30-005-43553

CONCHO

COG Operating, LLC

Lea County, NM
Sec. 21, T 21S, R33E
Boone 16 State Com #3H

Wellbore #1

Design: Wellbore #1

QES Survey Report

04 June, 2018

QES
DIRECTIONAL DRILLING

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Project Lea County, NM

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 Sec. 21, T 21S, R33E

Site Position:		**Northing:**	535,715.28 usft	**Latitude:**	32° 28' 13.912 N
From:	Lat/Long	**Easting:**	732,736.10 usft	**Longitude:**	103° 34' 43.280 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.41 °

Well Boone 16 State Com #3H

Well Position	**+N/-S**	0.0 usft	**Northing:**	535,715.28 usft	**Latitude:**	32° 28' 13.912 N
	+E/-W	0.0 usft	**Easting:**	732,736.10 usft	**Longitude:**	103° 34' 43.280 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,753.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	4/23/2018	6.97	60.34	48,237.00000000

Design Wellbore #1

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	358.77

Survey Program **Date** 6/4/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,992.0	Scientific GYRO (Wellbore #1)	GYRO-NS	OWSG Gyrocompass Gyro
11,138.0	22,297.0	QES MWD Survey (Sci Gryo Tie-in) (Wellb	MWD+IFR1+MS	OWSG MWD + IFR1 + Multi-Station Correction

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.09	173.00	100.0	-0.1	0.0	-0.1	0.09	0.09	0.00
125.0	0.14	132.24	125.0	-0.1	0.0	-0.1	0.37	0.20	-163.04
150.0	0.04	168.63	150.0	-0.1	0.1	-0.1	0.44	-0.40	145.56
175.0	0.09	313.16	175.0	-0.1	0.0	-0.1	0.50	0.20	578.12
200.0	0.18	319.24	200.0	-0.1	0.0	-0.1	0.36	0.36	24.32
225.0	0.12	68.49	225.0	-0.1	0.0	-0.1	0.99	-0.24	437.00
250.0	0.11	303.31	250.0	0.0	0.0	0.0	0.82	-0.04	-500.72
275.0	0.13	7.63	275.0	0.0	0.0	0.0	0.52	0.08	257.28
300.0	0.17	333.50	300.0	0.1	0.0	0.1	0.38	0.16	-136.52

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Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
325.0	0.17	353.58	325.0	0.1	0.0	0.1	0.24	0.00	80.32
350.0	0.14	333.97	350.0	0.2	-0.1	0.2	0.24	-0.12	-78.44
375.0	0.12	299.75	375.0	0.2	-0.1	0.2	0.32	-0.08	-136.88
400.0	0.22	277.89	400.0	0.3	-0.2	0.3	0.47	0.40	-87.44
425.0	0.11	285.08	425.0	0.3	-0.2	0.3	0.45	-0.44	28.76
450.0	0.22	275.83	450.0	0.3	-0.3	0.3	0.45	0.44	-37.00
475.0	0.23	260.01	475.0	0.3	-0.4	0.3	0.25	0.04	-63.28
500.0	0.25	252.95	500.0	0.3	-0.5	0.3	0.14	0.08	-28.24
525.0	0.21	237.22	525.0	0.2	-0.6	0.2	0.30	-0.16	-62.92
550.0	0.20	259.93	550.0	0.2	-0.7	0.2	0.33	-0.04	90.84
575.0	0.26	224.46	575.0	0.1	-0.8	0.2	0.61	0.24	-141.88
600.0	0.22	228.42	600.0	0.1	-0.8	0.1	0.17	-0.16	15.84
625.0	0.30	236.05	625.0	0.0	-0.9	0.0	0.35	0.32	30.52
650.0	0.27	245.40	650.0	-0.1	-1.0	0.0	0.22	-0.12	37.40
675.0	0.31	236.86	675.0	-0.1	-1.1	-0.1	0.24	0.16	-34.16
700.0	0.40	230.86	700.0	-0.2	-1.3	-0.2	0.39	0.36	-24.00
725.0	0.30	205.54	725.0	-0.3	-1.4	-0.3	0.73	-0.40	-101.28
750.0	0.41	202.87	750.0	-0.5	-1.4	-0.4	0.44	0.44	-10.68
775.0	0.41	185.58	775.0	-0.6	-1.5	-0.6	0.49	0.00	-69.16
800.0	0.51	196.97	800.0	-0.8	-1.5	-0.8	0.54	0.40	45.56
825.0	0.59	197.87	825.0	-1.1	-1.6	-1.0	0.32	0.32	3.60
850.0	0.55	197.25	850.0	-1.3	-1.7	-1.3	0.16	-0.16	-2.48
875.0	0.60	196.28	875.0	-1.5	-1.7	-1.5	0.20	0.20	-3.88
900.0	0.68	208.89	900.0	-1.8	-1.8	-1.8	0.65	0.32	50.44
925.0	0.79	201.47	925.0	-2.1	-2.0	-2.1	0.58	0.44	-29.68
950.0	0.83	202.03	950.0	-2.4	-2.1	-2.4	0.16	0.16	2.24
975.0	0.92	202.08	975.0	-2.8	-2.2	-2.7	0.36	0.36	0.20
1,000.0	0.93	198.13	1,000.0	-3.2	-2.4	-3.1	0.26	0.04	-15.80
1,025.0	0.95	201.54	1,025.0	-3.5	-2.5	-3.5	0.24	0.08	13.64
1,050.0	1.08	205.43	1,050.0	-3.9	-2.7	-3.9	0.59	0.52	15.56
1,075.0	1.01	205.67	1,075.0	-4.4	-2.9	-4.3	0.28	-0.28	0.96
1,100.0	0.99	198.04	1,100.0	-4.8	-3.1	-4.7	0.54	-0.08	-30.52
1,125.0	1.01	202.44	1,125.0	-5.2	-3.2	-5.1	0.32	0.08	17.60
1,150.0	0.94	190.98	1,150.0	-5.6	-3.3	-5.5	0.83	-0.28	-45.84
1,175.0	1.04	188.46	1,175.0	-6.0	-3.4	-5.9	0.44	0.40	-10.08
1,200.0	1.00	187.71	1,199.9	-6.4	-3.5	-6.4	0.17	-0.16	-3.00
1,225.0	1.01	191.37	1,224.9	-6.9	-3.5	-6.8	0.26	0.04	14.64
1,250.0	1.10	184.37	1,249.9	-7.3	-3.6	-7.3	0.63	0.36	-28.00
1,275.0	1.16	190.43	1,274.9	-7.8	-3.7	-7.7	0.53	0.24	24.24
1,300.0	1.05	183.62	1,299.9	-8.3	-3.7	-8.2	0.68	-0.44	-27.24
1,325.0	1.00	186.21	1,324.9	-8.7	-3.8	-8.7	0.27	-0.20	10.36
1,350.0	1.08	188.02	1,349.9	-9.2	-3.8	-9.1	0.35	0.32	7.24
1,375.0	1.16	177.09	1,374.9	-9.7	-3.8	-9.6	0.91	0.32	-43.72

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,400.0	1.10	179.58	1,399.9	-10.2	-3.8	-10.1	0.31	-0.24	9.96
1,425.0	1.05	185.08	1,424.9	-10.6	-3.8	-10.6	0.46	-0.20	22.00
1,450.0	1.15	190.31	1,449.9	-11.1	-3.9	-11.0	0.57	0.40	20.92
1,475.0	1.10	190.09	1,474.9	-11.6	-4.0	-11.5	0.20	-0.20	-0.88
1,500.0	1.13	201.86	1,499.9	-12.1	-4.1	-12.0	0.92	0.12	47.08
1,525.0	1.20	208.47	1,524.9	-12.5	-4.4	-12.4	0.61	0.28	26.44
1,550.0	1.17	208.18	1,549.9	-13.0	-4.6	-12.9	0.12	-0.12	-1.16
1,575.0	1.20	205.01	1,574.9	-13.4	-4.8	-13.3	0.29	0.12	-12.68
1,600.0	1.23	203.17	1,599.9	-13.9	-5.0	-13.8	0.20	0.12	-7.36
1,625.0	1.26	205.68	1,624.9	-14.4	-5.3	-14.3	0.25	0.12	10.04
1,650.0	1.23	207.21	1,649.9	-14.9	-5.5	-14.8	0.18	-0.12	6.12
1,675.0	1.21	207.18	1,674.9	-15.4	-5.8	-15.2	0.08	-0.08	-0.12
1,700.0	1.24	206.57	1,699.8	-15.9	-6.0	-15.7	0.13	0.12	-2.44
1,725.0	1.42	206.06	1,724.8	-16.4	-6.3	-16.2	0.72	0.72	-2.04
1,750.0	1.24	200.63	1,749.8	-16.9	-6.5	-16.8	0.88	-0.72	-21.72
1,775.0	1.29	211.40	1,774.8	-17.4	-6.7	-17.2	0.97	0.20	43.08
1,800.0	1.37	206.33	1,799.8	-17.9	-7.0	-17.8	0.57	0.32	-20.28
1,825.0	1.27	203.91	1,824.8	-18.4	-7.2	-18.3	0.46	-0.40	-9.68
1,850.0	1.38	201.44	1,849.8	-19.0	-7.5	-18.8	0.50	0.44	-9.88
1,875.0	1.51	197.47	1,874.8	-19.6	-7.7	-19.4	0.66	0.52	-15.88
1,900.0	1.58	192.01	1,899.8	-20.2	-7.9	-20.0	0.65	0.28	-21.84
1,925.0	1.60	198.69	1,924.8	-20.9	-8.0	-20.7	0.75	0.08	26.72
1,950.0	1.67	196.56	1,949.8	-21.6	-8.3	-21.4	0.37	0.28	-8.52
1,975.0	1.86	190.89	1,974.8	-22.3	-8.4	-22.1	1.03	0.76	-22.68
2,000.0	2.03	190.82	1,999.7	-23.1	-8.6	-22.9	0.68	0.68	-0.28
2,025.0	2.15	188.10	2,024.7	-24.0	-8.7	-23.8	0.62	0.48	-10.88
2,050.0	2.17	188.45	2,049.7	-25.0	-8.9	-24.8	0.10	0.08	1.40
2,075.0	2.12	186.19	2,074.7	-25.9	-9.0	-25.7	0.39	-0.20	-9.04
2,100.0	2.17	188.59	2,099.7	-26.8	-9.1	-26.6	0.41	0.20	9.60
2,125.0	2.34	187.79	2,124.7	-27.8	-9.3	-27.6	0.69	0.68	-3.20
2,150.0	2.45	185.65	2,149.6	-28.8	-9.4	-28.6	0.57	0.44	-8.56
2,175.0	2.33	189.35	2,174.6	-29.9	-9.5	-29.7	0.78	-0.48	14.80
2,200.0	2.36	187.10	2,199.6	-30.9	-9.7	-30.7	0.39	0.12	-9.00
2,225.0	2.49	188.23	2,224.6	-31.9	-9.8	-31.7	0.55	0.52	4.52
2,250.0	2.55	190.91	2,249.5	-33.0	-10.0	-32.8	0.53	0.24	10.72
2,275.0	2.69	191.48	2,274.5	-34.1	-10.2	-33.9	0.57	0.56	2.28
2,300.0	2.65	193.08	2,299.5	-35.3	-10.5	-35.0	0.34	-0.16	6.40
2,325.0	2.69	192.59	2,324.5	-36.4	-10.7	-36.2	0.18	0.16	-1.96
2,350.0	2.71	194.48	2,349.4	-37.5	-11.0	-37.3	0.36	0.08	7.56
2,375.0	2.76	193.84	2,374.4	-38.7	-11.3	-38.5	0.23	0.20	-2.56
2,400.0	2.75	198.82	2,399.4	-39.9	-11.6	-39.6	0.96	-0.04	19.92
2,425.0	2.85	199.49	2,424.4	-41.0	-12.0	-40.7	0.42	0.40	2.68
2,450.0	2.84	200.82	2,449.3	-42.2	-12.4	-41.9	0.27	-0.04	5.32

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2,475.0	2.76	199.30	2,474.3	-43.3	-12.9	-43.0	0.44	-0.32	-6.08
2,500.0	2.85	202.83	2,499.3	-44.5	-13.3	-44.2	0.78	0.36	14.12
2,525.0	2.83	202.37	2,524.2	-45.6	-13.8	-45.3	0.12	-0.08	-1.84
2,550.0	2.87	208.21	2,549.2	-46.7	-14.3	-46.4	1.17	0.16	23.36
2,575.0	2.56	207.81	2,574.2	-47.8	-14.9	-47.4	1.24	-1.24	-1.60
2,600.0	2.14	214.37	2,599.2	-48.7	-15.4	-48.3	1.99	-1.68	26.24
2,625.0	1.64	227.31	2,624.1	-49.3	-15.9	-48.9	2.62	-2.00	51.76
2,650.0	1.51	234.18	2,649.1	-49.7	-16.4	-49.4	0.92	-0.52	27.48
2,675.0	1.39	247.53	2,674.1	-50.0	-17.0	-49.7	1.43	-0.48	53.40
2,700.0	1.20	252.83	2,699.1	-50.2	-17.5	-49.8	0.90	-0.76	21.20
2,725.0	1.23	256.58	2,724.1	-50.4	-18.0	-50.0	0.34	0.12	15.00
2,750.0	1.24	255.79	2,749.1	-50.5	-18.6	-50.1	0.08	0.04	-3.16
2,775.0	1.18	262.51	2,774.1	-50.6	-19.1	-50.2	0.62	-0.24	26.88
2,800.0	1.08	267.92	2,799.1	-50.6	-19.6	-50.2	0.58	-0.40	21.64
2,825.0	1.06	281.91	2,824.1	-50.6	-20.0	-50.1	1.05	-0.08	55.96
2,850.0	0.99	287.83	2,849.1	-50.5	-20.5	-50.0	0.51	-0.28	23.68
2,875.0	1.04	293.70	2,874.1	-50.3	-20.9	-49.9	0.46	0.20	23.48
2,900.0	1.06	301.32	2,899.1	-50.1	-21.3	-49.6	0.56	0.08	30.48
2,925.0	1.08	311.17	2,924.1	-49.8	-21.7	-49.4	0.74	0.08	39.40
2,950.0	1.14	302.75	2,949.1	-49.5	-22.0	-49.1	0.69	0.24	-33.68
2,975.0	1.02	311.92	2,974.1	-49.3	-22.4	-48.8	0.84	-0.48	36.68
3,000.0	1.25	312.82	2,999.1	-48.9	-22.8	-48.4	0.92	0.92	3.60
3,025.0	1.27	316.87	3,024.1	-48.5	-23.2	-48.0	0.37	0.08	16.20
3,050.0	1.32	317.55	3,049.0	-48.1	-23.6	-47.6	0.21	0.20	2.72
3,075.0	1.33	322.68	3,074.0	-47.7	-23.9	-47.2	0.48	0.04	20.52
3,100.0	1.36	327.05	3,099.0	-47.2	-24.3	-46.7	0.43	0.12	17.48
3,125.0	1.37	332.61	3,124.0	-46.7	-24.6	-46.1	0.53	0.04	22.24
3,150.0	1.51	336.84	3,149.0	-46.1	-24.8	-45.6	0.70	0.56	16.92
3,175.0	1.42	341.69	3,174.0	-45.5	-25.1	-45.0	0.61	-0.36	19.40
3,200.0	1.60	340.51	3,199.0	-44.9	-25.3	-44.3	0.73	0.72	-4.72
3,225.0	1.62	351.85	3,224.0	-44.2	-25.4	-43.7	1.27	0.08	45.36
3,250.0	1.74	356.12	3,249.0	-43.5	-25.5	-42.9	0.69	0.48	17.08
3,275.0	1.86	0.97	3,274.0	-42.7	-25.5	-42.1	0.78	0.48	19.40
3,300.0	1.90	3.30	3,299.0	-41.9	-25.5	-41.3	0.35	0.16	9.32
3,325.0	2.00	2.60	3,323.9	-41.0	-25.5	-40.5	0.41	0.40	-2.80
3,350.0	2.14	8.71	3,348.9	-40.1	-25.4	-39.6	1.04	0.56	24.44
3,375.0	2.30	9.71	3,373.9	-39.2	-25.2	-38.6	0.66	0.64	4.00
3,400.0	2.29	8.39	3,398.9	-38.2	-25.1	-37.6	0.22	-0.04	-5.28
3,425.0	2.34	9.03	3,423.9	-37.2	-24.9	-36.7	0.23	0.20	2.56
3,450.0	2.25	11.63	3,448.8	-36.2	-24.7	-35.7	0.55	-0.36	10.40
3,475.0	2.26	13.55	3,473.8	-35.3	-24.5	-34.7	0.30	0.04	7.68
3,500.0	1.86	13.43	3,498.8	-34.4	-24.3	-33.9	1.60	-1.60	-0.48
3,525.0	1.31	14.62	3,523.8	-33.7	-24.1	-33.2	2.20	-2.20	4.76
3,550.0	0.77	358.40	3,548.8	-33.3	-24.1	-32.7	2.44	-2.16	-64.88

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,575.0	0.75	1.91	3,573.8	-32.9	-24.1	-32.4	0.20	-0.08	14.04
3,600.0	0.58	347.65	3,598.8	-32.6	-24.1	-32.1	0.94	-0.68	-57.04
3,625.0	0.48	333.43	3,623.8	-32.4	-24.2	-31.9	0.66	-0.40	-56.88
3,650.0	0.38	326.62	3,648.8	-32.3	-24.2	-31.7	0.45	-0.40	-27.24
3,675.0	0.41	294.18	3,673.8	-32.2	-24.4	-31.6	0.89	0.12	-129.76
3,700.0	0.39	296.20	3,698.8	-32.1	-24.5	-31.6	0.10	-0.08	8.08
3,725.0	0.41	293.42	3,723.8	-32.0	-24.7	-31.5	0.11	0.08	-11.12
3,750.0	0.45	297.38	3,748.8	-31.9	-24.9	-31.4	0.20	0.16	15.84
3,775.0	0.49	298.50	3,773.8	-31.8	-25.0	-31.3	0.16	0.16	4.48
3,800.0	0.48	292.38	3,798.8	-31.7	-25.2	-31.2	0.21	-0.04	-24.48
3,825.0	0.52	284.28	3,823.8	-31.7	-25.4	-31.1	0.32	0.16	-32.40
3,850.0	0.54	282.03	3,848.8	-31.6	-25.7	-31.1	0.12	0.08	-9.00
3,875.0	0.54	273.65	3,873.8	-31.6	-25.9	-31.0	0.32	0.00	-33.52
3,900.0	0.67	283.40	3,898.8	-31.6	-26.2	-31.0	0.66	0.52	39.00
3,925.0	0.55	283.00	3,923.8	-31.5	-26.4	-30.9	0.48	-0.48	-1.60
3,950.0	0.65	288.97	3,948.8	-31.4	-26.7	-30.8	0.47	0.40	23.88
3,975.0	0.66	287.86	3,973.8	-31.3	-26.9	-30.7	0.06	0.04	-4.44
4,000.0	0.61	285.36	3,998.8	-31.2	-27.2	-30.7	0.23	-0.20	-10.00
4,025.0	0.76	282.23	4,023.8	-31.2	-27.5	-30.6	0.62	0.60	-12.52
4,050.0	0.77	280.58	4,048.8	-31.1	-27.8	-30.5	0.10	0.04	-6.60
4,075.0	0.71	282.98	4,073.8	-31.0	-28.1	-30.4	0.27	-0.24	9.60
4,100.0	0.72	295.81	4,098.8	-30.9	-28.4	-30.3	0.64	0.04	51.32
4,125.0	0.76	290.23	4,123.8	-30.8	-28.7	-30.2	0.33	0.16	-22.32
4,150.0	0.68	287.31	4,148.8	-30.7	-29.0	-30.1	0.35	-0.32	-11.68
4,175.0	0.77	287.24	4,173.8	-30.6	-29.3	-30.0	0.36	0.36	-0.28
4,200.0	0.82	288.38	4,198.8	-30.5	-29.7	-29.9	0.21	0.20	4.56
4,225.0	0.74	296.45	4,223.8	-30.4	-30.0	-29.7	0.54	-0.32	32.28
4,250.0	0.96	295.57	4,248.8	-30.2	-30.3	-29.6	0.88	0.88	-3.52
4,275.0	0.93	285.02	4,273.7	-30.1	-30.7	-29.4	0.71	-0.12	-42.20
4,300.0	1.08	291.28	4,298.7	-29.9	-31.1	-29.3	0.74	0.60	25.04
4,325.0	1.12	287.02	4,323.7	-29.8	-31.6	-29.1	0.36	0.16	-17.04
4,350.0	1.13	287.39	4,348.7	-29.6	-32.0	-28.9	0.05	0.04	1.48
4,375.0	1.30	289.64	4,373.7	-29.5	-32.5	-28.8	0.71	0.68	9.00
4,400.0	1.36	291.76	4,398.7	-29.3	-33.1	-28.5	0.31	0.24	8.48
4,425.0	1.37	290.63	4,423.7	-29.1	-33.6	-28.3	0.11	0.04	-4.52
4,450.0	1.35	294.10	4,448.7	-28.8	-34.2	-28.1	0.34	-0.08	13.88
4,475.0	1.40	290.98	4,473.7	-28.6	-34.7	-27.8	0.36	0.20	-12.48
4,500.0	1.29	293.57	4,498.7	-28.4	-35.3	-27.6	0.50	-0.44	10.36
4,525.0	1.37	294.20	4,523.7	-28.1	-35.8	-27.4	0.33	0.32	2.52
4,550.0	1.37	290.12	4,548.7	-27.9	-36.4	-27.1	0.39	0.00	-16.32
4,575.0	1.39	295.29	4,573.7	-27.7	-36.9	-26.9	0.50	0.08	20.68
4,600.0	1.38	290.28	4,598.7	-27.4	-37.5	-26.6	0.49	-0.04	-20.04
4,625.0	1.43	287.88	4,623.7	-27.2	-38.0	-26.4	0.31	0.20	-9.60

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,650.0	1.45	290.95	4,648.6	-27.0	-38.6	-26.2	0.32	0.08	12.28
4,675.0	1.57	293.50	4,673.6	-26.8	-39.2	-25.9	0.55	0.48	10.20
4,700.0	1.65	295.76	4,698.6	-26.5	-39.9	-25.6	0.41	0.32	9.04
4,725.0	1.79	295.02	4,723.6	-26.2	-40.6	-25.3	0.57	0.56	-2.96
4,750.0	1.77	301.63	4,748.6	-25.8	-41.2	-24.9	0.82	-0.08	26.44
4,775.0	1.70	306.64	4,773.6	-25.4	-41.9	-24.5	0.67	-0.28	20.04
4,800.0	1.74	307.67	4,798.6	-24.9	-42.5	-24.0	0.20	0.16	4.12
4,825.0	1.83	315.96	4,823.6	-24.4	-43.1	-23.5	1.09	0.36	33.16
4,850.0	1.82	318.20	4,848.6	-23.8	-43.6	-22.9	0.29	-0.04	8.96
4,875.0	1.82	316.36	4,873.5	-23.2	-44.1	-22.3	0.23	0.00	-7.36
4,900.0	1.86	315.42	4,898.5	-22.7	-44.7	-21.7	0.20	0.16	-3.76
4,925.0	1.90	317.13	4,923.5	-22.1	-45.3	-21.1	0.28	0.16	6.84
4,950.0	1.97	320.67	4,948.5	-21.4	-45.8	-20.5	0.55	0.28	14.16
4,975.0	2.16	321.55	4,973.5	-20.7	-46.4	-19.7	0.77	0.76	3.52
5,000.0	2.36	322.83	4,998.5	-20.0	-47.0	-18.9	0.83	0.80	5.12
5,025.0	2.49	321.41	5,023.4	-19.1	-47.6	-18.1	0.57	0.52	-5.68
5,050.0	2.55	321.09	5,048.4	-18.3	-48.3	-17.2	0.25	0.24	-1.28
5,075.0	2.67	322.33	5,073.4	-17.4	-49.0	-16.3	0.53	0.48	4.96
5,100.0	2.61	322.60	5,098.4	-16.5	-49.7	-15.4	0.25	-0.24	1.08
5,125.0	2.63	321.43	5,123.3	-15.6	-50.4	-14.5	0.23	0.08	-4.68
5,150.0	2.68	324.36	5,148.3	-14.6	-51.1	-13.5	0.58	0.20	11.72
5,175.0	2.65	327.90	5,173.3	-13.7	-51.8	-12.6	0.67	-0.12	14.16
5,200.0	2.57	332.66	5,198.3	-12.7	-52.3	-11.6	0.92	-0.32	19.04
5,225.0	2.47	335.43	5,223.2	-11.7	-52.8	-10.6	0.63	-0.40	11.08
5,250.0	2.28	337.44	5,248.2	-10.7	-53.2	-9.6	0.83	-0.76	8.04
5,275.0	2.16	339.87	5,273.2	-9.8	-53.6	-8.7	0.61	-0.48	9.72
5,300.0	2.28	342.31	5,298.2	-8.9	-53.9	-7.8	0.61	0.48	9.76
5,325.0	2.15	344.86	5,323.2	-8.0	-54.2	-6.8	0.65	-0.52	10.20
5,350.0	1.89	347.38	5,348.1	-7.1	-54.4	-6.0	1.10	-1.04	10.08
5,375.0	1.65	346.39	5,373.1	-6.4	-54.6	-5.2	0.97	-0.96	-3.96
5,400.0	1.45	344.99	5,398.1	-5.7	-54.7	-4.6	0.81	-0.80	-5.60
5,425.0	1.45	345.16	5,423.1	-5.1	-54.9	-4.0	0.02	0.00	0.68
5,450.0	1.45	348.05	5,448.1	-4.5	-55.0	-3.3	0.29	0.00	11.56
5,475.0	1.38	352.14	5,473.1	-3.9	-55.1	-2.7	0.49	-0.28	16.36
5,500.0	1.27	357.99	5,498.1	-3.3	-55.2	-2.1	0.70	-0.44	23.40
5,525.0	1.15	2.27	5,523.1	-2.8	-55.2	-1.6	0.60	-0.48	17.12
5,550.0	1.01	3.30	5,548.1	-2.3	-55.2	-1.1	0.57	-0.56	4.12
5,575.0	0.78	15.55	5,573.1	-1.9	-55.1	-0.8	1.19	-0.92	49.00
5,600.0	0.88	7.88	5,598.1	-1.6	-55.0	-0.4	0.60	0.40	-30.68
5,625.0	0.87	7.55	5,623.1	-1.2	-55.0	0.0	0.04	-0.04	-1.32
5,650.0	0.93	10.34	5,648.1	-0.8	-54.9	0.3	0.30	0.24	11.16
5,675.0	0.89	7.57	5,673.1	-0.4	-54.9	0.7	0.24	-0.16	-11.08
5,700.0	0.77	7.25	5,698.1	-0.1	-54.8	1.1	0.48	-0.48	-1.28

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,725.0	0.80	12.83	5,723.1	0.3	-54.8	1.4	0.33	0.12	22.32
5,750.0	0.76	22.68	5,748.1	0.6	-54.7	1.8	0.56	-0.16	39.40
5,775.0	0.80	25.80	5,773.1	0.9	-54.5	2.1	0.23	0.16	12.48
5,800.0	0.79	27.28	5,798.1	1.2	-54.4	2.4	0.09	-0.04	5.92
5,825.0	0.74	28.20	5,823.1	1.5	-54.2	2.7	0.21	-0.20	3.68
5,850.0	0.69	26.17	5,848.1	1.8	-54.1	2.9	0.22	-0.20	-8.12
5,875.0	0.80	29.17	5,873.1	2.1	-53.9	3.2	0.47	0.44	12.00
5,900.0	0.81	32.10	5,898.1	2.4	-53.7	3.5	0.17	0.04	11.72
5,925.0	0.80	35.08	5,923.0	2.7	-53.5	3.8	0.17	-0.04	11.92
5,950.0	0.82	42.15	5,948.0	2.9	-53.3	4.1	0.41	0.08	28.28
5,975.0	0.88	41.27	5,973.0	3.2	-53.1	4.3	0.25	0.24	-3.52
6,000.0	0.96	44.68	5,998.0	3.5	-52.8	4.6	0.39	0.32	13.64
6,025.0	0.80	43.97	6,023.0	3.8	-52.5	4.9	0.64	-0.64	-2.84
6,050.0	0.83	42.42	6,048.0	4.0	-52.3	5.2	0.15	0.12	-6.20
6,075.0	0.71	45.11	6,073.0	4.3	-52.1	5.4	0.50	-0.48	10.76
6,100.0	0.77	46.81	6,098.0	4.5	-51.8	5.6	0.26	0.24	6.80
6,125.0	0.75	48.13	6,123.0	4.7	-51.6	5.8	0.11	-0.08	5.28
6,150.0	0.80	45.87	6,148.0	5.0	-51.3	6.1	0.23	0.20	-9.04
6,175.0	0.88	46.84	6,173.0	5.2	-51.1	6.3	0.33	0.32	3.88
6,200.0	0.95	44.50	6,198.0	5.5	-50.8	6.6	0.32	0.28	-9.36
6,225.0	0.87	45.21	6,223.0	5.8	-50.5	6.9	0.32	-0.32	2.84
6,250.0	0.77	51.60	6,248.0	6.0	-50.2	7.1	0.54	-0.40	25.56
6,275.0	0.90	46.33	6,273.0	6.3	-50.0	7.3	0.60	0.52	-21.08
6,300.0	0.81	42.81	6,298.0	6.5	-49.7	7.6	0.42	-0.36	-14.08
6,325.0	0.88	47.81	6,323.0	6.8	-49.4	7.8	0.41	0.28	20.00
6,350.0	0.94	42.36	6,348.0	7.1	-49.2	8.1	0.42	0.24	-21.80
6,375.0	0.84	48.17	6,373.0	7.3	-48.9	8.4	0.54	-0.40	23.24
6,400.0	0.89	48.21	6,398.0	7.6	-48.6	8.6	0.20	0.20	0.16
6,425.0	0.96	44.68	6,423.0	7.9	-48.3	8.9	0.36	0.28	-14.12
6,450.0	0.88	50.60	6,448.0	8.1	-48.0	9.2	0.50	-0.32	23.68
6,475.0	0.92	49.76	6,473.0	8.4	-47.7	9.4	0.17	0.16	-3.36
6,500.0	0.90	47.84	6,498.0	8.6	-47.4	9.7	0.15	-0.08	-7.68
6,525.0	0.90	54.42	6,523.0	8.9	-47.1	9.9	0.41	0.00	26.32
6,550.0	1.06	51.27	6,548.0	9.1	-46.8	10.1	0.68	0.64	-12.60
6,575.0	1.16	49.10	6,573.0	9.5	-46.4	10.5	0.43	0.40	-8.68
6,600.0	1.08	52.19	6,598.0	9.8	-46.0	10.8	0.40	-0.32	12.36
6,625.0	1.14	50.98	6,623.0	10.1	-45.6	11.0	0.26	0.24	-4.84
6,650.0	1.07	49.84	6,648.0	10.4	-45.3	11.3	0.29	-0.28	-4.56
6,675.0	1.05	53.03	6,673.0	10.7	-44.9	11.6	0.25	-0.08	12.76
6,700.0	1.14	52.49	6,698.0	11.0	-44.5	11.9	0.36	0.36	-2.16
6,725.0	1.11	52.07	6,722.9	11.3	-44.1	12.2	0.12	-0.12	-1.68
6,750.0	1.08	50.36	6,747.9	11.6	-43.8	12.5	0.18	-0.12	-6.84
6,775.0	1.06	50.89	6,772.9	11.8	-43.4	12.8	0.09	-0.08	2.12
6,800.0	1.08	52.49	6,797.9	12.1	-43.0	13.1	0.14	0.08	6.40

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,825.0	1.12	47.81	6,822.9	12.4	-42.7	13.4	0.39	0.16	-18.72
6,850.0	1.11	51.33	6,847.9	12.8	-42.3	13.7	0.28	-0.04	14.08
6,875.0	1.15	53.28	6,872.9	13.1	-41.9	14.0	0.22	0.16	7.80
6,900.0	1.17	49.07	6,897.9	13.4	-41.5	14.3	0.35	0.08	-16.84
6,925.0	1.12	58.18	6,922.9	13.7	-41.1	14.6	0.75	-0.20	36.44
6,950.0	1.10	69.92	6,947.9	13.9	-40.7	14.8	0.91	-0.08	46.96
6,975.0	1.15	78.58	6,972.9	14.0	-40.2	14.9	0.71	0.20	34.64
7,000.0	1.23	84.21	6,997.9	14.1	-39.7	14.9	0.57	0.32	22.52
7,025.0	1.21	76.71	7,022.9	14.2	-39.2	15.0	0.64	-0.08	-30.00
7,050.0	1.27	75.64	7,047.9	14.3	-38.6	15.1	0.26	0.24	-4.28
7,075.0	1.25	79.15	7,072.9	14.4	-38.1	15.2	0.32	-0.08	14.04
7,100.0	1.28	79.51	7,097.9	14.5	-37.6	15.3	0.12	0.12	1.44
7,125.0	1.28	80.79	7,122.9	14.6	-37.0	15.4	0.11	0.00	5.12
7,150.0	1.16	81.00	7,147.9	14.7	-36.5	15.5	0.48	-0.48	0.84
7,175.0	1.15	85.11	7,172.9	14.8	-36.0	15.5	0.33	-0.04	16.44
7,200.0	1.20	87.26	7,197.8	14.8	-35.5	15.6	0.27	0.20	8.60
7,225.0	1.14	86.71	7,222.8	14.8	-35.0	15.6	0.24	-0.24	-2.20
7,250.0	1.15	92.83	7,247.8	14.8	-34.5	15.6	0.49	0.04	24.48
7,275.0	1.09	107.38	7,272.8	14.8	-34.0	15.5	1.16	-0.24	58.20
7,300.0	1.03	113.13	7,297.8	14.6	-33.6	15.3	0.49	-0.24	23.00
7,325.0	1.07	139.25	7,322.8	14.3	-33.2	15.0	1.90	0.16	104.48
7,350.0	1.20	143.77	7,347.8	13.9	-32.9	14.6	0.63	0.52	18.08
7,375.0	1.10	143.88	7,372.8	13.5	-32.6	14.2	0.40	-0.40	0.44
7,400.0	1.20	143.14	7,397.8	13.1	-32.3	13.8	0.40	0.40	-2.96
7,425.0	1.10	143.51	7,422.8	12.7	-32.0	13.4	0.40	-0.40	1.48
7,450.0	1.25	147.03	7,447.8	12.3	-31.7	13.0	0.67	0.60	14.08
7,475.0	1.06	148.87	7,472.8	11.9	-31.4	12.6	0.77	-0.76	7.36
7,500.0	1.12	152.49	7,497.8	11.5	-31.2	12.1	0.37	0.24	14.48
7,525.0	1.11	148.76	7,522.8	11.0	-31.0	11.7	0.29	-0.04	-14.92
7,550.0	1.11	148.55	7,547.8	10.6	-30.7	11.3	0.02	0.00	-0.84
7,575.0	1.12	153.46	7,572.8	10.2	-30.5	10.9	0.38	0.04	19.64
7,600.0	1.00	156.31	7,597.8	9.8	-30.3	10.4	0.52	-0.48	11.40
7,625.0	0.90	159.00	7,622.8	9.4	-30.1	10.0	0.44	-0.40	10.76
7,650.0	0.90	165.53	7,647.8	9.0	-30.0	9.7	0.41	0.00	26.12
7,675.0	0.92	167.73	7,672.8	8.6	-29.9	9.3	0.16	0.08	8.80
7,700.0	0.93	164.89	7,697.8	8.3	-29.8	8.9	0.19	0.04	-11.36
7,725.0	0.88	166.65	7,722.8	7.9	-29.7	8.5	0.23	-0.20	7.04
7,750.0	0.77	168.20	7,747.8	7.5	-29.6	8.2	0.45	-0.44	6.20
7,775.0	0.70	167.48	7,772.8	7.2	-29.6	7.8	0.28	-0.28	-2.88
7,800.0	0.74	171.18	7,797.7	6.9	-29.5	7.5	0.25	0.16	14.80
7,825.0	0.64	179.71	7,822.7	6.6	-29.5	7.2	0.57	-0.40	34.12
7,850.0	0.67	175.94	7,847.7	6.3	-29.5	6.9	0.21	0.12	-15.08
7,875.0	0.63	172.79	7,872.7	6.0	-29.5	6.7	0.21	-0.16	-12.60

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,900.0	0.56	173.79	7,897.7	5.8	-29.4	6.4	0.28	-0.28	4.00
7,925.0	0.68	180.08	7,922.7	5.5	-29.4	6.1	0.55	0.48	25.16
7,950.0	0.61	173.01	7,947.7	5.2	-29.4	5.9	0.42	-0.28	-28.28
7,975.0	0.66	179.81	7,972.7	4.9	-29.4	5.6	0.36	0.20	27.20
8,000.0	0.73	176.73	7,997.7	4.6	-29.4	5.3	0.32	0.28	-12.32
8,025.0	0.66	181.36	8,022.7	4.3	-29.4	5.0	0.36	-0.28	18.52
8,050.0	0.72	185.87	8,047.7	4.0	-29.4	4.7	0.32	0.24	18.04
8,075.0	0.59	172.75	8,072.7	3.8	-29.4	4.4	0.79	-0.52	-52.48
8,100.0	0.68	175.69	8,097.7	3.5	-29.4	4.1	0.38	0.36	11.76
8,125.0	0.69	169.27	8,122.7	3.2	-29.3	3.8	0.31	0.04	-25.68
8,150.0	0.72	162.57	8,147.7	2.9	-29.2	3.5	0.35	0.12	-26.80
8,175.0	0.62	177.28	8,172.7	2.6	-29.2	3.2	0.79	-0.40	58.84
8,200.0	0.75	169.63	8,197.7	2.3	-29.2	2.9	0.63	0.52	-30.60
8,225.0	0.63	178.65	8,222.7	2.0	-29.1	2.6	0.65	-0.48	36.08
8,250.0	0.64	172.16	8,247.7	1.7	-29.1	2.4	0.29	0.04	-25.96
8,275.0	0.67	169.07	8,272.7	1.4	-29.1	2.1	0.19	0.12	-12.36
8,300.0	0.68	170.29	8,297.7	1.2	-29.0	1.8	0.07	0.04	4.88
8,325.0	0.69	172.12	8,322.7	0.9	-29.0	1.5	0.10	0.04	7.32
8,350.0	0.70	173.80	8,347.7	0.6	-28.9	1.2	0.09	0.04	6.72
8,375.0	0.69	166.23	8,372.7	0.3	-28.9	0.9	0.37	-0.04	-30.28
8,400.0	0.72	168.96	8,397.7	0.0	-28.8	0.6	0.18	0.12	10.92
8,425.0	0.67	170.29	8,422.7	-0.3	-28.7	0.3	0.21	-0.20	5.32
8,450.0	0.69	169.40	8,447.7	-0.6	-28.7	0.0	0.09	0.08	-3.56
8,475.0	0.69	173.17	8,472.7	-0.9	-28.6	-0.3	0.18	0.00	15.08
8,500.0	0.68	176.39	8,497.7	-1.2	-28.6	-0.6	0.16	-0.04	12.88
8,525.0	0.73	173.40	8,522.7	-1.5	-28.6	-0.9	0.25	0.20	-11.96
8,550.0	0.66	169.79	8,547.7	-1.8	-28.5	-1.2	0.33	-0.28	-14.44
8,575.0	0.69	169.92	8,572.7	-2.1	-28.5	-1.5	0.12	0.12	0.52
8,600.0	0.74	160.29	8,597.7	-2.4	-28.4	-1.8	0.52	0.20	-38.52
8,625.0	0.68	173.29	8,622.7	-2.7	-28.3	-2.1	0.69	-0.24	52.00
8,650.0	0.66	163.01	8,647.7	-3.0	-28.3	-2.4	0.49	-0.08	-41.12
8,675.0	0.71	161.21	8,672.7	-3.3	-28.2	-2.7	0.22	0.20	-7.20
8,700.0	0.68	160.15	8,697.7	-3.6	-28.1	-3.0	0.13	-0.12	-4.24
8,725.0	0.67	159.41	8,722.7	-3.8	-28.0	-3.2	0.05	-0.04	-2.96
8,750.0	0.71	156.47	8,747.7	-4.1	-27.9	-3.5	0.21	0.16	-11.76
8,775.0	0.67	157.10	8,772.7	-4.4	-27.8	-3.8	0.16	-0.16	2.52
8,800.0	0.71	159.80	8,797.7	-4.7	-27.6	-4.1	0.21	0.16	10.80
8,825.0	0.72	151.32	8,822.7	-5.0	-27.5	-4.4	0.42	0.04	-33.92
8,850.0	0.69	153.43	8,847.7	-5.2	-27.4	-4.6	0.16	-0.12	8.44
8,875.0	0.78	141.07	8,872.7	-5.5	-27.2	-4.9	0.73	0.36	-49.44
8,900.0	0.82	142.42	8,897.7	-5.8	-27.0	-5.2	0.18	0.16	5.40
8,925.0	0.88	138.46	8,922.7	-6.1	-26.8	-5.5	0.34	0.24	-15.84
8,950.0	0.94	137.99	8,947.7	-6.4	-26.5	-5.8	0.24	0.24	-1.88

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,975.0	0.94	134.94	8,972.7	-6.7	-26.2	-6.1	0.20	0.00	-12.20
9,000.0	0.99	125.91	8,997.7	-6.9	-25.9	-6.4	0.64	0.20	-36.12
9,025.0	0.96	111.44	9,022.7	-7.1	-25.5	-6.6	0.99	-0.12	-57.88
9,050.0	1.05	114.51	9,047.7	-7.3	-25.1	-6.8	0.42	0.36	12.28
9,075.0	0.96	112.03	9,072.6	-7.5	-24.7	-6.9	0.40	-0.36	-9.92
9,100.0	1.04	109.80	9,097.6	-7.6	-24.3	-7.1	0.36	0.32	-8.92
9,125.0	1.03	109.48	9,122.6	-7.8	-23.9	-7.3	0.05	-0.04	-1.28
9,150.0	0.85	107.12	9,147.6	-7.9	-23.5	-7.4	0.74	-0.72	-9.44
9,175.0	0.95	104.73	9,172.6	-8.0	-23.1	-7.5	0.43	0.40	-9.56
9,200.0	1.00	104.19	9,197.6	-8.1	-22.7	-7.6	0.20	0.20	-2.16
9,225.0	0.95	106.45	9,222.6	-8.2	-22.3	-7.8	0.25	-0.20	9.04
9,250.0	0.93	111.60	9,247.6	-8.4	-21.9	-7.9	0.35	-0.08	20.60
9,275.0	0.81	106.00	9,272.6	-8.5	-21.5	-8.0	0.59	-0.48	-22.40
9,300.0	0.71	102.93	9,297.6	-8.6	-21.2	-8.1	0.43	-0.40	-12.28
9,325.0	0.60	101.19	9,322.6	-8.6	-20.9	-8.2	0.45	-0.44	-6.96
9,350.0	0.71	95.36	9,347.6	-8.7	-20.7	-8.2	0.51	0.44	-23.32
9,375.0	0.78	96.20	9,372.6	-8.7	-20.3	-8.3	0.28	0.28	3.36
9,400.0	0.67	88.73	9,397.6	-8.7	-20.0	-8.3	0.58	-0.44	-29.88
9,425.0	0.55	80.22	9,422.6	-8.7	-19.8	-8.3	0.60	-0.48	-34.04
9,450.0	1.02	87.09	9,447.6	-8.7	-19.4	-8.3	1.91	1.88	27.48
9,475.0	1.15	88.61	9,472.6	-8.7	-18.9	-8.2	0.53	0.52	6.08
9,500.0	1.06	88.71	9,497.6	-8.6	-18.5	-8.2	0.36	-0.36	0.40
9,525.0	1.38	79.82	9,522.6	-8.6	-17.9	-8.2	1.48	1.28	-35.56
9,550.0	1.52	80.42	9,547.6	-8.5	-17.3	-8.1	0.56	0.56	2.40
9,575.0	1.52	78.05	9,572.6	-8.4	-16.7	-8.0	0.25	0.00	-9.48
9,600.0	1.60	79.17	9,597.6	-8.2	-16.0	-7.9	0.34	0.32	4.48
9,625.0	1.62	81.03	9,622.6	-8.1	-15.3	-7.8	0.22	0.08	7.44
9,650.0	1.52	86.25	9,647.5	-8.0	-14.6	-7.7	0.70	-0.40	20.88
9,675.0	1.47	95.91	9,672.5	-8.0	-14.0	-7.7	1.03	-0.20	38.64
9,700.0	1.49	100.34	9,697.5	-8.1	-13.3	-7.8	0.46	0.08	17.72
9,725.0	1.44	103.11	9,722.5	-8.3	-12.7	-8.0	0.35	-0.20	11.08
9,750.0	1.51	107.99	9,747.5	-8.4	-12.1	-8.2	0.57	0.28	19.52
9,775.0	1.35	111.77	9,772.5	-8.6	-11.5	-8.4	0.74	-0.64	15.12
9,800.0	1.25	121.16	9,797.5	-8.9	-11.0	-8.7	0.94	-0.40	37.56
9,825.0	1.23	125.55	9,822.5	-9.2	-10.5	-9.0	0.39	-0.08	17.56
9,850.0	1.15	130.49	9,847.5	-9.5	-10.1	-9.3	0.52	-0.32	19.76
9,875.0	1.04	135.23	9,872.5	-9.8	-9.8	-9.6	0.57	-0.44	18.96
9,900.0	1.01	140.77	9,897.5	-10.2	-9.5	-10.0	0.41	-0.12	22.16
9,925.0	0.94	141.60	9,922.5	-10.5	-9.2	-10.3	0.29	-0.28	3.32
9,950.0	0.85	144.69	9,947.5	-10.8	-9.0	-10.6	0.41	-0.36	12.36
9,975.0	0.85	148.56	9,972.5	-11.1	-8.8	-10.9	0.23	0.00	15.48
10,000.0	0.89	147.63	9,997.5	-11.4	-8.6	-11.2	0.17	0.16	-3.72
10,025.0	0.88	143.82	10,022.5	-11.8	-8.4	-11.6	0.24	-0.04	-15.24
10,050.0	0.79	146.25	10,047.5	-12.1	-8.1	-11.9	0.39	-0.36	9.72

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,075.0	0.80	143.79	10,072.5	-12.3	-7.9	-12.2	0.14	0.04	-9.84
10,100.0	0.74	141.22	10,097.5	-12.6	-7.7	-12.4	0.28	-0.24	-10.28
10,125.0	0.76	137.10	10,122.5	-12.9	-7.5	-12.7	0.23	0.08	-16.48
10,150.0	0.76	138.14	10,147.5	-13.1	-7.3	-12.9	0.06	0.00	4.16
10,175.0	0.75	133.01	10,172.4	-13.3	-7.1	-13.2	0.27	-0.04	-20.52
10,200.0	0.74	132.82	10,197.4	-13.6	-6.8	-13.4	0.04	-0.04	-0.76
10,225.0	0.80	133.14	10,222.4	-13.8	-6.6	-13.6	0.24	0.24	1.28
10,250.0	0.74	134.82	10,247.4	-14.0	-6.4	-13.9	0.26	-0.24	6.72
10,275.0	0.77	131.59	10,272.4	-14.2	-6.1	-14.1	0.21	0.12	-12.92
10,300.0	0.78	132.00	10,297.4	-14.5	-5.9	-14.3	0.05	0.04	1.64
10,325.0	0.80	132.75	10,322.4	-14.7	-5.6	-14.6	0.09	0.08	3.00
10,350.0	0.79	129.20	10,347.4	-14.9	-5.3	-14.8	0.20	-0.04	-14.20
10,375.0	0.76	128.12	10,372.4	-15.1	-5.1	-15.0	0.13	-0.12	-4.32
10,400.0	0.75	136.96	10,397.4	-15.4	-4.8	-15.3	0.47	-0.04	35.36
10,425.0	0.83	121.30	10,422.4	-15.6	-4.6	-15.5	0.92	0.32	-62.64
10,450.0	0.83	126.89	10,447.4	-15.8	-4.3	-15.7	0.32	0.00	22.36
10,475.0	0.82	127.40	10,472.4	-16.0	-4.0	-15.9	0.05	-0.04	2.04
10,500.0	0.86	124.77	10,497.4	-16.2	-3.7	-16.1	0.22	0.16	-10.52
10,525.0	0.91	124.34	10,522.4	-16.4	-3.4	-16.4	0.20	0.20	-1.72
10,550.0	0.90	122.93	10,547.4	-16.6	-3.0	-16.6	0.10	-0.04	-5.64
10,575.0	0.91	121.31	10,572.4	-16.9	-2.7	-16.8	0.11	0.04	-6.48
10,600.0	0.85	120.37	10,597.4	-17.1	-2.4	-17.0	0.25	-0.24	-3.76
10,625.0	0.86	120.02	10,622.4	-17.2	-2.1	-17.2	0.05	0.04	-1.40
10,650.0	0.88	111.87	10,647.4	-17.4	-1.7	-17.4	0.50	0.08	-32.60
10,675.0	0.85	112.27	10,672.4	-17.5	-1.4	-17.5	0.12	-0.12	1.60
10,700.0	0.93	109.65	10,697.4	-17.7	-1.0	-17.7	0.36	0.32	-10.48
10,725.0	0.99	108.18	10,722.4	-17.8	-0.6	-17.8	0.26	0.24	-5.88
10,750.0	0.96	109.51	10,747.4	-18.0	-0.2	-17.9	0.15	-0.12	5.32
10,775.0	0.87	108.45	10,772.4	-18.1	0.2	-18.1	0.37	-0.36	-4.24
10,800.0	0.68	111.38	10,797.4	-18.2	0.5	-18.2	0.78	-0.76	11.72
10,825.0	0.95	111.67	10,822.4	-18.3	0.8	-18.3	1.08	1.08	1.16
10,850.0	0.94	114.38	10,847.4	-18.5	1.2	-18.5	0.18	-0.04	10.84
10,875.0	0.80	116.77	10,872.4	-18.7	1.5	-18.7	0.58	-0.56	9.56
10,900.0	0.98	119.65	10,897.4	-18.8	1.9	-18.9	0.74	0.72	11.52
10,925.0	1.18	121.70	10,922.4	-19.1	2.3	-19.1	0.81	0.80	8.20
10,950.0	1.35	123.08	10,947.4	-19.4	2.8	-19.4	0.69	0.68	5.52
10,975.0	1.52	127.93	10,972.4	-19.7	3.3	-19.8	0.84	0.68	19.40
Gyro Tie-in @ 10992.0' MD / 10989.3' TVD									
10,992.0	1.70	126.77	10,989.3	-20.0	3.6	-20.1	1.08	1.06	-6.82
11,138.0	2.49	138.20	11,135.2	-23.7	7.5	-23.8	0.61	0.54	7.83
11,201.0	0.44	37.19	11,198.2	-24.5	8.6	-24.7	4.14	-3.25	-160.33
11,232.0	6.65	348.27	11,229.2	-22.7	8.3	-22.8	20.55	20.03	-157.81
11,264.0	10.68	347.91	11,260.8	-18.0	7.3	-18.1	12.59	12.59	-1.13

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,295.0	11.50	350.19	11,291.2	-12.1	6.1	-12.2	3.00	2.65	7.35
11,327.0	11.95	350.26	11,322.5	-5.7	5.0	-5.8	1.41	1.41	0.22
11,358.0	13.95	351.45	11,352.7	1.2	3.9	1.1	6.51	6.45	3.84
11,390.0	18.32	349.45	11,383.5	9.9	2.4	9.9	13.76	13.66	-6.25
11,421.0	19.68	348.94	11,412.8	19.8	0.5	19.8	4.42	4.39	-1.65
11,453.0	22.25	348.56	11,442.7	31.1	-1.7	31.1	8.04	8.03	-1.19
11,484.0	25.23	348.50	11,471.0	43.3	-4.2	43.4	9.61	9.61	-0.19
11,516.0	29.07	348.45	11,499.5	57.6	-7.1	57.7	12.00	12.00	-0.16
11,547.0	32.24	348.21	11,526.2	73.1	-10.3	73.3	10.23	10.23	-0.77
11,579.0	33.87	348.82	11,553.0	90.2	-13.8	90.5	5.20	5.09	1.91
11,610.0	36.78	349.56	11,578.3	107.8	-17.1	108.1	9.49	9.39	2.39
11,642.0	39.80	350.12	11,603.4	127.3	-20.6	127.7	9.50	9.44	1.75
11,673.0	43.29	349.73	11,626.6	147.5	-24.2	148.0	11.29	11.26	-1.26
11,705.0	47.70	349.25	11,649.0	170.0	-28.4	170.6	13.82	13.78	-1.50
11,736.0	52.58	349.05	11,668.9	193.3	-32.9	194.0	15.75	15.74	-0.65
11,768.0	56.52	349.49	11,687.4	219.0	-37.7	219.7	12.36	12.31	1.38
11,799.0	61.31	350.32	11,703.4	245.1	-42.4	245.9	15.62	15.45	2.68
11,830.0	65.65	349.65	11,717.3	272.4	-47.2	273.3	14.13	14.00	-2.16
11,862.0	68.90	349.22	11,729.6	301.4	-52.6	302.5	10.23	10.16	-1.34
11,893.0	71.98	350.24	11,740.0	330.1	-57.8	331.3	10.41	9.94	3.29
11,925.0	73.83	351.12	11,749.4	360.3	-62.8	361.6	6.35	5.78	2.75
11,971.0	74.59	351.91	11,761.9	404.1	-69.3	405.5	2.34	1.65	1.72
12,002.0	75.33	351.98	11,770.0	433.7	-73.5	435.2	2.40	2.39	0.23
12,033.0	75.57	352.05	11,777.8	463.5	-77.6	465.0	0.80	0.77	0.23
12,063.0	75.26	352.28	11,785.3	492.2	-81.6	493.9	1.27	-1.03	0.77
12,094.0	75.42	352.19	11,793.2	521.9	-85.7	523.7	0.59	0.52	-0.29
12,127.0	75.68	351.95	11,801.4	553.6	-90.1	555.4	1.06	0.79	-0.73
12,159.0	79.84	354.41	11,808.2	584.6	-93.8	586.5	15.01	13.00	7.69
12,190.0	84.59	355.23	11,812.4	615.2	-96.5	617.1	15.54	15.32	2.65
12,222.0	89.02	355.74	11,814.2	647.1	-99.1	649.0	13.93	13.84	1.59
12,253.0	90.67	355.70	11,814.3	678.0	-101.4	680.0	5.32	5.32	-0.13
12,316.0	93.72	356.87	11,811.8	740.8	-105.4	742.9	5.18	4.84	1.86
12,411.0	91.43	355.32	11,807.6	835.5	-111.9	837.7	2.91	-2.41	-1.63
12,506.0	92.19	354.91	11,804.6	930.1	-120.0	932.4	0.91	0.80	-0.43
12,600.0	88.93	355.63	11,803.7	1,023.7	-127.7	1,026.2	3.55	-3.47	0.77
12,694.0	91.09	355.96	11,803.6	1,117.5	-134.6	1,120.1	2.32	2.30	0.35
12,790.0	90.06	356.92	11,802.7	1,213.3	-140.6	1,216.0	1.47	-1.07	1.00
12,884.0	91.26	358.89	11,801.6	1,307.2	-144.0	1,310.0	2.45	1.28	2.10
12,979.0	93.87	359.75	11,797.3	1,402.1	-145.2	1,404.9	2.89	2.75	0.91
13,073.0	90.92	357.83	11,793.4	1,496.0	-147.1	1,498.8	3.74	-3.14	-2.04
13,168.0	91.01	357.79	11,791.8	1,590.9	-150.8	1,593.8	0.10	0.09	-0.04
13,262.0	93.59	0.28	11,788.0	1,684.8	-152.4	1,687.7	3.81	2.74	2.65
13,356.0	94.71	0.23	11,781.2	1,778.5	-151.9	1,781.4	1.19	1.19	-0.05

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,451.0	94.01	0.05	11,774.0	1,873.3	-151.7	1,876.1	0.76	-0.74	-0.19
13,545.0	95.30	359.30	11,766.4	1,966.9	-152.2	1,969.8	1.59	1.37	-0.80
13,640.0	94.31	359.33	11,758.4	2,061.6	-153.4	2,064.4	1.04	-1.04	0.03
13,734.0	93.64	358.67	11,751.9	2,155.4	-155.0	2,158.2	1.00	-0.71	-0.70
13,828.0	91.29	359.46	11,747.9	2,249.3	-156.5	2,252.1	2.64	-2.50	0.84
13,923.0	89.69	357.66	11,747.1	2,344.2	-158.9	2,347.1	2.53	-1.68	-1.89
14,017.0	91.15	357.56	11,746.4	2,438.1	-162.8	2,441.1	1.56	1.55	-0.11
14,111.0	92.86	357.45	11,743.1	2,532.0	-166.9	2,535.0	1.82	1.82	-0.12
14,205.0	91.79	358.48	11,739.3	2,625.8	-170.3	2,628.9	1.58	-1.14	1.10
14,299.0	92.58	358.62	11,735.7	2,719.7	-172.7	2,722.8	0.85	0.84	0.15
14,393.0	88.99	359.46	11,734.4	2,813.7	-174.2	2,816.8	3.92	-3.82	0.89
14,488.0	90.48	359.60	11,734.8	2,908.7	-175.0	2,911.8	1.58	1.57	0.15
14,582.0	91.85	359.96	11,732.9	3,002.7	-175.4	3,005.7	1.51	1.46	0.38
14,677.0	93.45	0.06	11,728.5	3,097.6	-175.3	3,100.6	1.69	1.68	0.11
14,771.0	94.77	359.87	11,721.8	3,191.3	-175.4	3,194.3	1.42	1.40	-0.20
14,866.0	94.09	359.59	11,714.5	3,286.0	-175.9	3,289.1	0.77	-0.72	-0.29
14,960.0	96.29	359.64	11,706.0	3,379.6	-176.5	3,382.6	2.34	2.34	0.05
15,054.0	86.61	358.73	11,703.6	3,473.5	-177.8	3,476.5	10.34	-10.30	-0.97
15,149.0	87.51	358.56	11,708.5	3,568.3	-180.1	3,571.4	0.96	0.95	-0.18
15,243.0	88.29	358.38	11,711.9	3,662.2	-182.6	3,665.3	0.85	0.83	-0.19
15,338.0	90.42	358.31	11,713.0	3,757.2	-185.3	3,760.3	2.24	2.24	-0.07
15,432.0	90.28	0.08	11,712.4	3,851.2	-186.6	3,854.3	1.89	-0.15	1.88
15,526.0	88.54	2.22	11,713.4	3,945.1	-184.7	3,948.2	2.93	-1.85	2.28
15,621.0	90.03	2.23	11,714.5	4,040.1	-181.1	4,043.0	1.57	1.57	0.01
15,715.0	91.31	1.62	11,713.4	4,134.0	-177.9	4,136.9	1.51	1.36	-0.65
15,810.0	91.49	2.07	11,711.1	4,228.9	-174.8	4,231.7	0.51	0.19	0.47
15,905.0	90.59	2.25	11,709.4	4,323.8	-171.3	4,326.5	0.97	-0.95	0.19
15,999.0	91.88	2.20	11,707.4	4,417.7	-167.6	4,420.3	1.37	1.37	-0.05
16,094.0	88.60	0.40	11,707.0	4,512.7	-165.5	4,515.2	3.94	-3.45	-1.89
16,186.0	89.78	0.49	11,708.3	4,604.7	-164.7	4,607.2	1.29	1.28	0.10
16,279.0	91.74	0.68	11,707.0	4,697.7	-163.8	4,700.1	2.12	2.11	0.20
16,373.0	90.48	359.62	11,705.2	4,791.6	-163.6	4,794.0	1.75	-1.34	-1.13
16,467.0	89.50	357.61	11,705.2	4,885.6	-165.8	4,888.0	2.38	-1.04	-2.14
16,562.0	90.84	357.14	11,705.0	4,980.5	-170.2	4,983.0	1.49	1.41	-0.49
16,656.0	91.99	356.94	11,702.6	5,074.4	-175.0	5,076.9	1.24	1.22	-0.21
16,751.0	87.76	355.69	11,702.8	5,169.1	-181.1	5,171.8	4.64	-4.45	-1.32
16,845.0	88.91	355.61	11,705.6	5,262.8	-188.3	5,265.6	1.23	1.22	-0.09
16,940.0	90.14	357.23	11,706.4	5,357.6	-194.2	5,360.6	2.14	1.29	1.71
17,034.0	90.98	356.63	11,705.4	5,451.5	-199.2	5,454.5	1.10	0.89	-0.64
17,128.0	91.51	358.63	11,703.4	5,545.4	-203.1	5,548.5	2.20	0.56	2.13
17,222.0	92.21	359.22	11,700.3	5,639.3	-204.9	5,642.4	0.97	0.74	0.63
17,317.0	92.13	1.99	11,696.8	5,734.2	-203.9	5,737.3	2.91	-0.08	2.92
17,411.0	90.14	2.39	11,694.9	5,828.1	-200.3	5,831.1	2.16	-2.12	0.43
17,506.0	90.45	1.96	11,694.4	5,923.1	-196.7	5,925.9	0.56	0.33	-0.45

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,600.0	88.71	0.04	11,695.1	6,017.0	-195.0	6,019.8	2.76	-1.85	-2.04
17,695.0	89.58	0.23	11,696.5	6,112.0	-194.8	6,114.8	0.94	0.92	0.20
17,789.0	91.09	0.23	11,696.0	6,206.0	-194.4	6,208.8	1.61	1.61	0.00
17,884.0	92.57	0.59	11,692.9	6,301.0	-193.8	6,303.7	1.60	1.56	0.38
17,919.0	92.72	359.68	11,691.3	6,335.9	-193.7	6,338.6	2.63	0.43	-2.60
18,013.0	92.02	359.92	11,687.4	6,429.9	-194.0	6,432.5	0.79	-0.74	0.26
18,107.0	91.71	0.66	11,684.4	6,523.8	-193.5	6,526.5	0.85	-0.33	0.79
18,201.0	91.49	0.91	11,681.7	6,617.8	-192.2	6,620.4	0.35	-0.23	0.27
18,295.0	89.13	0.93	11,681.2	6,711.7	-190.7	6,714.3	2.51	-2.51	0.02
18,389.0	88.69	0.79	11,683.0	6,805.7	-189.3	6,808.2	0.49	-0.47	-0.15
18,484.0	88.66	0.79	11,685.2	6,900.7	-188.0	6,903.1	0.03	-0.03	0.00
18,579.0	88.41	1.74	11,687.6	6,995.6	-185.9	6,998.0	1.03	-0.26	1.00
18,672.0	89.81	2.22	11,689.1	7,088.5	-182.7	7,090.8	1.59	1.51	0.52
18,766.0	90.22	0.77	11,689.1	7,182.5	-180.2	7,184.7	1.60	0.44	-1.54
18,861.0	90.09	358.15	11,688.8	7,277.5	-181.1	7,279.7	2.76	-0.14	-2.76
18,956.0	90.36	359.05	11,688.4	7,372.5	-183.5	7,374.7	0.99	0.28	0.95
19,050.0	90.25	358.78	11,687.9	7,466.5	-185.2	7,468.7	0.31	-0.12	-0.29
19,144.0	90.36	359.82	11,687.4	7,560.4	-186.4	7,562.7	1.11	0.12	1.11
19,239.0	90.22	357.35	11,687.0	7,655.4	-188.7	7,657.7	2.60	-0.15	-2.60
19,334.0	90.22	356.65	11,686.6	7,750.3	-193.7	7,752.6	0.74	0.00	-0.74
19,429.0	90.31	356.64	11,686.1	7,845.1	-199.3	7,847.6	0.10	0.09	-0.01
19,523.0	90.17	358.29	11,685.8	7,939.0	-203.4	7,941.5	1.76	-0.15	1.76
19,617.0	90.22	359.49	11,685.4	8,033.0	-205.2	8,035.5	1.28	0.05	1.28
19,712.0	90.14	358.85	11,685.1	8,128.0	-206.6	8,130.5	0.68	-0.08	-0.67
19,806.0	90.45	359.56	11,684.7	8,222.0	-207.9	8,224.5	0.82	0.33	0.76
19,900.0	90.03	359.94	11,684.3	8,316.0	-208.3	8,318.5	0.60	-0.45	0.40
19,994.0	89.83	0.13	11,684.4	8,410.0	-208.3	8,412.5	0.29	-0.21	0.20
20,089.0	90.34	0.53	11,684.2	8,505.0	-207.7	8,507.5	0.68	0.54	0.42
20,183.0	92.04	3.39	11,682.3	8,598.9	-204.5	8,601.3	3.54	1.81	3.04
20,278.0	91.57	3.86	11,679.3	8,693.6	-198.5	8,695.9	0.70	-0.49	0.49
20,372.0	91.09	3.83	11,677.1	8,787.4	-192.2	8,789.5	0.51	-0.51	-0.03
20,467.0	91.12	4.53	11,675.3	8,882.1	-185.3	8,884.1	0.74	0.03	0.74
20,563.0	91.57	5.69	11,673.0	8,977.7	-176.7	8,979.4	1.30	0.47	1.21
20,657.0	90.50	2.91	11,671.3	9,071.4	-169.7	9,073.0	3.17	-1.14	-2.96
20,751.0	89.94	2.85	11,671.0	9,165.3	-165.0	9,166.7	0.60	-0.60	-0.06
20,846.0	92.07	6.20	11,669.3	9,260.0	-157.5	9,261.2	4.18	2.24	3.53
20,940.0	91.57	5.86	11,666.3	9,353.4	-147.6	9,354.4	0.64	-0.53	-0.36
21,034.0	90.84	4.43	11,664.3	9,447.0	-139.2	9,447.8	1.71	-0.78	-1.52
21,129.0	90.56	3.96	11,663.2	9,541.7	-132.2	9,542.4	0.58	-0.29	-0.49
21,224.0	90.45	3.44	11,662.3	9,636.5	-126.1	9,637.0	0.56	-0.12	-0.55
21,318.0	89.97	3.06	11,662.0	9,730.4	-120.8	9,730.7	0.65	-0.51	-0.40
21,413.0	89.61	2.44	11,662.3	9,825.3	-116.2	9,825.5	0.75	-0.38	-0.65
21,507.0	90.17	4.81	11,662.5	9,919.1	-110.3	9,919.2	2.59	0.60	2.52

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Boone 16 State Com #3H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3782.0usft (Noram #21)
Site:	Sec. 21, T 21S, R33E	**MD Reference:**	Well @ 3782.0usft (Noram #21)
Well:	Boone 16 State Com #3H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
21,602.0	89.78	2.97	11,662.6	10,013.9	-103.8	10,013.8	1.98	-0.41	-1.94
21,696.0	89.41	2.43	11,663.2	10,107.8	-99.4	10,107.6	0.70	-0.39	-0.57
21,790.0	88.63	1.93	11,664.8	10,201.7	-95.8	10,201.4	0.99	-0.83	-0.53
21,885.0	87.37	1.78	11,668.1	10,296.6	-92.8	10,296.2	1.34	-1.33	-0.16
21,979.0	85.58	1.35	11,673.9	10,390.3	-90.2	10,389.9	1.96	-1.90	-0.46
22,074.0	84.19	1.46	11,682.4	10,484.9	-87.9	10,484.4	1.47	-1.46	0.12
LTP @ 22169.0' MD / 11692.8' TVD									
22,169.0	83.24	1.76	11,692.8	10,579.3	-85.2	10,578.7	1.05	-1.00	0.32
TD @ 22297.0' MD / 11707.9' TVD									
22,297.0	83.24	1.76	11,707.9	10,706.4	-81.3	10,705.7	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
10,992.0	10,989.3	-20.0	3.6	Gyro Tie-in @ 10992.0' MD / 10989.3' TVD
22,169.0	11,692.8	10,579.3	-85.2	LTP @ 22169.0' MD / 11692.8' TVD
22,297.0	11,707.9	10,706.4	-81.3	TD @ 22297.0' MD / 11707.9' TVD