



PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

Lea County, NM (NAD27 NME)

Coonskin Fee

28H

HOBBS OCD

JUL 15 2019

RECEIVED

OH / 63567/63588

Design: Surveys (Scan Quest)

Standard Survey Report

04 January, 2019





Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	Coonskin Fee			
Site Position:		Northing:	436,159.30 usft	Latitude: 32° 11' 43.77433 N
From:	Map	Easting:	796,231.00 usft	Longitude: 103° 22' 32.57448 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.51 °

Well	28H			
Well Position	+N/-S	0.00 usft	Northing:	436,151.10 usft
	+E/-W	0.00 usft	Easting:	795,331.10 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level: 3,307.00 usft

Wellbore	OH / 63567/63588				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	10/4/2018	6.72	59.86	47,900.94940142

Design	Surveys (Scan Quest)			
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	181.38

Survey Program	Date 1/4/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	11,580.00	Scientific Gyro Surveys (OH / 63567/6358	Scientific Keeper	Scientific Drilling Intl. Standard Wireline Keeper
11,580.00	19,901.00	Phoenix MWD Surveys (OH / 63567/63588	MWD+HDGM	OWSG Rev.2 MWD + HDGM

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	0.29	167.50	100.00	-0.25	0.05	0.25	0.29	0.29	0.00
125.00	0.43	188.90	125.00	-0.40	0.05	0.40	0.77	0.56	85.60
150.00	0.39	182.21	150.00	-0.58	0.04	0.58	0.25	-0.16	-26.76
175.00	0.44	181.88	175.00	-0.76	0.03	0.76	0.20	0.20	-1.32
200.00	0.48	192.49	200.00	-0.96	0.00	0.96	0.38	0.16	42.44
225.00	0.49	197.10	225.00	-1.16	-0.05	1.16	0.16	0.04	18.44
250.00	0.48	209.72	250.00	-1.36	-0.13	1.36	0.43	-0.04	50.48
275.00	0.47	214.15	274.99	-1.53	-0.24	1.54	0.15	-0.04	17.72
300.00	0.43	218.31	299.99	-1.69	-0.36	1.70	0.21	-0.16	16.64



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	0.44	231.67	324.99	-1.82	-0.49	1.83	0.41	0.04	53.44
350.00	0.50	219.01	349.99	-1.97	-0.64	1.98	0.48	0.24	-50.64
375.00	0.52	224.39	374.99	-2.13	-0.78	2.15	0.21	0.08	21.52
400.00	0.51	221.91	399.99	-2.30	-0.94	2.32	0.10	-0.04	-9.92
425.00	0.48	219.82	424.99	-2.46	-1.08	2.49	0.14	-0.12	-8.36
450.00	0.51	218.71	449.99	-2.63	-1.22	2.66	0.13	0.12	-4.44
475.00	0.52	223.62	474.99	-2.80	-1.36	2.83	0.18	0.04	19.64
500.00	0.53	220.57	499.99	-2.97	-1.52	3.00	0.12	0.04	-12.20
525.00	0.47	224.78	524.99	-3.13	-1.66	3.17	0.28	-0.24	16.84
550.00	0.47	218.32	549.98	-3.28	-1.80	3.32	0.21	0.00	-25.84
575.00	0.49	217.35	574.98	-3.45	-1.93	3.49	0.09	0.08	-3.88
600.00	0.44	217.46	599.98	-3.61	-2.05	3.66	0.20	-0.20	0.44
625.00	0.34	232.43	624.98	-3.73	-2.17	3.78	0.57	-0.40	59.88
650.00	0.23	261.91	649.98	-3.78	-2.28	3.83	0.72	-0.44	117.92
675.00	0.33	308.81	674.98	-3.74	-2.38	3.80	0.96	0.40	187.60
700.00	0.53	322.04	699.98	-3.61	-2.51	3.67	0.89	0.80	52.92
725.00	0.71	323.85	724.98	-3.39	-2.67	3.45	0.72	0.72	7.24
750.00	0.76	320.74	749.98	-3.14	-2.87	3.21	0.26	0.20	-12.44
775.00	0.77	318.21	774.98	-2.88	-3.09	2.96	0.14	0.04	-10.12
800.00	0.80	320.45	799.97	-2.62	-3.31	2.70	0.17	0.12	8.96
825.00	0.73	320.11	824.97	-2.37	-3.52	2.45	0.28	-0.28	-1.36
850.00	0.74	314.93	849.97	-2.13	-3.74	2.22	0.27	0.04	-20.72
875.00	0.73	316.05	874.97	-1.90	-3.96	2.00	0.07	-0.04	4.48
900.00	0.75	318.19	899.96	-1.67	-4.18	1.77	0.14	0.08	8.56
925.00	0.73	318.79	924.96	-1.42	-4.40	1.53	0.09	-0.08	2.40
950.00	0.71	317.36	949.96	-1.19	-4.61	1.30	0.11	-0.08	-5.72
975.00	0.71	323.11	974.96	-0.95	-4.81	1.07	0.28	0.00	23.00
1,000.00	0.65	320.22	999.96	-0.72	-4.99	0.84	0.28	-0.24	-11.56
1,025.00	0.64	317.87	1,024.95	-0.51	-5.17	0.63	0.11	-0.04	-9.40
1,050.00	0.60	326.60	1,049.95	-0.29	-5.34	0.42	0.41	-0.16	34.92
1,075.00	0.59	332.09	1,074.95	-0.07	-5.47	0.20	0.23	-0.04	21.96
1,100.00	0.53	337.17	1,099.95	0.15	-5.58	-0.02	0.31	-0.24	20.32
1,125.00	0.55	332.97	1,124.95	0.36	-5.68	-0.23	0.18	0.08	-16.80
1,150.00	0.60	333.71	1,149.95	0.59	-5.79	-0.45	0.20	0.20	2.96
1,175.00	0.58	335.19	1,174.95	0.82	-5.90	-0.68	0.10	-0.08	5.92
1,200.00	0.65	330.58	1,199.95	1.06	-6.02	-0.91	0.34	0.28	-18.44
1,225.00	0.58	322.50	1,224.94	1.28	-6.17	-1.13	0.45	-0.28	-32.32
1,250.00	0.54	331.49	1,249.94	1.49	-6.30	-1.33	0.39	-0.16	35.96
1,275.00	0.59	333.74	1,274.94	1.70	-6.42	-1.55	0.22	0.20	9.00
1,300.00	0.61	330.30	1,299.94	1.94	-6.54	-1.78	0.16	0.08	-13.76
1,325.00	0.57	339.75	1,324.94	2.17	-6.65	-2.01	0.42	-0.16	37.80
1,350.00	0.61	325.09	1,349.94	2.39	-6.77	-2.23	0.62	0.16	-58.64
1,375.00	0.59	330.31	1,374.94	2.61	-6.91	-2.45	0.23	-0.08	20.88



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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)
1,400.00	0.63	332.30	1,399.94	2.85	-7.03	-2.68	0.18	0.16	7.96
1,425.00	0.65	339.47	1,424.93	3.10	-7.15	-2.93	0.33	0.08	28.68
1,450.00	0.64	326.45	1,449.93	3.35	-7.27	-3.18	0.59	-0.04	-52.08
1,475.00	0.94	316.20	1,474.93	3.62	-7.49	-3.43	1.32	1.20	-41.00
1,500.00	1.67	301.69	1,499.92	3.96	-7.95	-3.76	3.18	2.92	-58.04
1,525.00	2.53	292.45	1,524.91	4.36	-8.77	-4.15	3.69	3.44	-36.96
1,550.00	3.02	290.77	1,549.88	4.80	-9.89	-4.56	1.99	1.96	-6.72
1,575.00	3.33	290.51	1,574.84	5.29	-11.19	-5.02	1.24	1.24	-1.04
1,600.00	4.05	286.46	1,599.79	5.79	-12.71	-5.49	3.06	2.88	-16.20
1,625.00	4.38	286.10	1,624.72	6.31	-14.48	-5.96	1.32	1.32	-1.44
1,650.00	4.57	285.48	1,649.64	6.84	-16.35	-6.44	0.78	0.76	-2.48
1,675.00	4.57	285.32	1,674.56	7.37	-18.28	-6.93	0.05	0.00	-0.64
1,700.00	4.63	284.61	1,699.48	7.89	-20.21	-7.40	0.33	0.24	-2.84
1,725.00	4.61	284.80	1,724.40	8.40	-22.16	-7.86	0.10	-0.08	0.76
1,750.00	4.76	283.71	1,749.32	8.90	-24.14	-8.32	0.70	0.60	-4.36
1,775.00	4.96	278.77	1,774.23	9.31	-26.21	-8.68	1.85	0.80	-19.76
1,800.00	5.15	274.73	1,799.13	9.57	-28.40	-8.88	1.61	0.76	-16.16
1,825.00	5.13	274.24	1,824.03	9.74	-30.63	-9.00	0.19	-0.08	-1.96
1,850.00	4.95	269.42	1,848.93	9.82	-32.83	-9.02	1.84	-0.72	-19.28
1,875.00	4.77	265.37	1,873.84	9.72	-34.94	-8.88	1.55	-0.72	-16.20
1,900.00	4.66	262.95	1,898.76	9.51	-36.99	-8.62	0.91	-0.44	-9.68
1,925.00	4.65	263.34	1,923.68	9.27	-39.00	-8.33	0.13	-0.04	1.56
1,950.00	4.53	262.79	1,948.60	9.03	-40.99	-8.04	0.51	-0.48	-2.20
1,975.00	4.56	261.91	1,973.52	8.76	-42.95	-7.73	0.30	0.12	-3.52
2,000.00	4.54	263.09	1,998.44	8.51	-44.92	-7.42	0.38	-0.08	4.72
2,025.00	4.50	263.19	2,023.36	8.27	-46.87	-7.14	0.16	-0.16	0.40
2,050.00	4.41	262.55	2,048.29	8.03	-48.80	-6.85	0.41	-0.36	-2.56
2,075.00	4.41	263.00	2,073.21	7.79	-50.71	-6.56	0.14	0.00	1.80
2,100.00	4.44	262.67	2,098.14	7.55	-52.62	-6.28	0.16	0.12	-1.32
2,125.00	4.52	263.45	2,123.06	7.31	-54.56	-6.00	0.40	0.32	3.12
2,150.00	4.45	268.71	2,147.98	7.14	-56.50	-5.78	1.06	-0.28	13.04
2,175.00	4.43	271.36	2,172.91	7.11	-58.44	-5.70	1.44	-0.08	18.60
2,200.00	4.49	272.09	2,197.83	7.17	-60.38	-5.71	0.33	0.24	2.92
2,225.00	4.36	273.00	2,222.76	7.25	-62.31	-5.75	0.59	-0.52	3.64
2,250.00	4.50	271.95	2,247.68	7.34	-64.24	-5.79	0.65	0.56	-4.20
2,275.00	4.57	272.96	2,272.61	7.42	-66.21	-5.83	0.42	0.28	4.04
2,300.00	4.47	275.03	2,297.53	7.56	-68.18	-5.91	0.77	-0.40	8.28
2,325.00	4.57	273.74	2,322.45	7.71	-70.14	-6.02	0.57	0.40	-5.16
2,350.00	4.59	273.85	2,347.37	7.84	-72.13	-6.10	0.09	0.08	0.44
2,375.00	4.58	274.24	2,372.29	7.98	-74.12	-6.19	0.17	-0.12	1.56
2,400.00	4.62	273.43	2,397.21	8.12	-76.12	-6.28	0.35	0.24	-3.24
2,425.00	4.57	273.51	2,422.13	8.24	-78.12	-6.35	0.20	-0.20	0.32
2,450.00	4.39	274.67	2,447.05	8.38	-80.07	-6.45	0.81	-0.72	4.64



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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)
2,475.00	4.15	272.78	2,471.99	8.50	-81.92	-6.52	1.11	-0.96	-7.56
2,500.00	3.69	271.35	2,496.93	8.56	-83.63	-6.54	1.88	-1.84	-5.72
2,525.00	3.73	271.60	2,521.87	8.60	-85.25	-6.55	0.17	0.16	1.00
2,550.00	3.62	270.32	2,546.82	8.63	-86.85	-6.54	0.55	-0.44	-5.12
2,575.00	3.68	271.22	2,571.77	8.65	-88.44	-6.52	0.33	0.24	3.60
2,600.00	3.68	269.70	2,596.72	8.66	-90.05	-6.49	0.39	0.00	-6.08
2,625.00	3.76	268.04	2,621.67	8.63	-91.67	-6.42	0.54	0.32	-6.64
2,650.00	4.07	268.61	2,646.61	8.58	-93.37	-6.33	1.25	1.24	2.28
2,675.00	4.04	267.46	2,671.55	8.52	-95.14	-6.23	0.35	-0.12	-4.60
2,700.00	4.15	267.16	2,696.48	8.44	-96.92	-6.10	0.45	0.44	-1.20
2,725.00	4.13	267.48	2,721.42	8.35	-98.73	-5.97	0.12	-0.08	1.28
2,750.00	4.14	265.45	2,746.35	8.24	-100.52	-5.82	0.59	0.04	-8.12
2,775.00	4.18	265.86	2,771.29	8.10	-102.33	-5.64	0.20	0.16	1.64
2,800.00	4.30	265.00	2,796.22	7.96	-104.18	-5.45	0.54	0.48	-3.44
2,825.00	4.80	264.59	2,821.14	7.78	-106.15	-5.22	2.00	2.00	-1.64
2,850.00	5.07	265.63	2,846.05	7.59	-108.29	-4.98	1.14	1.08	4.16
2,875.00	5.18	265.51	2,870.95	7.42	-110.52	-4.76	0.44	0.44	-0.48
2,900.00	5.15	265.62	2,895.85	7.25	-112.76	-4.53	0.13	-0.12	0.44
2,925.00	5.25	264.82	2,920.74	7.06	-115.02	-4.29	0.49	0.40	-3.20
2,950.00	5.07	264.75	2,945.64	6.85	-117.26	-4.03	0.72	-0.72	-0.28
2,975.00	4.92	263.87	2,970.55	6.64	-119.43	-3.76	0.67	-0.60	-3.52
3,000.00	4.64	261.31	2,995.46	6.37	-121.49	-3.44	1.41	-1.12	-10.24
3,025.00	4.49	261.08	3,020.38	6.07	-123.46	-3.09	0.60	-0.60	-0.92
3,050.00	4.48	261.31	3,045.30	5.77	-125.39	-2.75	0.08	-0.04	0.92
3,075.00	4.47	260.78	3,070.23	5.46	-127.32	-2.40	0.17	-0.04	-2.12
3,100.00	4.60	260.62	3,095.15	5.14	-129.27	-2.03	0.52	0.52	-0.64
3,125.00	5.57	265.18	3,120.05	4.88	-131.47	-1.71	4.20	3.88	18.24
3,150.00	5.84	264.87	3,144.93	4.68	-133.94	-1.44	1.09	1.08	-1.24
3,175.00	5.87	265.31	3,169.80	4.45	-136.48	-1.16	0.22	0.12	1.76
3,200.00	5.77	265.30	3,194.67	4.24	-139.01	-0.89	0.40	-0.40	-0.04
3,225.00	5.94	265.47	3,219.54	4.03	-141.55	-0.62	0.68	0.68	0.68
3,250.00	5.89	265.31	3,244.40	3.83	-144.12	-0.35	0.21	-0.20	-0.64
3,275.00	5.49	264.55	3,269.28	3.61	-146.59	-0.08	1.63	-1.60	-3.04
3,300.00	5.27	263.86	3,294.17	3.37	-148.92	0.22	0.92	-0.88	-2.76
3,325.00	5.06	263.26	3,319.07	3.12	-151.16	0.52	0.87	-0.84	-2.40
3,350.00	4.84	263.37	3,343.98	2.87	-153.30	0.83	0.88	-0.88	0.44
3,375.00	4.66	264.30	3,368.89	2.64	-155.36	1.10	0.78	-0.72	3.72
3,400.00	4.44	265.31	3,393.81	2.46	-157.33	1.33	0.94	-0.88	4.04
3,425.00	4.26	265.04	3,418.74	2.31	-159.22	1.53	0.72	-0.72	-1.08
3,450.00	4.02	265.35	3,443.67	2.15	-161.02	1.72	0.96	-0.96	1.24
3,475.00	4.08	265.29	3,468.61	2.01	-162.78	1.91	0.16	0.16	-0.24
3,500.00	4.11	266.18	3,493.55	1.88	-164.55	2.09	0.32	0.20	3.56
3,525.00	4.02	265.10	3,518.49	1.74	-166.32	2.26	0.47	-0.36	-4.32
3,550.00	4.11	265.91	3,543.42	1.60	-168.09	2.44	0.43	0.36	3.24



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	4.02	265.78	3,568.36	1.48	-169.85	2.61	0.36	-0.36	-0.52
3,600.00	4.05	265.75	3,593.30	1.35	-171.61	2.79	0.12	0.12	-0.12
3,625.00	4.09	265.83	3,618.23	1.22	-173.38	2.96	0.16	0.16	0.32
3,650.00	3.95	264.54	3,643.17	1.07	-175.12	3.15	0.67	-0.56	-5.16
3,675.00	3.90	264.69	3,668.11	0.91	-176.83	3.35	0.20	-0.20	0.60
3,700.00	3.65	262.04	3,693.06	0.72	-178.46	3.58	1.22	-1.00	-10.60
3,725.00	3.28	260.44	3,718.01	0.49	-179.95	3.84	1.53	-1.48	-6.40
3,750.00	2.81	258.66	3,742.98	0.25	-181.26	4.11	1.92	-1.88	-7.12
3,775.00	2.32	253.51	3,767.95	-0.01	-182.35	4.40	2.16	-1.96	-20.60
3,800.00	2.10	249.96	3,792.94	-0.31	-183.26	4.73	1.04	-0.88	-14.20
3,825.00	1.94	248.80	3,817.92	-0.62	-184.09	5.06	0.66	-0.64	-4.64
3,850.00	1.07	255.65	3,842.91	-0.83	-184.71	5.28	3.55	-3.48	27.40
3,875.00	0.52	13.78	3,867.91	-0.78	-184.91	5.23	5.57	-2.20	472.52
3,900.00	0.81	31.41	3,892.91	-0.52	-184.79	4.97	1.41	1.16	70.52
3,925.00	0.76	31.22	3,917.91	-0.23	-184.61	4.67	0.20	-0.20	-0.76
3,950.00	0.69	4.26	3,942.90	0.06	-184.51	4.38	1.38	-0.28	-107.84
3,975.00	1.08	300.99	3,967.90	0.34	-184.70	4.11	3.94	1.56	-253.08
4,000.00	2.25	277.26	3,992.89	0.52	-185.39	3.95	5.34	4.68	-94.92
4,025.00	3.54	271.19	4,017.86	0.60	-186.65	3.90	5.30	5.16	-24.28
4,050.00	4.54	270.95	4,042.80	0.63	-188.41	3.91	4.00	4.00	-0.96
4,075.00	5.76	271.12	4,067.69	0.67	-190.66	3.92	4.88	4.88	0.68
4,100.00	5.92	271.15	4,092.56	0.72	-193.20	3.93	0.64	0.64	0.12
4,125.00	6.03	271.23	4,117.43	0.77	-195.80	3.94	0.44	0.44	0.32
4,150.00	6.25	272.02	4,142.28	0.85	-198.47	3.93	0.94	0.88	3.16
4,175.00	6.57	272.97	4,167.13	0.97	-201.26	3.87	1.35	1.28	3.80
4,200.00	6.62	272.82	4,191.96	1.12	-204.13	3.80	0.21	0.20	-0.60
4,225.00	6.91	273.84	4,216.79	1.29	-207.07	3.70	1.26	1.16	4.08
4,250.00	7.48	274.57	4,241.59	1.52	-210.19	3.54	2.31	2.28	2.92
4,275.00	7.91	275.95	4,266.37	1.83	-213.53	3.32	1.87	1.72	5.52
4,300.00	8.52	277.25	4,291.11	2.24	-217.07	2.99	2.55	2.44	5.20
4,325.00	8.99	278.76	4,315.82	2.77	-220.84	2.55	2.09	1.88	6.04
4,350.00	9.21	279.38	4,340.50	3.39	-224.75	2.02	0.96	0.88	2.48
4,375.00	9.49	279.88	4,365.17	4.07	-228.75	1.44	1.17	1.12	2.00
4,400.00	9.61	280.73	4,389.83	4.82	-232.83	0.79	0.74	0.48	3.40
4,425.00	9.45	280.44	4,414.48	5.58	-236.90	0.13	0.67	-0.64	-1.16
4,450.00	8.65	281.80	4,439.17	6.33	-240.76	-0.53	3.31	-3.20	5.44
4,475.00	7.87	282.43	4,463.91	7.09	-244.27	-1.20	3.14	-3.12	2.52
4,500.00	7.64	283.01	4,488.68	7.83	-247.56	-1.86	0.97	-0.92	2.32
4,525.00	7.26	283.76	4,513.47	8.58	-250.71	-2.54	1.57	-1.52	3.00
4,550.00	5.85	286.47	4,538.31	9.32	-253.47	-3.21	5.77	-5.64	10.84
4,575.00	5.13	287.08	4,563.19	10.00	-255.76	-3.84	2.89	-2.88	2.44
4,600.00	4.49	288.06	4,588.10	10.64	-257.76	-4.43	2.58	-2.56	3.92
4,625.00	3.44	291.43	4,613.04	11.21	-259.39	-4.96	4.30	-4.20	13.48



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	2.21	301.11	4,638.01	11.74	-260.50	-5.46	5.26	-4.92	38.72
4,675.00	1.22	326.37	4,663.00	12.21	-261.06	-5.92	4.89	-3.96	101.04
4,700.00	0.82	12.21	4,688.00	12.60	-261.17	-6.31	3.50	-1.60	183.36
4,725.00	1.23	73.16	4,712.99	12.88	-260.87	-6.57	4.39	1.64	243.80
4,750.00	2.20	93.67	4,737.98	12.90	-260.14	-6.64	4.53	3.88	82.04
4,775.00	3.25	98.68	4,762.95	12.77	-258.96	-6.53	4.30	4.20	20.04
4,800.00	3.89	102.50	4,787.91	12.48	-257.43	-6.27	2.73	2.56	15.28
4,825.00	4.55	106.47	4,812.84	12.01	-255.65	-5.85	2.89	2.64	15.88
4,850.00	4.79	107.57	4,837.75	11.41	-253.70	-5.30	1.02	0.96	4.40
4,875.00	4.94	108.14	4,862.66	10.76	-251.69	-4.70	0.63	0.60	2.28
4,900.00	4.88	106.88	4,887.57	10.12	-249.65	-4.11	0.49	-0.24	-5.04
4,925.00	4.06	101.89	4,912.50	9.63	-247.76	-3.66	3.63	-3.28	-19.96
4,950.00	3.42	97.95	4,937.44	9.34	-246.16	-3.41	2.76	-2.56	-15.76
4,975.00	2.97	98.18	4,962.40	9.15	-244.78	-3.25	1.80	-1.80	0.92
5,000.00	2.55	101.56	4,987.38	8.95	-243.59	-3.08	1.80	-1.68	13.52
5,025.00	1.61	120.95	5,012.36	8.65	-242.75	-2.80	4.65	-3.76	77.56
5,050.00	1.37	128.11	5,037.35	8.29	-242.21	-2.45	1.21	-0.96	28.64
5,075.00	1.09	136.79	5,062.34	7.93	-241.81	-2.10	1.34	-1.12	34.72
5,100.00	0.75	164.81	5,087.34	7.60	-241.61	-1.78	2.22	-1.36	112.08
5,125.00	0.68	191.72	5,112.34	7.30	-241.59	-1.48	1.36	-0.28	107.64
5,150.00	0.68	197.55	5,137.34	7.01	-241.67	-1.19	0.28	0.00	23.32
5,175.00	0.59	193.81	5,162.34	6.74	-241.74	-0.92	0.40	-0.36	-14.96
5,200.00	0.62	200.12	5,187.34	6.49	-241.82	-0.66	0.29	0.12	25.24
5,225.00	0.62	194.40	5,212.33	6.23	-241.90	-0.41	0.25	0.00	-22.88
5,250.00	0.59	198.36	5,237.33	5.98	-241.98	-0.15	0.21	-0.12	15.84
5,275.00	0.60	205.93	5,262.33	5.74	-242.07	0.09	0.32	0.04	30.28
5,300.00	0.72	203.33	5,287.33	5.48	-242.19	0.36	0.49	0.48	-10.40
5,325.00	0.70	204.98	5,312.33	5.19	-242.32	0.64	0.11	-0.08	6.60
5,350.00	0.70	203.56	5,337.33	4.92	-242.45	0.92	0.07	0.00	-5.68
5,375.00	0.72	202.76	5,362.32	4.63	-242.57	1.21	0.09	0.08	-3.20
5,400.00	0.60	205.57	5,387.32	4.37	-242.68	1.48	0.50	-0.48	11.24
5,425.00	0.69	203.42	5,412.32	4.11	-242.80	1.74	0.37	0.36	-8.60
5,450.00	0.71	205.42	5,437.32	3.83	-242.93	2.02	0.13	0.08	8.00
5,475.00	0.61	203.66	5,462.32	3.57	-243.05	2.28	0.41	-0.40	-7.04
5,500.00	0.64	206.57	5,487.32	3.33	-243.16	2.53	0.17	0.12	11.64
5,525.00	0.64	205.18	5,512.31	3.07	-243.28	2.79	0.06	0.00	-5.56
5,550.00	0.66	205.91	5,537.31	2.82	-243.41	3.04	0.09	0.08	2.92
5,575.00	0.67	205.51	5,562.31	2.56	-243.53	3.31	0.04	0.04	-1.60
5,600.00	0.70	201.58	5,587.31	2.28	-243.65	3.59	0.22	0.12	-15.72
5,625.00	0.67	203.17	5,612.31	2.01	-243.77	3.86	0.14	-0.12	6.36
5,650.00	0.57	199.78	5,637.31	1.76	-243.86	4.12	0.43	-0.40	-13.56
5,675.00	0.64	203.49	5,662.30	1.51	-243.96	4.37	0.32	0.28	14.84
5,700.00	0.61	198.49	5,687.30	1.26	-244.06	4.62	0.25	-0.12	-20.00



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	0.66	200.03	5,712.30	0.99	-244.15	4.89	0.21	0.20	6.16
5,750.00	0.63	200.26	5,737.30	0.73	-244.25	5.15	0.12	-0.12	0.92
5,775.00	0.56	219.13	5,762.30	0.51	-244.37	5.38	0.83	-0.28	75.48
5,800.00	0.42	223.19	5,787.30	0.35	-244.51	5.54	0.58	-0.56	16.24
5,825.00	0.49	229.81	5,812.30	0.21	-244.66	5.68	0.35	0.28	26.48
5,850.00	0.46	228.98	5,837.30	0.07	-244.82	5.82	0.12	-0.12	-3.32
5,875.00	0.49	243.56	5,862.29	-0.04	-244.99	5.94	0.50	0.12	58.32
5,900.00	0.42	233.46	5,887.29	-0.14	-245.16	6.04	0.42	-0.28	-40.40
5,925.00	0.45	235.60	5,912.29	-0.25	-245.31	6.16	0.14	0.12	8.56
5,950.00	0.41	233.49	5,937.29	-0.36	-245.46	6.27	0.17	-0.16	-8.44
5,975.00	0.39	237.27	5,962.29	-0.46	-245.61	6.37	0.13	-0.08	15.12
6,000.00	0.47	235.03	5,987.29	-0.56	-245.76	6.48	0.33	0.32	-8.96
6,025.00	0.42	241.06	6,012.29	-0.67	-245.93	6.59	0.27	-0.20	24.12
6,050.00	0.49	244.30	6,037.29	-0.76	-246.10	6.68	0.30	0.28	12.96
6,075.00	0.46	235.41	6,062.29	-0.86	-246.28	6.79	0.32	-0.12	-35.56
6,100.00	0.42	229.47	6,087.29	-0.98	-246.43	6.91	0.24	-0.16	-23.76
6,125.00	0.46	221.17	6,112.29	-1.11	-246.57	7.05	0.30	0.16	-33.20
6,150.00	0.42	224.25	6,137.29	-1.25	-246.70	7.19	0.19	-0.16	12.32
6,175.00	0.46	221.41	6,162.29	-1.39	-246.83	7.34	0.18	0.16	-11.36
6,200.00	0.40	212.08	6,187.28	-1.54	-246.94	7.49	0.37	-0.24	-37.32
6,225.00	0.37	213.71	6,212.28	-1.68	-247.03	7.63	0.13	-0.12	6.52
6,250.00	0.43	214.47	6,237.28	-1.83	-247.13	7.78	0.24	0.24	3.04
6,275.00	0.41	216.44	6,262.28	-1.98	-247.24	7.93	0.10	-0.08	7.88
6,300.00	0.40	204.73	6,287.28	-2.13	-247.33	8.09	0.33	-0.04	-46.84
6,325.00	0.36	214.84	6,312.28	-2.27	-247.41	8.23	0.31	-0.16	40.44
6,350.00	0.42	217.45	6,337.28	-2.41	-247.51	8.37	0.25	0.24	10.44
6,375.00	0.34	209.72	6,362.28	-2.55	-247.60	8.51	0.38	-0.32	-30.92
6,400.00	0.40	228.96	6,387.28	-2.67	-247.71	8.63	0.55	0.24	76.96
6,425.00	0.39	214.13	6,412.28	-2.80	-247.82	8.76	0.41	-0.04	-59.32
6,450.00	0.50	225.12	6,437.28	-2.94	-247.94	8.92	0.56	0.44	43.96
6,475.00	0.41	210.99	6,462.28	-3.10	-248.07	9.07	0.57	-0.36	-56.52
6,500.00	0.45	211.55	6,487.28	-3.26	-248.16	9.23	0.16	0.16	2.24
6,525.00	0.44	214.22	6,512.28	-3.42	-248.27	9.40	0.09	-0.04	10.68
6,550.00	0.40	212.78	6,537.28	-3.57	-248.37	9.55	0.17	-0.16	-5.76
6,575.00	0.37	218.13	6,562.28	-3.71	-248.47	9.69	0.19	-0.12	21.40
6,600.00	0.35	209.09	6,587.28	-3.84	-248.56	9.83	0.24	-0.08	-36.16
6,625.00	0.41	223.35	6,612.27	-3.97	-248.65	9.96	0.45	0.24	57.04
6,650.00	0.42	220.82	6,637.27	-4.11	-248.78	10.10	0.08	0.04	-10.12
6,675.00	0.49	213.61	6,662.27	-4.27	-248.89	10.26	0.36	0.28	-28.84
6,700.00	0.45	220.84	6,687.27	-4.43	-249.02	10.43	0.29	-0.16	28.92
6,725.00	0.44	216.07	6,712.27	-4.58	-249.14	10.58	0.15	-0.04	-19.08
6,750.00	0.38	210.53	6,737.27	-4.73	-249.24	10.73	0.29	-0.24	-22.16
6,775.00	0.35	208.03	6,762.27	-4.87	-249.31	10.87	0.14	-0.12	-10.00
6,800.00	0.41	208.33	6,787.27	-5.02	-249.39	11.02	0.24	0.24	1.20



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	0.37	215.84	6,812.27	-5.16	-249.48	11.17	0.26	-0.16	30.04
6,850.00	0.44	217.67	6,837.27	-5.30	-249.59	11.31	0.28	0.28	7.32
6,875.00	0.44	218.98	6,862.27	-5.45	-249.71	11.46	0.04	0.00	5.24
6,900.00	0.49	214.11	6,887.27	-5.61	-249.83	11.63	0.25	0.20	-19.48
6,925.00	0.43	214.68	6,912.27	-5.78	-249.94	11.80	0.24	-0.24	2.28
6,950.00	0.42	208.62	6,937.27	-5.94	-250.04	11.96	0.18	-0.04	-24.24
6,975.00	0.43	209.85	6,962.26	-6.10	-250.13	12.12	0.05	0.04	4.92
7,000.00	0.44	209.82	6,987.26	-6.26	-250.22	12.29	0.04	0.04	-0.12
7,025.00	0.43	212.90	7,012.26	-6.43	-250.32	12.45	0.10	-0.04	12.32
7,050.00	0.44	215.39	7,037.26	-6.58	-250.43	12.61	0.09	0.04	9.96
7,075.00	0.43	226.44	7,062.26	-6.73	-250.55	12.76	0.34	-0.04	44.20
7,100.00	0.43	220.63	7,087.26	-6.86	-250.68	12.90	0.17	0.00	-23.24
7,125.00	0.49	218.81	7,112.26	-7.02	-250.81	13.05	0.25	0.24	-7.28
7,150.00	0.42	216.55	7,137.26	-7.17	-250.93	13.21	0.29	-0.28	-9.04
7,175.00	0.46	209.28	7,162.26	-7.33	-251.03	13.38	0.27	0.16	-29.08
7,200.00	0.49	219.06	7,187.26	-7.50	-251.15	13.55	0.35	0.12	39.12
7,225.00	0.43	209.39	7,212.26	-7.67	-251.26	13.72	0.39	-0.24	-38.68
7,250.00	0.46	221.60	7,237.26	-7.83	-251.38	13.88	0.40	0.12	48.84
7,275.00	0.47	216.04	7,262.26	-7.98	-251.50	14.04	0.18	0.04	-22.24
7,300.00	0.39	213.94	7,287.25	-8.14	-251.61	14.20	0.33	-0.32	-8.40
7,325.00	0.51	207.91	7,312.25	-8.31	-251.71	14.37	0.52	0.48	-24.12
7,350.00	0.47	207.86	7,337.25	-8.50	-251.81	14.56	0.16	-0.16	-0.20
7,375.00	0.40	204.61	7,362.25	-8.67	-251.90	14.73	0.30	-0.28	-13.00
7,400.00	0.46	205.04	7,387.25	-8.84	-251.97	14.90	0.24	0.24	1.72
7,425.00	0.42	202.78	7,412.25	-9.01	-252.05	15.08	0.17	-0.16	-9.04
7,450.00	0.40	194.91	7,437.25	-9.18	-252.11	15.25	0.24	-0.08	-31.48
7,475.00	0.44	204.33	7,462.25	-9.35	-252.17	15.42	0.32	0.16	37.68
7,500.00	0.44	198.99	7,487.25	-9.53	-252.24	15.60	0.16	0.00	-21.36
7,525.00	0.47	203.69	7,512.25	-9.72	-252.32	15.79	0.19	0.12	18.80
7,550.00	0.44	193.27	7,537.25	-9.90	-252.38	15.98	0.35	-0.12	-41.68
7,575.00	0.41	191.59	7,562.25	-10.08	-252.42	16.16	0.13	-0.12	-8.72
7,600.00	0.41	195.00	7,587.25	-10.26	-252.46	16.33	0.10	0.00	13.64
7,625.00	0.41	199.23	7,612.25	-10.43	-252.51	16.51	0.12	0.00	16.92
7,650.00	0.44	200.81	7,637.24	-10.60	-252.58	16.68	0.13	0.12	6.32
7,675.00	0.38	197.68	7,662.24	-10.77	-252.64	16.85	0.26	-0.24	-12.52
7,700.00	0.35	195.44	7,687.24	-10.92	-252.68	17.01	0.13	-0.12	-8.96
7,725.00	0.33	206.50	7,712.24	-11.06	-252.73	17.15	0.27	-0.08	44.24
7,750.00	0.24	210.71	7,737.24	-11.17	-252.79	17.26	0.37	-0.36	16.84
7,775.00	0.27	203.20	7,762.24	-11.27	-252.84	17.36	0.18	0.12	-30.04
7,800.00	0.10	180.56	7,787.24	-11.35	-252.87	17.43	0.73	-0.68	-90.56
7,825.00	0.03	209.58	7,812.24	-11.37	-252.87	17.46	0.30	-0.28	116.08
7,850.00	0.05	124.45	7,837.24	-11.39	-252.86	17.47	0.22	0.08	-340.52
7,875.00	0.01	330.58	7,862.24	-11.39	-252.86	17.48	0.24	-0.16	-615.48



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/83588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
7,900.00	0.01	81.55	7,887.24	-11.39	-252.85	17.47	0.07	0.00	443.88
7,925.00	0.06	125.13	7,912.24	-11.39	-252.84	17.48	0.21	0.20	174.32
7,950.00	0.03	217.02	7,937.24	-11.41	-252.84	17.49	0.27	-0.12	367.56
7,975.00	0.04	179.56	7,962.24	-11.42	-252.84	17.51	0.10	0.04	-149.84
8,000.00	0.22	188.87	7,987.24	-11.48	-252.85	17.56	0.72	0.72	37.24
8,025.00	0.23	156.55	8,012.24	-11.57	-252.83	17.66	0.50	0.04	-129.28
8,050.00	0.21	151.26	8,037.24	-11.66	-252.79	17.74	0.11	-0.08	-21.16
8,075.00	0.24	154.01	8,062.24	-11.74	-252.75	17.83	0.13	0.12	11.00
8,100.00	0.31	155.09	8,087.24	-11.85	-252.70	17.94	0.28	0.28	4.32
8,125.00	0.36	153.54	8,112.24	-11.98	-252.63	18.07	0.20	0.20	-6.20
8,150.00	0.38	144.91	8,137.24	-12.12	-252.55	18.20	0.24	0.08	-34.52
8,175.00	0.42	138.05	8,162.24	-12.26	-252.44	18.33	0.25	0.16	-27.44
8,200.00	0.46	137.38	8,187.24	-12.40	-252.31	18.47	0.16	0.16	-2.68
8,225.00	0.49	146.68	8,212.24	-12.56	-252.18	18.63	0.33	0.12	37.20
8,250.00	0.53	148.91	8,237.24	-12.75	-252.07	18.82	0.18	0.16	8.92
8,275.00	0.49	140.64	8,262.24	-12.93	-251.94	19.00	0.33	-0.16	-33.08
8,300.00	0.51	133.22	8,287.24	-13.09	-251.79	19.15	0.27	0.08	-29.68
8,325.00	0.54	133.65	8,312.23	-13.25	-251.62	19.31	0.12	0.12	1.72
8,350.00	0.67	132.31	8,337.23	-13.43	-251.43	19.48	0.52	0.52	-5.36
8,375.00	0.66	126.86	8,362.23	-13.61	-251.21	19.66	0.26	-0.04	-21.80
8,400.00	0.60	127.89	8,387.23	-13.78	-250.99	19.82	0.24	-0.24	4.12
8,425.00	0.63	127.83	8,412.23	-13.95	-250.78	19.98	0.12	0.12	-0.24
8,450.00	0.66	125.52	8,437.23	-14.11	-250.55	20.14	0.16	0.12	-9.24
8,475.00	0.66	128.36	8,462.23	-14.29	-250.32	20.31	0.13	0.00	11.36
8,500.00	0.69	128.81	8,487.22	-14.47	-250.09	20.49	0.12	0.12	1.80
8,525.00	0.72	126.00	8,512.22	-14.66	-249.85	20.67	0.18	0.12	-11.24
8,550.00	0.75	121.89	8,537.22	-14.84	-249.58	20.84	0.24	0.12	-16.44
8,575.00	0.64	123.00	8,562.22	-15.00	-249.32	21.00	0.44	-0.44	4.44
8,600.00	0.64	125.85	8,587.22	-15.16	-249.09	21.15	0.13	0.00	11.40
8,625.00	0.62	125.45	8,612.21	-15.32	-248.87	21.31	0.08	-0.08	-1.60
8,650.00	0.68	122.37	8,637.21	-15.47	-248.63	21.46	0.28	0.24	-12.32
8,675.00	0.71	123.88	8,662.21	-15.64	-248.38	21.62	0.14	0.12	6.04
8,700.00	0.65	121.60	8,687.21	-15.80	-248.13	21.77	0.26	-0.24	-9.12
8,725.00	0.65	124.55	8,712.21	-15.96	-247.89	21.92	0.13	0.00	11.80
8,750.00	0.65	120.39	8,737.21	-16.11	-247.65	22.07	0.19	0.00	-16.64
8,775.00	0.62	119.16	8,762.20	-16.25	-247.41	22.20	0.13	-0.12	-4.92
8,800.00	0.74	124.11	8,787.20	-16.40	-247.16	22.35	0.53	0.48	19.80
8,825.00	0.69	122.83	8,812.20	-16.57	-246.90	22.52	0.21	-0.20	-5.12
8,850.00	0.72	125.65	8,837.20	-16.75	-246.65	22.68	0.18	0.12	11.28
8,875.00	0.81	119.77	8,862.20	-16.93	-246.37	22.86	0.48	0.36	-23.52
8,900.00	0.71	117.05	8,887.19	-17.09	-246.08	23.01	0.43	-0.40	-10.88
8,925.00	0.79	119.66	8,912.19	-17.24	-245.79	23.16	0.35	0.32	10.44
8,950.00	0.77	123.97	8,937.19	-17.42	-245.50	23.33	0.25	-0.08	17.24



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	0.78	119.61	8,962.19	-17.60	-245.21	23.50	0.24	0.04	-17.44
9,000.00	0.80	118.44	8,987.19	-17.77	-244.91	23.66	0.10	0.08	-4.68
9,025.00	0.70	119.44	9,012.18	-17.92	-244.62	23.81	0.40	-0.40	4.00
9,050.00	0.73	124.28	9,037.18	-18.09	-244.36	23.97	0.27	0.12	19.36
9,075.00	0.78	122.25	9,062.18	-18.27	-244.08	24.14	0.23	0.20	-8.12
9,100.00	0.78	123.14	9,087.18	-18.45	-243.80	24.32	0.05	0.00	3.56
9,125.00	0.84	120.03	9,112.17	-18.64	-243.50	24.50	0.30	0.24	-12.44
9,150.00	1.02	119.13	9,137.17	-18.84	-243.14	24.69	0.72	0.72	-3.60
9,175.00	1.13	117.97	9,162.17	-19.06	-242.73	24.90	0.45	0.44	-4.64
9,200.00	1.17	118.60	9,187.16	-19.30	-242.29	25.13	0.17	0.16	2.52
9,225.00	1.13	119.00	9,212.16	-19.54	-241.85	25.36	0.16	-0.16	1.60
9,250.00	1.29	120.84	9,237.15	-19.80	-241.39	25.61	0.66	0.64	7.36
9,275.00	1.38	118.63	9,262.14	-20.09	-240.89	25.89	0.41	0.36	-8.84
9,300.00	1.43	118.47	9,287.14	-20.39	-240.35	26.17	0.20	0.20	-0.64
9,325.00	1.42	118.72	9,312.13	-20.68	-239.80	26.45	0.05	-0.04	1.00
9,350.00	1.54	118.15	9,337.12	-20.99	-239.23	26.75	0.48	0.48	-2.28
9,375.00	1.58	118.15	9,362.11	-21.31	-238.63	27.05	0.16	0.16	0.00
9,400.00	1.45	119.28	9,387.10	-21.63	-238.05	27.36	0.53	-0.52	4.52
9,425.00	1.66	119.26	9,412.09	-21.96	-237.46	27.67	0.84	0.84	-0.08
9,450.00	1.42	118.92	9,437.08	-22.29	-236.88	27.99	0.96	-0.96	-1.36
9,475.00	0.59	103.50	9,462.08	-22.47	-236.48	28.16	3.46	-3.32	-61.68
9,500.00	0.56	106.46	9,487.08	-22.53	-236.24	28.21	0.17	-0.12	11.84
9,525.00	0.50	101.57	9,512.08	-22.59	-236.01	28.27	0.30	-0.24	-19.56
9,550.00	0.57	102.94	9,537.08	-22.64	-235.79	28.31	0.28	0.28	5.48
9,575.00	0.50	113.62	9,562.08	-22.71	-235.56	28.38	0.49	-0.28	42.72
9,600.00	0.55	105.57	9,587.07	-22.79	-235.35	28.45	0.36	0.20	-32.20
9,625.00	0.50	105.33	9,612.07	-22.85	-235.13	28.50	0.20	-0.20	-0.96
9,650.00	0.55	101.48	9,637.07	-22.90	-234.90	28.55	0.24	0.20	-15.40
9,675.00	0.52	97.16	9,662.07	-22.94	-234.67	28.58	0.20	-0.12	-17.28
9,700.00	0.42	100.67	9,687.07	-22.97	-234.47	28.61	0.42	-0.40	14.04
9,725.00	0.42	102.35	9,712.07	-23.01	-234.29	28.64	0.05	0.00	6.72
9,750.00	0.28	89.13	9,737.07	-23.02	-234.14	28.66	0.64	-0.56	-52.88
9,775.00	0.23	104.67	9,762.07	-23.04	-234.03	28.67	0.34	-0.20	62.16
9,800.00	0.24	130.10	9,787.07	-23.08	-233.94	28.71	0.42	0.04	101.72
9,825.00	0.23	132.54	9,812.07	-23.15	-233.87	28.78	0.06	-0.04	9.76
9,850.00	0.30	143.20	9,837.07	-23.24	-233.79	28.86	0.34	0.28	42.64
9,875.00	0.28	142.77	9,862.07	-23.34	-233.71	28.96	0.08	-0.08	-1.72
9,900.00	0.25	151.09	9,887.07	-23.43	-233.65	29.05	0.19	-0.12	33.28
9,925.00	0.25	155.74	9,912.07	-23.53	-233.60	29.15	0.08	0.00	18.60
9,950.00	0.29	147.40	9,937.07	-23.63	-233.55	29.25	0.22	0.16	-33.36
9,975.00	0.50	159.76	9,962.07	-23.79	-233.47	29.41	0.80	0.84	49.44
10,000.00	0.67	162.63	9,987.07	-24.03	-233.39	29.65	0.69	0.68	11.48
10,025.00	0.70	160.35	10,012.06	-24.31	-233.30	29.93	0.16	0.12	-9.12
10,050.00	0.82	165.98	10,037.06	-24.63	-233.20	30.24	0.56	0.48	22.52



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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)
10,075.00	0.99	167.55	10,062.06	-25.02	-233.11	30.62	0.69	0.68	6.28
10,100.00	1.02	169.33	10,087.05	-25.45	-233.03	31.05	0.17	0.12	7.12
10,125.00	1.07	169.20	10,112.05	-25.89	-232.94	31.50	0.20	0.20	-0.52
10,150.00	1.19	165.82	10,137.05	-26.38	-232.83	31.97	0.55	0.48	-13.52
10,175.00	1.34	160.81	10,162.04	-26.90	-232.67	32.50	0.74	0.60	-20.04
10,200.00	1.56	165.17	10,187.03	-27.51	-232.49	33.10	0.98	0.88	17.44
10,225.00	1.78	164.96	10,212.02	-28.21	-232.30	33.80	0.88	0.88	-0.84
10,250.00	1.78	169.36	10,237.01	-28.97	-232.13	34.55	0.55	0.00	17.60
10,275.00	1.89	166.56	10,262.00	-29.75	-231.96	35.33	0.57	0.44	-11.20
10,300.00	1.80	170.66	10,286.98	-30.54	-231.80	36.11	0.64	-0.36	16.40
10,325.00	1.58	170.15	10,311.97	-31.27	-231.68	36.84	0.88	-0.88	-2.04
10,350.00	1.52	172.41	10,336.96	-31.93	-231.58	37.50	0.34	-0.24	9.04
10,375.00	1.56	171.91	10,361.95	-32.60	-231.49	38.17	0.17	0.16	-2.00
10,400.00	0.69	195.30	10,386.95	-33.08	-231.48	38.65	3.87	-3.48	93.56
10,425.00	0.81	316.17	10,411.95	-33.10	-231.64	38.67	5.22	0.48	483.48
10,450.00	1.17	330.42	10,436.94	-32.75	-231.89	38.33	1.73	1.44	57.00
10,475.00	1.27	333.09	10,461.94	-32.28	-232.14	37.86	0.46	0.40	10.68
10,500.00	1.33	334.91	10,486.93	-31.77	-232.39	37.36	0.29	0.24	7.28
10,525.00	1.24	337.29	10,511.93	-31.26	-232.62	36.85	0.42	-0.36	9.52
10,550.00	1.19	336.62	10,536.92	-30.77	-232.82	36.37	0.21	-0.20	-2.68
10,575.00	1.34	336.67	10,561.91	-30.26	-233.04	35.87	0.60	0.60	0.20
10,600.00	1.44	330.73	10,586.91	-29.72	-233.31	35.33	0.70	0.40	-23.76
10,625.00	1.23	329.72	10,611.90	-29.22	-233.60	34.83	0.85	-0.84	-4.04
10,650.00	1.23	320.87	10,636.89	-28.78	-233.90	34.40	0.76	0.00	-35.40
10,675.00	1.11	314.58	10,661.89	-28.40	-234.25	34.03	0.70	-0.48	-25.16
10,700.00	1.03	316.73	10,686.88	-28.07	-234.57	33.71	0.36	-0.32	8.60
10,725.00	0.85	318.67	10,711.88	-27.75	-234.86	33.39	0.35	-0.32	7.76
10,750.00	0.85	319.92	10,736.88	-27.45	-235.12	33.10	0.41	-0.40	5.00
10,775.00	0.64	328.53	10,761.88	-27.19	-235.31	32.85	0.95	-0.84	34.44
10,800.00	0.64	344.84	10,786.87	-26.93	-235.42	32.60	0.73	0.00	65.24
10,825.00	0.71	357.54	10,811.87	-26.64	-235.46	32.31	0.66	0.28	50.80
10,850.00	0.73	357.48	10,836.87	-26.33	-235.48	31.99	0.08	0.08	-0.24
10,875.00	0.89	10.98	10,861.87	-25.98	-235.45	31.64	0.99	0.64	54.00
10,900.00	1.07	3.62	10,886.86	-25.56	-235.40	31.22	0.88	0.72	-29.44
10,925.00	1.08	3.46	10,911.86	-25.09	-235.37	30.75	0.04	0.04	-0.64
10,950.00	1.14	2.62	10,936.86	-24.61	-235.34	30.27	0.25	0.24	-3.36
10,975.00	1.12	7.01	10,961.85	-24.11	-235.30	29.77	0.36	-0.08	17.56
11,000.00	1.16	6.46	10,986.85	-23.62	-235.24	29.28	0.17	0.16	-2.20
11,025.00	1.16	2.29	11,011.84	-23.12	-235.20	28.77	0.34	0.00	-16.68
11,050.00	1.29	5.07	11,036.83	-22.58	-235.17	28.24	0.57	0.52	11.12
11,075.00	1.37	354.93	11,061.83	-22.00	-235.17	27.66	0.99	0.32	-40.56
11,100.00	1.71	344.06	11,086.82	-21.35	-235.30	27.01	1.79	1.36	-43.48
11,125.00	1.91	338.01	11,111.81	-20.60	-235.56	26.27	1.11	0.80	-24.20



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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	2.33	332.83	11,136.79	-19.77	-235.95	25.44	1.84	1.68	-20.72
11,175.00	2.52	330.19	11,161.77	-18.84	-236.45	24.53	0.88	0.76	-10.56
11,200.00	2.48	330.06	11,186.74	-17.89	-236.99	23.59	0.16	-0.16	-0.52
11,225.00	2.49	331.64	11,211.72	-16.94	-237.52	22.66	0.28	0.04	6.32
11,250.00	2.73	330.77	11,236.69	-15.95	-238.07	21.68	0.97	0.96	-3.48
11,275.00	2.76	331.32	11,261.67	-14.90	-238.65	20.64	0.16	0.12	2.20
11,300.00	2.71	332.77	11,286.64	-13.85	-239.21	19.60	0.34	-0.20	5.80
11,325.00	2.63	332.71	11,311.61	-12.81	-239.74	18.58	0.32	-0.32	-0.24
11,350.00	2.51	336.27	11,336.58	-11.80	-240.23	17.58	0.80	-0.48	14.24
11,375.00	2.08	340.61	11,361.56	-10.87	-240.60	16.66	1.85	-1.72	17.36
11,400.00	1.25	0.36	11,386.55	-10.17	-240.75	15.96	3.99	-3.32	79.00
11,425.00	0.97	17.54	11,411.55	-9.70	-240.68	15.49	1.73	-1.12	68.72
11,450.00	0.98	24.05	11,436.55	-9.30	-240.53	15.09	0.44	0.04	26.04
11,475.00	1.02	27.39	11,461.54	-8.91	-240.34	14.69	0.28	0.16	13.36
11,500.00	0.98	24.54	11,486.54	-8.51	-240.15	14.29	0.26	-0.16	-11.40
11,525.00	1.16	25.53	11,511.53	-8.09	-239.95	13.87	0.72	0.72	3.96
11,550.00	1.16	20.27	11,536.53	-7.62	-239.75	13.40	0.43	0.00	-21.04
11,575.00	1.12	23.63	11,561.52	-7.16	-239.57	12.93	0.31	-0.16	13.44
11,580.00	1.17	26.10	11,566.52	-7.07	-239.53	12.84	1.40	1.00	49.40
Tie In									
11,723.00	0.90	27.55	11,709.50	-4.77	-238.37	10.51	0.19	-0.19	1.01
First Phoenix MWD Survey									
11,817.00	1.82	89.52	11,803.48	-4.10	-236.53	9.79	1.71	0.98	65.93
11,849.00	5.55	120.43	11,835.41	-4.88	-234.69	10.53	12.80	11.66	96.59
11,880.00	7.88	131.00	11,866.19	-7.03	-231.79	12.61	8.48	7.52	34.10
11,912.00	11.65	130.31	11,897.72	-10.56	-227.67	16.04	11.79	11.78	-2.16
11,943.00	15.53	130.06	11,927.85	-15.26	-222.10	20.61	12.52	12.52	-0.81
11,974.00	18.90	128.97	11,957.46	-21.09	-215.02	26.26	10.92	10.87	-3.52
12,006.00	22.61	134.61	11,987.38	-28.67	-206.61	33.64	13.16	11.59	17.63
12,038.00	26.46	143.45	12,016.49	-38.73	-197.98	43.48	16.59	12.03	27.63
12,069.00	27.60	148.78	12,044.11	-50.42	-190.14	54.98	8.63	3.68	17.19
12,100.00	26.99	154.40	12,071.66	-62.91	-183.38	67.30	8.54	-1.97	18.13
12,132.00	26.94	161.74	12,100.19	-76.34	-177.97	80.61	10.40	-0.16	22.94
12,163.00	28.52	169.16	12,127.64	-90.29	-174.38	94.46	12.24	5.10	23.94
12,194.00	30.22	174.79	12,154.66	-105.33	-172.28	109.45	10.45	5.48	18.16
12,226.00	30.43	179.70	12,182.29	-121.45	-171.50	125.55	7.77	0.66	15.34
12,257.00	29.97	182.52	12,209.08	-137.04	-171.80	141.14	4.81	-1.48	9.10
12,288.00	32.83	185.15	12,235.54	-153.15	-172.90	157.27	10.23	9.23	8.48
12,320.00	36.38	187.65	12,261.87	-171.20	-174.94	175.36	11.95	11.09	7.81
12,351.00	39.66	189.43	12,286.29	-190.08	-177.78	194.30	11.16	10.58	5.74
12,382.00	42.70	187.53	12,309.62	-210.26	-180.78	214.58	10.60	9.81	-6.13
12,414.00	46.87	185.24	12,332.33	-232.66	-183.27	237.01	13.97	13.03	-7.16
12,445.00	49.89	186.89	12,352.92	-255.70	-185.73	260.10	10.52	9.74	5.32
12,477.00	53.53	187.38	12,372.74	-280.62	-188.85	285.08	11.44	11.38	1.53



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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)
12,478.40	53.79	187.41	12,373.57	-281.73	-189.00	286.20	18.71	18.64	2.03
FTP: 12478' MD									
12,508.00	59.31	187.97	12,389.88	-306.20	-192.30	310.74	18.71	18.65	1.90
12,540.00	61.19	188.12	12,405.76	-333.71	-196.19	338.34	5.89	5.88	0.47
12,571.00	63.15	188.57	12,420.23	-360.89	-199.69	365.60	7.72	6.32	-5.00
12,609.00	68.48	184.98	12,435.80	-395.37	-203.17	400.15	14.54	14.03	-4.18
12,640.00	75.95	184.12	12,445.26	-424.77	-205.50	429.60	24.24	24.10	-2.77
12,697.00	95.81	185.61	12,449.33	-481.14	-210.31	486.06	34.94	34.84	2.61
12,760.00	98.74	186.08	12,441.36	-543.30	-216.67	548.36	4.71	4.65	0.75
12,792.00	97.95	184.73	12,436.71	-574.82	-219.66	579.94	4.85	-2.47	-4.22
12,855.00	97.58	184.21	12,428.20	-637.05	-224.52	642.27	1.01	-0.59	-0.83
12,886.00	95.24	184.04	12,424.74	-667.77	-226.74	673.04	7.57	-7.55	-0.55
12,981.00	91.68	181.45	12,419.01	-762.47	-231.27	767.82	4.63	-3.75	-2.73
13,076.00	89.50	183.32	12,418.03	-857.37	-235.23	862.79	3.02	-2.29	1.97
13,170.00	87.25	178.42	12,420.70	-951.29	-236.65	956.71	5.73	-2.39	-5.21
13,264.00	87.73	178.54	12,424.81	-1,045.16	-234.16	1,050.50	0.53	0.51	0.13
13,358.00	87.40	177.39	12,428.81	-1,139.02	-230.83	1,144.25	1.27	-0.35	-1.22
13,452.00	89.89	180.98	12,431.03	-1,232.96	-229.49	1,238.13	4.65	2.65	3.82
13,547.00	90.17	180.77	12,430.98	-1,327.95	-230.94	1,333.13	0.37	0.29	-0.22
13,641.00	91.15	181.72	12,429.90	-1,421.92	-232.99	1,427.12	1.45	1.04	1.01
13,727.00	93.03	183.08	12,426.76	-1,507.78	-236.58	1,513.04	2.70	2.19	1.58
13,821.00	86.55	181.62	12,427.11	-1,601.65	-240.44	1,606.97	7.07	-6.89	-1.55
13,915.00	88.80	181.93	12,430.92	-1,695.52	-243.35	1,700.89	2.42	2.39	0.33
14,010.00	89.33	181.70	12,432.47	-1,790.46	-246.35	1,795.87	0.61	0.56	-0.24
14,105.00	87.84	179.77	12,434.81	-1,885.41	-247.57	1,890.83	2.57	-1.57	-2.03
14,199.00	86.36	179.91	12,439.57	-1,979.29	-247.31	1,984.67	1.58	-1.57	0.15
14,293.00	84.65	180.30	12,446.94	-2,073.00	-247.48	2,078.36	1.87	-1.82	0.41
14,387.00	82.81	178.42	12,457.20	-2,166.42	-246.44	2,171.73	2.79	-1.96	-2.00
14,482.00	82.25	177.23	12,469.55	-2,260.55	-242.87	2,265.74	1.37	-0.59	-1.25
14,576.00	84.70	175.33	12,480.24	-2,353.73	-236.80	2,358.75	3.29	2.61	-2.02
14,670.00	88.43	173.95	12,485.87	-2,447.13	-228.04	2,451.91	4.23	3.97	-1.47
14,764.00	90.36	176.14	12,486.86	-2,540.76	-219.92	2,545.32	3.11	2.05	2.33
14,858.00	89.36	176.77	12,487.09	-2,634.58	-214.11	2,638.97	1.26	-1.06	0.67
14,953.00	89.55	177.52	12,487.99	-2,729.46	-209.38	2,733.71	0.81	0.20	0.79
15,048.00	89.75	177.98	12,488.57	-2,824.38	-205.65	2,828.52	0.53	0.21	0.48
15,143.00	91.71	179.58	12,487.36	-2,919.35	-203.63	2,923.40	2.66	2.06	1.68
15,237.00	87.56	178.24	12,487.96	-3,013.30	-201.84	3,017.29	4.64	-4.41	-1.43
15,331.00	90.56	179.51	12,489.50	-3,107.26	-199.99	3,111.18	3.47	3.19	1.35
15,429.00	90.17	182.30	12,488.88	-3,205.24	-201.54	3,209.16	2.87	-0.40	2.85
15,523.00	91.09	183.96	12,487.85	-3,299.09	-206.67	3,303.11	2.02	0.98	1.77
15,618.00	89.92	183.56	12,487.01	-3,393.88	-212.90	3,398.02	1.30	-1.23	-0.42
15,712.00	89.30	180.83	12,487.65	-3,487.80	-216.50	3,492.00	2.98	-0.66	-2.90
15,807.00	89.02	180.37	12,489.04	-3,582.78	-217.50	3,586.98	0.57	-0.29	-0.48



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandril Quest)
MD Reference: RKB @ 3337.00usft (Scandril Quest)
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)
15,901.00	89.27	180.29	12,490.44	-3,676.77	-218.04	3,680.95	0.28	0.27	-0.09
15,995.00	87.14	178.04	12,493.39	-3,770.70	-216.67	3,774.83	3.30	-2.27	-2.39
16,090.00	86.16	177.92	12,498.94	-3,865.48	-213.33	3,869.50	1.04	-1.03	-0.13
16,185.00	87.34	178.39	12,504.33	-3,960.28	-210.27	3,964.19	1.34	1.24	0.49
16,279.00	88.07	178.09	12,508.09	-4,054.15	-207.39	4,057.97	0.84	0.78	-0.32
16,373.00	89.27	179.70	12,510.27	-4,148.11	-205.58	4,151.85	2.14	1.28	1.71
16,468.00	90.36	179.87	12,510.58	-4,243.10	-205.22	4,246.82	1.16	1.15	0.18
16,562.00	89.27	179.57	12,510.88	-4,337.10	-204.76	4,340.77	1.20	-1.16	-0.32
16,657.00	90.08	179.33	12,511.42	-4,432.09	-203.85	4,435.72	0.89	0.85	-0.25
16,751.00	86.41	178.96	12,514.30	-4,526.02	-202.45	4,529.59	3.92	-3.90	-0.39
16,853.00	87.93	180.87	12,519.34	-4,627.89	-202.30	4,631.42	2.39	1.49	1.87
16,948.00	89.19	181.29	12,521.72	-4,722.84	-204.09	4,726.39	1.40	1.33	0.44
17,043.00	88.24	180.99	12,523.85	-4,817.80	-205.98	4,821.36	1.05	-1.00	-0.32
17,137.00	88.32	179.42	12,526.68	-4,911.75	-206.31	4,915.30	1.67	0.09	-1.67
17,232.00	89.47	180.81	12,528.51	-5,006.73	-206.51	5,010.25	1.90	1.21	1.46
17,326.00	87.84	179.98	12,530.71	-5,100.70	-207.15	5,104.21	1.95	-1.73	-0.88
17,420.00	88.15	180.26	12,534.00	-5,194.64	-207.35	5,198.13	0.44	0.33	0.30
17,515.00	87.81	180.12	12,537.35	-5,289.58	-207.67	5,293.05	0.39	-0.36	-0.15
17,609.00	87.76	180.03	12,540.98	-5,383.51	-207.79	5,386.95	0.11	-0.05	-0.10
17,704.00	88.18	180.74	12,544.35	-5,478.45	-208.43	5,481.88	0.87	0.44	0.75
17,798.00	88.18	181.23	12,547.34	-5,572.39	-210.04	5,575.83	0.52	0.00	0.52
17,892.00	89.50	181.74	12,549.24	-5,666.33	-212.48	5,669.81	1.51	1.40	0.54
17,987.00	88.38	181.02	12,551.00	-5,761.29	-214.76	5,764.79	1.40	-1.18	-0.76
18,082.00	88.91	179.46	12,553.24	-5,856.26	-215.16	5,859.74	1.73	0.56	-1.64
18,177.00	87.17	178.29	12,556.49	-5,951.18	-213.30	5,954.59	2.21	-1.83	-1.23
18,271.00	90.14	179.77	12,558.70	-6,045.13	-211.71	6,048.47	3.53	3.16	1.57
18,366.00	90.98	178.04	12,557.77	-6,140.10	-209.89	6,143.37	2.02	0.88	-1.82
18,460.00	88.29	178.63	12,558.37	-6,234.05	-207.16	6,237.23	2.93	-2.86	0.63
18,556.00	87.45	178.72	12,561.94	-6,329.96	-204.94	6,333.06	0.88	-0.88	0.09
18,651.00	88.32	178.28	12,565.44	-6,424.86	-202.46	6,427.87	1.03	0.92	-0.46
18,745.00	87.51	177.85	12,568.86	-6,518.74	-199.29	6,521.65	0.98	-0.86	-0.46
18,839.00	89.33	176.36	12,571.45	-6,612.58	-194.54	6,615.35	2.50	1.94	-1.59
18,932.00	88.12	175.66	12,573.52	-6,705.33	-188.07	6,707.91	1.50	-1.30	-0.75
19,026.00	87.11	178.82	12,577.44	-6,799.12	-183.55	6,801.57	3.53	-1.07	3.36
19,121.00	85.43	178.45	12,583.62	-6,893.89	-181.29	6,896.26	1.81	-1.77	-0.39
19,215.00	87.34	179.50	12,589.54	-6,987.68	-179.61	6,989.98	2.32	2.03	1.12
19,310.00	89.13	180.23	12,592.47	-7,082.63	-179.39	7,084.90	2.03	1.88	0.77
19,405.00	90.98	179.86	12,592.38	-7,177.63	-179.47	7,179.87	1.99	1.95	-0.39
19,499.00	90.98	179.79	12,590.77	-7,271.62	-179.18	7,273.82	0.07	0.00	-0.07
19,594.00	89.86	179.98	12,590.07	-7,366.61	-178.99	7,368.79	1.20	-1.18	0.20
19,689.00	91.99	180.62	12,588.54	-7,461.59	-179.49	7,463.75	2.34	2.24	0.67
19,772.40	90.20	180.19	12,586.95	-7,544.97	-180.08	7,547.12	2.21	-2.15	-0.51
LTP: 19772' MD									
19,783.00	89.97	180.14	12,586.93	-7,555.57	-180.11	7,557.72	2.21	-2.15	-0.51



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Coonskin Fee
Well: 28H
Wellbore: OH / 63567/63588
Design: Surveys (Scan Quest)

Local Co-ordinate Reference: Well 28H
TVD Reference: RKB @ 3337.00usft (Scandriill Quest)
MD Reference: RKB @ 3337.00usft (Scandriill Quest)
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)
19,832.00	89.83	179.44	12,587.02	-7,604.57	-179.93	7,606.70	1.46	-0.29	-1.43
Final Phoenix MWD Survey									
19,901.00	89.83	179.44	12,587.22	-7,673.57	-179.25	7,675.66	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)	
11,580.00	11,566.52	-7.07	-239.53	Tie In
11,723.00	11,709.50	-4.77	-238.37	First Phoenix MWD Survey
12,478.40	12,373.57	-281.73	-189.00	FTP: 12478' MD
19,772.40	12,586.95	-7,544.97	-180.08	LTP: 19772' MD
19,832.00	12,587.02	-7,604.57	-179.93	Final Phoenix MWD Survey
19,901.00	12,587.22	-7,673.57	-179.25	Projection to TD