.41	-0.16	9.44
10,950.00	2.22	112.24	10,937.77	-230.98	3.92	-231.00	0.51	-0.20	11.92
10,975.00	2.28	114.71	10,962.75	-231.37	4.82	-231.39	0.46	0.24	9.88
11,000.00	2.25	118.64	10,987.73	-231.81	5.71	-231.84	0.63	-0.12	15.72
11,025.00	2.28	120.56	11,012.71	-232.30	6.56	-232.34	0.33	0.12	7.68
11,050.00	2.36	120.67	11,037.69	-232.82	7.44	-232.86	0.32	0.32	0.44
11,075.00	2.34	122.89	11,062.67	-233.36	8.31	-233.40	0.37	-0.08	8.88
11,100.00	2.40	127.52	11,087.65	-233.95	9.15	-234.00	0.80	0.24	18.52
11,125.00	2.59	127.19	11,112.63	-234.61	10.02	-234.67	0.76	0.76	-1.32



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH / 64149
Design: Surveys (Precision 595)

Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
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	2.65	131.46	11,137.60	-235.34	10.90	-235.40	0.82	0.24	17.08
11,175.00	2.64	134.94	11,162.57	-236.13	11.74	-236.19	0.64	-0.04	13.92
11,200.00	2.61	140.39	11,187.55	-236.97	12.51	-237.04	1.01	-0.12	21.80
11,225.00	2.34	147.09	11,212.52	-237.84	13.15	-237.91	1.58	-1.08	26.80
11,250.00	1.83	152.34	11,237.51	-238.62	13.61	-238.70	2.18	-2.04	21.00
11,275.00	1.41	161.30	11,262.50	-239.27	13.90	-239.34	1.96	-1.68	35.84
11,300.00	1.24	169.97	11,287.49	-239.82	14.04	-239.90	1.05	-0.68	34.68
11,325.00	0.91	184.68	11,312.49	-240.29	14.07	-240.37	1.71	-1.32	58.84
11,350.00	0.76	202.56	11,337.48	-240.64	13.99	-240.72	1.20	-0.60	71.52
11,375.00	0.79	221.81	11,362.48	-240.92	13.81	-241.00	1.04	0.12	77.00
11,400.00	0.83	235.02	11,387.48	-241.15	13.55	-241.23	0.76	0.16	52.84
11,425.00	0.84	254.06	11,412.48	-241.31	13.23	-241.38	1.11	0.04	76.16
11,440.00	0.87	249.23	11,427.47	-241.38	13.01	-241.45	0.52	0.20	-32.20
Tie In									
11,604.00	1.64	270.27	11,591.43	-241.81	9.50	-241.86	0.54	0.47	12.83
First Phoenix MWD Survey									
11,631.00	1.40	284.27	11,618.42	-241.72	8.80	-241.77	1.63	-0.89	51.85
11,676.00	1.15	299.91	11,663.41	-241.36	7.87	-241.41	0.95	-0.56	34.76
11,721.00	5.87	16.34	11,708.33	-238.93	8.13	-238.97	12.69	10.49	169.84
11,766.00	9.96	6.09	11,752.89	-232.85	9.19	-232.90	9.58	9.09	-22.78
11,810.00	15.03	1.10	11,795.84	-223.35	9.70	-223.41	11.77	11.52	-11.34
11,855.00	21.90	357.54	11,838.50	-209.12	9.46	-209.17	15.46	15.27	-7.91
11,900.00	26.35	356.98	11,879.56	-190.75	8.57	-190.80	9.90	9.89	-1.24
11,945.00	27.59	354.39	11,919.66	-170.41	7.02	-170.44	3.80	2.76	-5.76
11,990.00	32.40	354.84	11,958.62	-148.01	4.92	-148.04	10.70	10.69	1.00
12,034.00	36.98	354.49	11,994.79	-123.09	2.59	-123.10	10.42	10.41	-0.80
12,079.00	40.91	356.55	12,029.79	-94.90	0.40	-94.90	9.19	8.73	4.58
12,124.00	43.78	0.24	12,063.05	-64.61	-0.42	-64.61	8.44	6.38	8.20
12,169.00	46.03	0.93	12,094.92	-32.85	-0.09	-32.85	5.12	5.00	1.53
12,213.00	50.34	2.92	12,124.25	-0.08	1.03	-0.09	10.36	9.80	4.52
12,258.00	54.11	3.45	12,151.81	35.42	3.01	35.41	8.43	8.38	1.18
12,275.00	55.79	2.94	12,161.57	49.32	3.78	49.29	10.16	9.86	-3.01
FTP: 12275' MD									
12,303.00	58.55	2.14	12,176.75	72.82	4.82	72.79	10.16	9.87	-2.85
12,348.00	60.14	359.33	12,199.70	111.52	5.31	111.49	6.43	3.53	-6.24
12,392.00	62.44	359.15	12,220.83	150.11	4.80	150.07	5.24	5.23	-0.41
12,437.00	66.47	0.06	12,240.24	190.70	4.52	190.67	9.14	8.96	2.02
12,499.00	70.94	0.82	12,262.75	248.45	4.97	248.41	7.30	7.21	1.23
12,544.00	75.28	359.76	12,275.82	291.49	5.19	291.46	9.90	9.64	-2.36
12,589.00	78.25	359.03	12,286.12	335.29	4.72	335.26	6.79	6.60	-1.62
12,633.00	80.43	358.49	12,294.26	378.52	3.79	378.49	5.10	4.95	-1.23
12,678.00	82.05	357.99	12,301.11	422.97	2.42	422.95	3.76	3.60	-1.11
12,723.00	85.59	359.42	12,305.96	467.69	1.41	467.67	8.48	7.87	3.18
12,768.00	86.24	359.45	12,309.16	512.57	0.97	512.56	1.45	1.44	0.07

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	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)
12,812.00	88.21	358.59	12,311.29	556.51	0.22	556.50	4.88	4.48	-1.95
12,902.00	90.36	356.89	12,312.41	646.43	-3.33	646.44	3.05	2.39	-1.89
12,991.00	90.27	356.84	12,311.92	735.29	-8.20	735.33	0.12	-0.10	-0.06
13,081.00	91.01	357.40	12,310.92	825.17	-12.72	825.23	1.03	0.82	0.62
13,171.00	91.76	357.31	12,308.74	915.05	-16.87	915.13	0.84	0.83	-0.10
13,260.00	93.82	359.14	12,304.41	1,003.89	-19.63	1,003.99	3.09	2.31	2.06
13,350.00	94.66	1.54	12,297.76	1,093.64	-19.10	1,093.73	2.82	0.93	2.67
13,442.00	95.15	1.84	12,289.89	1,185.26	-16.39	1,185.34	0.62	0.53	0.33
13,532.00	91.67	2.50	12,284.54	1,275.02	-12.99	1,275.08	3.94	-3.87	0.73
13,621.00	91.19	2.18	12,282.32	1,363.92	-9.36	1,363.95	0.65	-0.54	-0.36
13,711.00	91.25	1.50	12,280.40	1,453.85	-6.47	1,453.87	0.76	0.07	-0.76
13,800.00	90.72	1.36	12,278.87	1,542.81	-4.25	1,542.81	0.62	-0.60	-0.16
13,890.00	89.88	1.42	12,278.40	1,632.78	-2.07	1,632.77	0.94	-0.93	0.07
13,979.00	90.61	1.02	12,278.02	1,721.76	-0.17	1,721.73	0.94	0.82	-0.45
14,069.00	90.96	1.43	12,276.79	1,811.73	1.75	1,811.69	0.60	0.39	0.46
14,158.00	89.72	1.19	12,276.26	1,900.71	3.79	1,900.65	1.42	-1.39	-0.27
14,248.00	89.99	359.81	12,276.49	1,990.70	4.57	1,990.64	1.56	0.30	-1.53
14,337.00	91.70	358.94	12,275.17	2,079.68	3.60	2,079.62	2.16	1.92	-0.98
14,427.00	90.64	358.06	12,273.34	2,169.63	1.25	2,169.58	1.53	-1.18	-0.98
14,517.00	90.49	357.65	12,272.45	2,259.56	-2.12	2,259.53	0.49	-0.17	-0.46
14,606.00	90.08	357.41	12,272.01	2,348.48	-5.96	2,348.47	0.53	-0.46	-0.27
14,695.00	92.06	357.61	12,270.34	2,437.37	-9.82	2,437.39	2.24	2.22	0.22
14,785.00	90.84	356.73	12,268.07	2,527.23	-14.27	2,527.27	1.67	-1.36	-0.98
14,874.00	93.01	359.00	12,265.08	2,616.11	-17.58	2,616.17	3.53	2.44	2.55
14,963.00	93.31	359.12	12,260.17	2,704.96	-19.04	2,705.03	0.36	0.34	0.13
15,053.00	91.64	358.29	12,256.28	2,794.85	-21.07	2,794.93	2.07	-1.86	-0.92
15,142.00	91.35	359.36	12,253.96	2,883.80	-22.89	2,883.89	1.25	-0.33	1.20
15,232.00	92.35	0.86	12,251.06	2,973.75	-22.72	2,973.83	2.00	1.11	1.67
15,321.00	92.18	0.81	12,247.54	3,062.67	-21.43	3,062.74	0.20	-0.19	-0.06
15,411.00	92.10	0.92	12,244.18	3,152.60	-20.07	3,152.66	0.15	-0.09	0.12
15,501.00	89.38	1.89	12,243.02	3,242.55	-17.86	3,242.60	3.21	-3.02	1.08
15,546.00	89.48	1.73	12,243.46	3,287.53	-16.44	3,287.57	0.42	0.22	-0.36
15,635.00	90.19	1.79	12,243.72	3,376.49	-13.71	3,376.51	0.80	0.80	0.07
15,724.00	90.30	1.15	12,243.34	3,465.46	-11.42	3,465.46	0.73	0.12	-0.72
15,813.00	90.22	359.66	12,242.93	3,554.45	-10.79	3,554.45	1.68	-0.09	-1.67
15,903.00	90.30	359.57	12,242.53	3,644.45	-11.40	3,644.45	0.13	0.09	-0.10
15,992.00	90.16	359.33	12,242.17	3,733.44	-12.25	3,733.45	0.31	-0.16	-0.27
16,082.00	90.28	359.22	12,241.82	3,823.43	-13.39	3,823.45	0.18	0.13	-0.12
16,171.00	89.95	358.83	12,241.65	3,912.42	-14.91	3,912.44	0.57	-0.37	-0.44
16,261.00	90.04	358.57	12,241.65	4,002.40	-16.95	4,002.43	0.31	0.10	-0.29
16,350.00	89.68	359.17	12,241.87	4,091.38	-18.70	4,091.42	0.79	-0.40	0.67
16,439.00	90.25	0.84	12,241.92	4,180.38	-18.70	4,180.41	1.98	0.64	1.88
16,528.00	90.62	1.93	12,241.25	4,269.35	-16.55	4,269.37	1.29	0.42	1.22

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,618.00	90.55	1.86	12,240.33	4,359.29	-13.57	4,359.29	0.11	-0.08	-0.08
16,707.00	90.22	1.48	12,239.73	4,448.25	-10.98	4,448.24	0.57	-0.37	-0.43
16,797.00	91.64	1.00	12,238.27	4,538.22	-9.03	4,538.19	1.67	1.58	-0.53
16,886.00	92.09	0.25	12,235.37	4,627.16	-8.06	4,627.13	0.98	0.51	-0.84
16,976.00	92.01	358.95	12,232.16	4,717.10	-8.69	4,717.07	1.45	-0.09	-1.44
17,065.00	91.27	358.71	12,229.61	4,806.05	-10.50	4,806.02	0.87	-0.83	-0.27
17,154.00	90.76	358.08	12,228.03	4,895.00	-12.99	4,894.99	0.91	-0.57	-0.71
17,243.00	90.59	357.55	12,226.98	4,983.92	-16.39	4,983.93	0.63	-0.19	-0.60
17,333.00	89.36	356.93	12,227.02	5,073.82	-20.72	5,073.85	1.53	-1.37	-0.69
17,422.00	91.13	358.47	12,226.64	5,162.74	-24.29	5,162.79	2.64	1.99	1.73
17,512.00	91.79	359.39	12,224.35	5,252.69	-25.97	5,252.75	1.26	0.73	1.02
17,601.00	89.67	358.09	12,223.21	5,341.66	-27.93	5,341.73	2.79	-2.38	-1.46
17,691.00	89.39	357.50	12,223.95	5,431.59	-31.39	5,431.68	0.73	-0.31	-0.66
17,780.00	89.85	357.09	12,224.54	5,520.49	-35.59	5,520.60	0.69	0.52	-0.46
17,870.00	91.05	358.07	12,223.84	5,610.40	-39.39	5,610.53	1.72	1.33	1.09
17,959.00	91.19	358.75	12,222.10	5,699.35	-41.86	5,699.50	0.78	0.16	0.76
18,049.00	91.30	359.73	12,220.14	5,789.32	-43.06	5,789.47	1.10	0.12	1.09
18,138.00	91.52	1.13	12,217.95	5,878.29	-42.39	5,878.43	1.59	0.25	1.57
18,227.00	91.27	2.79	12,215.78	5,967.20	-39.34	5,967.33	1.89	-0.28	1.87
18,317.00	90.25	2.43	12,214.59	6,057.10	-35.25	6,057.20	1.20	-1.13	-0.40
18,406.00	90.33	2.74	12,214.14	6,146.01	-31.23	6,146.09	0.36	0.09	0.35
18,496.00	90.41	1.91	12,213.56	6,235.93	-27.58	6,235.99	0.93	0.09	-0.92
18,585.00	90.33	0.62	12,212.98	6,324.91	-25.62	6,324.95	1.45	-0.09	-1.45
18,675.00	90.24	359.03	12,212.54	6,414.90	-25.89	6,414.94	1.77	-0.10	-1.77
18,765.00	90.22	358.74	12,212.18	6,504.89	-27.64	6,504.93	0.32	-0.02	-0.32
18,854.00	89.65	357.80	12,212.28	6,593.84	-30.33	6,593.91	1.24	-0.64	-1.06
18,943.00	89.21	357.46	12,213.16	6,682.76	-34.01	6,682.85	0.62	-0.49	-0.38
19,033.00	89.28	358.19	12,214.35	6,772.69	-37.43	6,772.79	0.81	0.08	0.81
19,121.00	89.02	359.24	12,215.65	6,860.66	-39.40	6,860.77	1.23	-0.30	1.19
19,210.00	88.70	359.86	12,217.42	6,949.63	-40.10	6,949.75	0.78	-0.36	0.70
19,299.00	87.14	0.25	12,220.65	7,038.57	-40.01	7,038.69	1.81	-1.75	0.44
19,389.00	87.39	0.09	12,224.95	7,128.47	-39.75	7,128.58	0.33	0.28	-0.18
19,478.00	87.39	0.15	12,229.00	7,217.38	-39.56	7,217.49	0.07	0.00	0.07
19,568.00	86.97	359.79	12,233.43	7,307.27	-39.61	7,307.37	0.61	-0.47	-0.40
19,658.00	87.00	359.52	12,238.16	7,397.14	-40.15	7,397.25	0.30	0.03	-0.30
19,747.00	88.62	359.01	12,241.56	7,486.07	-41.29	7,486.18	1.91	1.82	-0.57
19,837.00	88.39	359.24	12,243.91	7,576.03	-42.66	7,576.14	0.36	-0.26	0.26
19,927.00	88.71	358.63	12,246.19	7,665.98	-44.34	7,666.11	0.77	0.36	-0.68
20,016.00	89.79	358.55	12,247.35	7,754.94	-46.52	7,755.08	1.22	1.21	-0.09
20,106.00	90.05	358.50	12,247.48	7,844.91	-48.84	7,845.07	0.29	0.29	-0.06
20,195.00	89.85	358.74	12,247.56	7,933.89	-50.98	7,934.05	0.35	-0.22	0.27
20,285.00	89.56	358.02	12,248.02	8,023.85	-53.53	8,024.03	0.86	-0.32	-0.80
20,374.00	89.28	358.50	12,248.92	8,112.80	-56.23	8,113.00	0.62	-0.31	0.54

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 603H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB= @ 3276.70usft (Precision 595)
Site:	Fez Federal Com	MD Reference:	RKB= @ 3276.70usft (Precision 595)
Well:	603H	North Reference:	Grid
Wellbore:	OH / 64149	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 595)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
20,464.00	88.98	359.53	12,250.29	8,202.78	-57.78	8,202.98	1.19	-0.33	1.14
20,554.00	89.13	0.31	12,251.77	8,292.77	-57.90	8,292.96	0.88	0.17	0.87
20,643.00	88.76	359.78	12,253.41	8,381.75	-57.83	8,381.95	0.73	-0.42	-0.60
20,733.00	88.42	359.79	12,255.63	8,471.72	-58.17	8,471.92	0.38	-0.38	0.01
20,822.00	88.94	0.29	12,257.68	8,560.70	-58.11	8,560.89	0.81	0.58	0.56
20,912.00	88.62	1.52	12,259.59	8,650.67	-56.69	8,650.85	1.41	-0.36	1.37
21,001.00	88.56	2.64	12,261.78	8,739.58	-53.46	8,739.74	1.26	-0.07	1.26
21,091.00	88.94	2.29	12,263.75	8,829.47	-49.59	8,829.61	0.57	0.42	-0.39
21,181.00	88.42	0.00	12,265.82	8,919.43	-47.79	8,919.55	2.61	-0.58	-2.54
21,270.00	88.36	358.62	12,268.32	9,008.38	-48.86	9,008.51	1.55	-0.07	-1.55
21,360.00	88.88	358.92	12,270.49	9,098.33	-50.79	9,098.48	0.67	0.58	0.33
21,449.00	88.68	358.54	12,272.38	9,187.29	-52.77	9,187.44	0.48	-0.22	-0.43
21,539.00	88.22	358.54	12,274.82	9,277.23	-55.06	9,277.39	0.51	-0.51	0.00
21,628.00	88.59	358.62	12,277.29	9,366.17	-57.26	9,366.34	0.43	0.42	0.09
21,718.00	88.48	359.58	12,279.60	9,456.13	-58.68	9,456.31	1.07	-0.12	1.07
21,808.00	87.53	358.44	12,282.73	9,546.06	-60.23	9,546.25	1.65	-1.06	-1.27
21,897.00	88.31	358.07	12,285.96	9,634.95	-62.94	9,635.16	0.97	0.88	-0.42
21,987.00	89.79	0.15	12,287.45	9,724.92	-64.34	9,725.14	2.84	1.64	2.31
22,076.00	89.90	1.09	12,287.69	9,813.92	-63.37	9,814.12	1.06	0.12	1.06
22,166.00	89.25	1.32	12,288.36	9,903.89	-61.48	9,904.09	0.77	-0.72	0.26
22,235.00	89.77	1.68	12,288.95	9,972.87	-59.67	9,973.05	0.92	0.75	0.53
LTP: 22235' MD									
22,255.00	89.92	1.79	12,289.00	9,992.86	-59.07	9,993.03	0.92	0.75	0.53
Final Phoenix MWD Survey									
22,333.00	89.92	1.79	12,289.11	10,070.82	-56.63	10,070.98	0.00	0.00	0.00
Projection to TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,440.00	11,427.47	-241.38	13.01	Tie In
11,604.00	11,591.43	-241.81	9.50	First Phoenix MWD Survey
12,275.00	12,161.57	49.32	3.78	FTP: 12275' MD
22,235.00	12,288.95	9,972.87	-59.67	LTP: 22235' MD
22,255.00	12,289.00	9,992.86	-59.07	Final Phoenix MWD Survey
22,333.00	12,289.11	10,070.82	-56.63	Projection to TD