



HOBBS OGD

APR 27 2015

RECEIVED

State of New Mexico
County of Lea

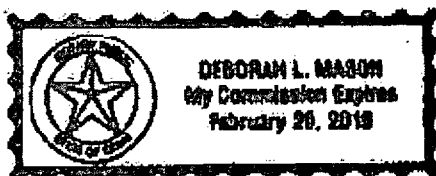
30-625-41803

I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 01/26/2015 through 02/04/2015 conduct or supervise the taking of a MWD survey from a depth of 10521 feet to a depth of 15407 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Terra Directional Services LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho Oil & Gas for the Brinninstock Unit #4H Well API 30-025-41803 in Lea County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Terra Directional Services LLC.

Donald D. Mason
President

State of Texas
County of Burnet

Before me, a notary public, on this day personally appeared DONALD D. MASON, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statements therein contained are true and correct.



Notary Public's Signature

MAY 04 2015



Customer Name: COG Operating, LLC
 Well Name: Brinninstool Unit #4H
 API Number: 30-025-41803
 County / Parish: Lea County, NM

HOBBS OGD
 APR 27 2015
 RECEIVED

M.W.D. Operator: Rusty Whitfield
 Directional Driller: Cory Owens
 Total Magnetic Correction: 6.77
 Job #: NM-499

Vertical Section: 359.56

Tie In Survey(s) Provided By:

0 to 6 Were Provided By Scientific

	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle	DLS
Tie - In										
0	10475.00	1.30	238.63	10473.40	-7.62	-8.00	-49.60	0.00	0.00	0.00
1	10521.00	2.02	291.92	10519.38	-7.58	-7.97	-50.80	51.42	261.08	3.53
2	10553.00	4.31	353.89	10551.34	-6.17	-6.56	-51.45	51.87	262.73	11.89
3	10585.00	8.09	10.85	10583.15	-2.76	-3.15	-51.15	51.25	266.47	13.00
4	10600.00	11.33	2.75	10597.93	-0.25	-0.64	-50.88	50.89	269.27	23.39
5	10631.00	16.50	0.98	10628.01	7.19	6.80	-50.66	51.12	277.65	16.73
6	10663.00	20.80	0.23	10658.33	17.42	17.03	-50.56	53.35	288.62	13.46
7	10692.00	23.70	0.80	10685.16	28.40	28.01	-50.46	57.71	299.04	10.03
8	10723.00	27.90	1.80	10713.07	41.88	41.50	-50.14	65.09	309.61	13.62
9	10755.00	31.20	3.60	10740.90	57.64	57.26	-49.39	75.62	319.22	10.68
10	10787.00	34.60	3.80	10767.77	74.97	74.60	-48.27	88.85	327.10	10.63
11	10819.00	39.10	0.30	10793.37	94.13	93.77	-47.61	105.16	333.08	15.51
12	10851.00	43.10	356.90	10817.48	115.15	114.79	-48.15	124.48	337.24	14.32
13	10882.00	47.60	355.70	10839.26	137.16	136.79	-49.58	145.50	340.08	14.77
14	10914.00	50.80	356.00	10860.17	161.33	160.94	-51.33	168.93	342.31	10.03
15	10946.00	53.70	356.20	10879.76	186.59	186.19	-53.05	193.60	344.10	9.08
16	10977.00	55.30	356.80	10897.76	211.79	211.38	-54.59	218.31	345.52	5.40
17	11009.00	57.10	357.50	10915.56	238.35	237.93	-55.91	244.41	346.78	5.91
18	11041.00	59.90	358.50	10932.28	265.63	265.20	-56.86	271.22	347.90	9.15
19	11072.00	62.90	359.00	10947.12	292.84	292.41	-57.45	298.00	348.88	9.78
20	11104.00	64.90	359.60	10961.19	321.57	321.14	-57.80	326.30	349.80	6.47
21	11136.00	66.70	359.60	10974.31	350.76	350.32	-58.01	355.09	350.60	5.63
22	11168.00	69.50	359.90	10986.24	380.45	380.01	-58.13	384.43	351.30	8.79
23	11199.00	73.10	0.40	10996.18	409.80	409.37	-58.06	413.47	351.93	11.71
24	11231.00	75.00	0.40	11004.98	440.57	440.14	-57.84	443.92	352.51	5.94
25	11263.00	77.20	0.80	11012.66	471.62	471.20	-57.52	474.69	353.04	6.98
26	11313.00	83.50	0.90	11021.04	520.88	520.46	-56.78	523.55	353.77	12.60
27	11345.00	84.30	359.90	11024.44	552.69	552.27	-56.56	555.16	354.15	3.99
28	11377.00	85.00	357.70	11027.42	584.55	584.13	-57.23	586.92	354.40	7.19
29	11408.00	87.60	354.50	11029.42	615.42	614.98	-59.33	617.84	354.49	13.28
30	11440.00	88.80	353.30	11030.43	647.25	646.79	-62.73	649.82	354.46	5.30
31	11535.00	93.50	356.20	11028.52	741.86	741.33	-71.42	744.76	354.50	5.81
32	11631.00	91.00	357.90	11024.75	837.68	837.12	-76.36	840.59	354.79	3.15
33	11726.00	91.40	359.10	11022.76	932.64	932.06	-78.84	935.39	355.16	1.33
34	11821.00	91.50	1.30	11020.36	1027.60	1027.03	-78.51	1030.02	355.63	2.32
35	11916.00	90.70	1.30	11018.54	1122.54	1121.98	-76.36	1124.58	356.11	0.84
36	12011.00	89.70	1.60	11018.21	1217.48	1216.95	-73.95	1219.20	356.52	1.10
37	12107.00	89.90	1.50	11018.54	1313.42	1312.92	-71.36	1314.85	356.89	0.23
38	12202.00	89.90	1.40	11018.71	1408.37	1407.89	-68.95	1409.57	357.20	0.11
39	12297.00	89.50	0.70	11019.20	1503.34	1502.87	-67.21	1504.37	357.44	0.85
40	12392.00	90.20	1.10	11019.45	1598.31	1597.85	-65.72	1599.21	357.64	0.85

41	12487.00	90.00	0.80	11019.29	1693.28	1692.84	-64.15	1694.06	357.83	0.38
42	12582.00	90.30	0.80	11019.04	1788.26	1787.83	-62.82	1788.93	357.99	0.32
43	12677.00	90.30	0.80	11018.54	1883.24	1882.82	-61.49	1883.82	358.13	0.00
44	12773.00	90.60	0.90	11017.79	1979.21	1978.81	-60.07	1979.72	358.26	0.33
45	12868.00	89.40	1.50	11017.79	2074.17	2073.78	-58.08	2074.60	358.40	1.41
46	12963.00	89.70	1.80	11018.53	2169.10	2168.74	-55.34	2169.45	358.54	0.45
47	13058.00	90.00	1.30	11018.78	2264.04	2263.71	-52.77	2264.32	358.66	0.61
48	13153.00	90.40	1.10	11018.45	2359.00	2358.68	-50.78	2359.23	358.77	0.47
49	13248.00	89.80	0.90	11018.28	2453.97	2453.67	-49.13	2454.16	358.85	0.67
50	13343.00	89.40	1.20	11018.95	2548.94	2548.65	-47.39	2549.09	358.93	0.53
51	13438.00	90.20	1.30	11019.28	2643.90	2643.63	-45.31	2644.01	359.02	0.85
52	13533.00	89.00	1.30	11019.94	2738.85	2738.60	-43.16	2738.94	359.10	1.26
53	13628.00	89.90	1.10	11020.85	2833.80	2833.57	-41.17	2833.87	359.17	0.97
54	13724.00	88.50	1.00	11022.19	2929.76	2929.54	-39.41	2929.81	359.23	1.46
55	13819.00	89.20	0.40	11024.10	3024.72	3024.52	-38.25	3024.76	359.28	0.97
56	13914.00	89.30	359.10	11025.34	3119.71	3119.51	-38.66	3119.75	359.29	1.37
57	14009.00	90.10	358.90	11025.84	3214.70	3214.49	-40.32	3214.74	359.28	0.87
58	14104.00	91.00	359.00	11024.93	3309.69	3309.47	-42.06	3309.74	359.27	0.95
59	14199.00	90.90	0.30	11023.35	3404.68	3404.45	-42.64	3404.72	359.28	1.37
60	14294.00	90.70	1.60	11022.03	3499.64	3499.43	-41.07	3499.67	359.33	1.38
61	14389.00	90.00	1.30	11021.45	3594.58	3594.39	-38.66	3594.60	359.38	0.80
62	14484.00	90.00	1.20	11021.45	3689.54	3689.37	-36.59	3689.55	359.43	0.11
63	14579.00	89.60	1.10	11021.78	3784.51	3784.35	-34.69	3784.51	359.47	0.43
64	14674.00	88.60	1.80	11023.27	3879.44	3879.31	-32.28	3879.44	359.52	1.28
65	14769.00	88.90	1.80	11025.34	3974.35	3974.24	-29.30	3974.35	359.58	0.32
66	14864.00	88.30	1.80	11027.66	4069.24	4069.16	-26.32	4069.25	359.63	0.63
67	14959.00	88.70	1.70	11030.15	4164.14	4164.08	-23.42	4164.15	359.68	0.43
68	15054.00	89.50	1.70	11031.64	4259.06	4259.03	-20.60	4259.08	359.72	0.84
69	15150.00	90.70	1.80	11031.48	4354.99	4354.98	-17.67	4355.02	359.77	1.25
70	15245.00	90.80	1.80	11030.23	4449.91	4449.93	-14.68	4449.95	359.81	0.11
71	15353.00	91.50	2.00	11028.07	4557.80	4557.85	-11.10	4557.86	359.86	0.67
PTB	15407.00	91.50	2.00	11026.65	4611.73	4611.80	-9.22	4611.80	359.89	0.00



COG Operating LLC

**Lea County, NM
Brinninstool Unit
#4H**

OH

Design: OH

Survey Report - Geographic

04 February, 2015





TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Lea County, NM	TVD Reference:	KB @ 3713.2usft
Site:	Brinninstool Unit	MD Reference:	KB @ 3713.2usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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	Brinninstool Unit				
Site Position:		Northing:	467,743.10 usft	Latitude:	32° 17' 1.468 N
From:	Map	Easting:	730,412.80 usft	Longitude:	103° 35' 15.927 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.40 °

Well	#4H					
Well Position	+N/-S	0.0 usft	Northing:	467,743.10 usft	Latitude:	32° 17' 1.468 N
	+E/-W	0.0 usft	Easting:	730,412.80 usft	Longitude:	103° 35' 15.927 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,687.2 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/5/2014	7.17	60.15	48,301

Design	OH				
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	359.56	

Survey Program	Date 2/4/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,475.0	GYRO #1 (OH)	Good_gyro	Good Gyro
10,521.0	15,407.0	MWD #2 (OH)	MWD	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	467,743.10	730,412.80	32° 17' 1.468 N	103° 35' 15.927 W
100.0	0.77	292.40	100.0	0.3	-0.6	467,743.36	730,412.18	32° 17' 1.471 N	103° 35' 15.934 W
200.0	0.85	295.28	200.0	0.8	-1.9	467,743.93	730,410.88	32° 17' 1.477 N	103° 35' 15.949 W
300.0	0.57	275.31	300.0	1.2	-3.1	467,744.29	730,409.72	32° 17' 1.480 N	103° 35' 15.963 W
400.0	0.62	280.54	400.0	1.3	-4.1	467,744.44	730,408.69	32° 17' 1.482 N	103° 35' 15.975 W
500.0	0.40	274.39	500.0	1.5	-5.0	467,744.56	730,407.81	32° 17' 1.483 N	103° 35' 15.985 W
600.0	0.37	269.24	600.0	1.5	-5.7	467,744.59	730,407.14	32° 17' 1.484 N	103° 35' 15.993 W
700.0	0.27	219.35	700.0	1.3	-6.1	467,744.40	730,406.67	32° 17' 1.482 N	103° 35' 15.998 W
800.0	0.38	218.70	800.0	0.9	-6.5	467,743.96	730,406.31	32° 17' 1.477 N	103° 35' 16.002 W
900.0	0.54	210.00	900.0	0.2	-6.9	467,743.29	730,405.87	32° 17' 1.471 N	103° 35' 16.008 W
1,000.0	0.84	205.18	1,000.0	-0.9	-7.5	467,742.22	730,405.32	32° 17' 1.460 N	103° 35' 16.014 W



TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Lea County, NM	TVD Reference:	KB @ 3713.2usft
Site:	Brinninstool Unit	MD Reference:	KB @ 3713.2usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.0	1.00	200.85	1,099.9	-2.4	-8.1	467,740.74	730,404.70	32° 17' 1.446 N	103° 35' 16.022 W
1,200.0	1.05	191.46	1,199.9	-4.1	-8.6	467,739.03	730,404.20	32° 17' 1.429 N	103° 35' 16.027 W
1,300.0	0.96	196.53	1,299.9	-5.8	-9.0	467,737.33	730,403.78	32° 17' 1.412 N	103° 35' 16.032 W
1,400.0	0.54	195.13	1,399.9	-7.0	-9.4	467,736.07	730,403.42	32° 17' 1.400 N	103° 35' 16.037 W
1,500.0	0.42	217.85	1,499.9	-7.8	-9.7	467,735.32	730,403.08	32° 17' 1.392 N	103° 35' 16.041 W
1,600.0	0.48	225.79	1,599.9	-8.4	-10.2	467,734.74	730,402.55	32° 17' 1.386 N	103° 35' 16.047 W
1,700.0	0.60	241.50	1,699.9	-8.9	-11.0	467,734.20	730,401.79	32° 17' 1.381 N	103° 35' 16.056 W
1,800.0	0.48	252.61	1,799.9	-9.3	-11.9	467,733.83	730,400.93	32° 17' 1.377 N	103° 35' 16.066 W
1,900.0	0.43	259.37	1,899.9	-9.5	-12.6	467,733.63	730,400.16	32° 17' 1.376 N	103° 35' 16.075 W
2,000.0	0.41	256.32	1,999.9	-9.6	-13.4	467,733.48	730,399.44	32° 17' 1.374 N	103° 35' 16.083 W
2,100.0	0.49	243.70	2,099.9	-9.9	-14.1	467,733.20	730,398.71	32° 17' 1.371 N	103° 35' 16.092 W
2,200.0	0.39	242.16	2,199.9	-10.2	-14.8	467,732.85	730,398.03	32° 17' 1.368 N	103° 35' 16.100 W
2,300.0	0.46	236.89	2,299.9	-10.6	-15.4	467,732.48	730,397.39	32° 17' 1.364 N	103° 35' 16.107 W
2,400.0	0.40	213.64	2,399.9	-11.1	-15.9	467,731.97	730,396.86	32° 17' 1.359 N	103° 35' 16.113 W
2,500.0	0.39	219.47	2,499.9	-11.7	-16.3	467,731.41	730,396.45	32° 17' 1.354 N	103° 35' 16.118 W
2,600.0	0.40	230.71	2,599.9	-12.2	-16.8	467,730.93	730,395.97	32° 17' 1.349 N	103° 35' 16.124 W
2,700.0	0.48	220.96	2,699.9	-12.7	-17.4	467,730.39	730,395.42	32° 17' 1.344 N	103° 35' 16.130 W
2,800.0	0.35	242.69	2,799.9	-13.2	-17.9	467,729.94	730,394.88	32° 17' 1.339 N	103° 35' 16.137 W
2,900.0	0.24	236.84	2,899.9	-13.4	-18.4	467,729.68	730,394.43	32° 17' 1.337 N	103° 35' 16.142 W
3,000.0	0.19	276.26	2,999.9	-13.5	-18.7	467,729.58	730,394.09	32° 17' 1.336 N	103° 35' 16.146 W
3,100.0	0.34	300.44	3,099.9	-13.3	-19.1	467,729.75	730,393.67	32° 17' 1.338 N	103° 35' 16.151 W
3,200.0	0.22	328.50	3,199.9	-13.0	-19.5	467,730.07	730,393.31	32° 17' 1.341 N	103° 35' 16.155 W
3,300.0	0.32	344.76	3,299.9	-12.6	-19.7	467,730.50	730,393.14	32° 17' 1.345 N	103° 35' 16.157 W
3,400.0	0.17	1.90	3,399.9	-12.2	-19.7	467,730.92	730,393.07	32° 17' 1.349 N	103° 35' 16.158 W
3,500.0	0.53	29.91	3,499.8	-11.6	-19.5	467,731.47	730,393.31	32° 17' 1.355 N	103° 35' 16.155 W
3,600.0	0.68	45.69	3,599.8	-10.8	-18.8	467,732.28	730,393.96	32° 17' 1.363 N	103° 35' 16.147 W
3,700.0	0.93	46.08	3,699.8	-9.8	-17.8	467,733.26	730,394.97	32° 17' 1.372 N	103° 35' 16.135 W
3,800.0	0.76	29.94	3,799.8	-8.7	-16.9	467,734.40	730,395.89	32° 17' 1.384 N	103° 35' 16.125 W
3,900.0	0.54	5.97	3,899.8	-7.7	-16.5	467,735.44	730,396.27	32° 17' 1.394 N	103° 35' 16.120 W
4,000.0	0.46	357.91	3,999.8	-6.8	-16.5	467,736.31	730,396.30	32° 17' 1.402 N	103° 35' 16.120 W
4,100.0	0.74	339.96	4,099.8	-5.8	-16.7	467,737.32	730,396.06	32° 17' 1.412 N	103° 35' 16.122 W
4,200.0	1.10	352.78	4,199.8	-4.2	-17.1	467,738.88	730,395.72	32° 17' 1.428 N	103° 35' 16.126 W
4,300.0	0.98	7.92	4,299.8	-2.4	-17.1	467,740.68	730,395.72	32° 17' 1.446 N	103° 35' 16.126 W
4,400.0	1.02	95.54	4,399.8	-1.7	-16.1	467,741.44	730,396.72	32° 17' 1.453 N	103° 35' 16.114 W
4,500.0	1.15	101.93	4,499.8	-2.0	-14.2	467,741.14	730,398.59	32° 17' 1.450 N	103° 35' 16.093 W
4,600.0	0.85	91.42	4,599.7	-2.2	-12.5	467,740.92	730,400.31	32° 17' 1.448 N	103° 35' 16.073 W
4,700.0	1.56	111.37	4,699.7	-2.7	-10.5	467,740.40	730,402.32	32° 17' 1.443 N	103° 35' 16.049 W
4,800.0	1.93	120.45	4,799.7	-4.0	-7.8	467,739.05	730,405.04	32° 17' 1.429 N	103° 35' 16.018 W
4,900.0	1.97	114.63	4,899.6	-5.6	-4.7	467,737.48	730,408.06	32° 17' 1.413 N	103° 35' 15.983 W
5,000.0	0.41	1.65	4,999.6	-6.0	-3.2	467,737.13	730,409.63	32° 17' 1.410 N	103° 35' 15.964 W
5,100.0	0.57	344.81	5,099.6	-5.1	-3.3	467,737.96	730,409.51	32° 17' 1.418 N	103° 35' 15.966 W
5,200.0	0.61	331.77	5,199.6	-4.2	-3.7	467,738.91	730,409.13	32° 17' 1.427 N	103° 35' 15.970 W
5,300.0	0.50	330.71	5,299.6	-3.3	-4.1	467,739.76	730,408.66	32° 17' 1.436 N	103° 35' 15.975 W
5,400.0	0.47	332.72	5,399.6	-2.6	-4.5	467,740.51	730,408.26	32° 17' 1.443 N	103° 35' 15.980 W
5,500.0	0.54	348.59	5,499.6	-1.8	-4.8	467,741.33	730,407.98	32° 17' 1.451 N	103° 35' 15.983 W
5,600.0	0.44	345.34	5,599.6	-0.9	-5.0	467,742.17	730,407.79	32° 17' 1.460 N	103° 35' 15.985 W
5,700.0	0.54	356.75	5,699.6	-0.1	-5.1	467,743.01	730,407.67	32° 17' 1.468 N	103° 35' 15.987 W
5,800.0	0.56	7.80	5,799.6	0.9	-5.1	467,743.96	730,407.70	32° 17' 1.477 N	103° 35' 15.986 W
5,900.0	0.50	13.51	5,899.6	1.8	-4.9	467,744.87	730,407.87	32° 17' 1.486 N	103° 35' 15.984 W
6,000.0	0.58	357.32	5,999.5	2.7	-4.8	467,745.80	730,407.95	32° 17' 1.496 N	103° 35' 15.983 W
6,100.0	0.72	2.28	6,099.5	3.8	-4.8	467,746.94	730,407.95	32° 17' 1.507 N	103° 35' 15.983 W
6,200.0	0.75	358.87	6,199.5	5.1	-4.8	467,748.22	730,407.96	32° 17' 1.519 N	103° 35' 15.983 W
6,300.0	0.54	348.88	6,299.5	6.2	-4.9	467,749.33	730,407.86	32° 17' 1.530 N	103° 35' 15.984 W
6,400.0	0.56	341.95	6,399.5	7.2	-5.2	467,750.26	730,407.62	32° 17' 1.540 N	103° 35' 15.987 W
6,500.0	0.60	348.28	6,499.5	8.1	-5.4	467,751.24	730,407.36	32° 17' 1.549 N	103° 35' 15.990 W



TDS
Survey Report - Geographic



Company: COG Operating LLC
Project: Lea County, NM
Site: Brinninstool Unit
Well: #4H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #4H
TVD Reference: KB @ 3713.2usft
MD Reference: KB @ 3713.2usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.0	0.54	321.83	6,599.5	9.0	-5.8	467,752.12	730,406.96	32° 17' 1.558 N	103° 35' 15.994 W
6,700.0	0.40	293.72	6,699.5	9.5	-6.4	467,752.63	730,406.35	32° 17' 1.563 N	103° 35' 16.001 W
6,800.0	0.41	295.53	6,799.5	9.8	-7.1	467,752.93	730,405.71	32° 17' 1.566 N	103° 35' 16.009 W
6,900.0	0.28	283.00	6,899.5	10.0	-7.6	467,753.14	730,405.15	32° 17' 1.568 N	103° 35' 16.015 W
7,000.0	0.17	290.31	6,999.5	10.1	-8.0	467,753.24	730,404.77	32° 17' 1.569 N	103° 35' 16.020 W
7,100.0	0.16	324.91	7,099.5	10.3	-8.2	467,753.41	730,404.55	32° 17' 1.571 N	103° 35' 16.022 W
7,200.0	0.15	263.32	7,199.5	10.4	-8.5	467,753.51	730,404.34	32° 17' 1.572 N	103° 35' 16.025 W
7,300.0	0.12	231.67	7,299.5	10.3	-8.7	467,753.43	730,404.13	32° 17' 1.571 N	103° 35' 16.027 W
7,400.0	0.13	78.15	7,399.5	10.3	-8.6	467,753.39	730,404.16	32° 17' 1.571 N	103° 35' 16.027 W
7,500.0	0.30	100.02	7,499.5	10.3	-8.3	467,753.36	730,404.53	32° 17' 1.571 N	103° 35' 16.022 W
7,600.0	0.46	97.10	7,599.5	10.2	-7.6	467,753.27	730,405.18	32° 17' 1.570 N	103° 35' 16.015 W
7,700.0	0.61	103.76	7,699.5	10.0	-6.7	467,753.09	730,406.10	32° 17' 1.568 N	103° 35' 16.004 W
7,800.0	0.75	110.86	7,799.5	9.6	-5.6	467,752.73	730,407.23	32° 17' 1.564 N	103° 35' 15.991 W
7,900.0	0.84	106.25	7,899.5	9.2	-4.3	467,752.29	730,408.54	32° 17' 1.560 N	103° 35' 15.976 W
8,000.0	0.71	114.81	7,999.5	8.7	-3.0	467,751.83	730,409.81	32° 17' 1.555 N	103° 35' 15.961 W
8,100.0	0.69	127.29	8,099.5	8.1	-1.9	467,751.20	730,410.85	32° 17' 1.549 N	103° 35' 15.949 W
8,200.0	0.77	162.99	8,199.5	7.1	-1.3	467,750.20	730,411.53	32° 17' 1.539 N	103° 35' 15.941 W
8,300.0	0.69	152.22	8,299.4	5.9	-0.8	467,749.02	730,412.00	32° 17' 1.527 N	103° 35' 15.936 W
8,400.0	0.93	167.11	8,399.4	4.6	-0.3	467,747.70	730,412.47	32° 17' 1.514 N	103° 35' 15.930 W
8,500.0	0.77	175.70	8,499.4	3.1	-0.1	467,746.24	730,412.70	32° 17' 1.500 N	103° 35' 15.928 W
8,600.0	0.70	190.68	8,599.4	1.9	-0.2	467,744.97	730,412.63	32° 17' 1.487 N	103° 35' 15.929 W
8,700.0	0.94	198.09	8,699.4	0.5	-0.5	467,743.59	730,412.27	32° 17' 1.473 N	103° 35' 15.933 W
8,800.0	0.86	215.77	8,799.4	-0.9	-1.2	467,742.20	730,411.57	32° 17' 1.460 N	103° 35' 15.941 W
8,900.0	0.78	218.34	8,899.4	-2.0	-2.1	467,741.06	730,410.71	32° 17' 1.448 N	103° 35' 15.951 W
9,000.0	0.82	225.48	8,999.4	-3.1	-3.0	467,740.02	730,409.78	32° 17' 1.438 N	103° 35' 15.962 W
9,100.0	0.89	232.42	9,099.4	-4.1	-4.1	467,739.04	730,408.65	32° 17' 1.429 N	103° 35' 15.976 W
9,200.0	1.37	249.15	9,199.3	-5.0	-5.9	467,738.15	730,406.92	32° 17' 1.420 N	103° 35' 15.996 W
9,300.0	1.45	252.37	9,299.3	-5.8	-8.2	467,737.34	730,404.60	32° 17' 1.412 N	103° 35' 16.023 W
9,400.0	1.52	250.09	9,399.3	-6.6	-10.7	467,736.50	730,402.15	32° 17' 1.404 N	103° 35' 16.052 W
9,500.0	1.65	270.21	9,499.2	-7.0	-13.3	467,736.06	730,399.46	32° 17' 1.400 N	103° 35' 16.083 W
9,600.0	1.80	277.72	9,599.2	-6.8	-16.3	467,736.27	730,396.46	32° 17' 1.402 N	103° 35' 16.118 W
9,700.0	1.13	294.99	9,699.2	-6.2	-18.8	467,736.90	730,394.01	32° 17' 1.408 N	103° 35' 16.146 W
9,800.0	1.08	321.99	9,799.1	-5.0	-20.3	467,738.06	730,392.54	32° 17' 1.420 N	103° 35' 16.163 W
9,900.0	2.12	284.57	9,899.1	-3.8	-22.6	467,739.27	730,390.17	32° 17' 1.432 N	103° 35' 16.191 W
10,000.6	2.92	264.87	9,999.7	-3.6	-27.0	467,739.51	730,385.81	32° 17' 1.435 N	103° 35' 16.242 W
10,025.2	2.98	265.77	10,024.2	-3.7	-28.2	467,739.40	730,384.55	32° 17' 1.434 N	103° 35' 16.256 W
10,050.8	3.14	265.73	10,049.8	-3.8	-29.6	467,739.30	730,383.19	32° 17' 1.433 N	103° 35' 16.272 W
10,075.3	3.28	267.13	10,074.2	-3.9	-31.0	467,739.22	730,381.82	32° 17' 1.432 N	103° 35' 16.288 W
10,100.9	3.38	266.64	10,099.7	-4.0	-32.5	467,739.14	730,380.34	32° 17' 1.431 N	103° 35' 16.305 W
10,125.2	3.40	265.95	10,124.0	-4.1	-33.9	467,739.04	730,378.90	32° 17' 1.431 N	103° 35' 16.322 W
10,150.2	3.55	263.77	10,149.0	-4.2	-35.4	467,738.91	730,377.39	32° 17' 1.429 N	103° 35' 16.340 W
10,176.4	3.41	260.30	10,175.2	-4.4	-37.0	467,738.69	730,375.82	32° 17' 1.427 N	103° 35' 16.358 W
10,200.6	3.36	260.37	10,199.3	-4.7	-38.4	467,738.45	730,374.41	32° 17' 1.425 N	103° 35' 16.374 W
10,226.3	3.40	261.07	10,224.9	-4.9	-39.9	467,738.20	730,372.91	32° 17' 1.423 N	103° 35' 16.392 W
10,250.1	2.94	262.29	10,248.7	-5.1	-41.2	467,738.01	730,371.62	32° 17' 1.421 N	103° 35' 16.407 W
10,275.6	3.10	261.90	10,274.2	-5.3	-42.5	467,737.83	730,370.28	32° 17' 1.419 N	103° 35' 16.423 W
10,300.1	2.93	256.34	10,298.6	-5.5	-43.8	467,737.59	730,369.02	32° 17' 1.417 N	103° 35' 16.437 W
10,326.1	2.62	251.46	10,324.6	-5.9	-45.0	467,737.24	730,367.81	32° 17' 1.414 N	103° 35' 16.451 W
10,350.3	2.48	249.83	10,348.8	-6.2	-46.0	467,736.88	730,366.79	32° 17' 1.410 N	103° 35' 16.463 W
10,375.2	2.21	245.63	10,373.7	-6.6	-46.9	467,736.50	730,365.85	32° 17' 1.406 N	103° 35' 16.474 W
10,400.3	1.89	242.83	10,398.8	-7.0	-47.8	467,736.11	730,365.04	32° 17' 1.403 N	103° 35' 16.484 W
10,425.5	1.72	239.89	10,423.9	-7.4	-48.5	467,735.73	730,364.34	32° 17' 1.399 N	103° 35' 16.492 W
10,450.8	1.57	239.30	10,449.3	-7.7	-49.1	467,735.36	730,363.72	32° 17' 1.395 N	103° 35' 16.499 W
10,475.0	1.30	238.63	10,473.4	-8.0	-49.6	467,735.05	730,363.20	32° 17' 1.392 N	103° 35' 16.505 W
10,521.0	2.02	291.92	10,519.4	-8.0	-50.8	467,735.08	730,362.00	32° 17' 1.393 N	103° 35' 16.519 W



TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Lea County, NM	TVD Reference:	KB @ 3713.2usft
Site:	Brinninstool Unit	MD Reference:	KB @ 3713.2usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,553.0	4.31	353.89	10,551.4	-6.6	-51.4	467,736.49	730,361.35	32° 17' 1.407 N	103° 35' 16.527 W
10,585.0	8.09	10.85	10,583.2	-3.2	-51.2	467,739.90	730,361.64	32° 17' 1.440 N	103° 35' 16.523 W
10,600.0	11.33	2.75	10,597.9	-0.7	-50.9	467,742.41	730,361.91	32° 17' 1.465 N	103° 35' 16.520 W
10,631.0	16.50	0.98	10,628.0	6.8	-50.7	467,749.85	730,362.14	32° 17' 1.539 N	103° 35' 16.517 W
10,663.0	20.80	0.23	10,658.3	17.0	-50.6	467,760.08	730,362.24	32° 17' 1.640 N	103° 35' 16.515 W
10,692.0	23.70	0.80	10,685.2	28.0	-50.5	467,771.06	730,362.34	32° 17' 1.749 N	103° 35' 16.512 W
10,723.0	27.90	1.80	10,713.1	41.4	-50.1	467,784.55	730,362.65	32° 17' 1.882 N	103° 35' 16.508 W
10,755.0	31.20	3.60	10,740.9	57.2	-49.4	467,800.31	730,363.41	32° 17' 2.038 N	103° 35' 16.498 W
10,787.0	34.60	3.80	10,767.8	74.6	-48.3	467,817.65	730,364.53	32° 17' 2.209 N	103° 35' 16.483 W
10,819.0	39.10	0.30	10,793.4	93.7	-47.6	467,836.82	730,365.19	32° 17' 2.399 N	103° 35' 16.474 W
10,851.0	43.10	356.90	10,817.5	114.7	-48.1	467,857.84	730,364.65	32° 17' 2.607 N	103° 35' 16.479 W
10,882.0	47.60	355.70	10,839.3	136.7	-49.6	467,879.84	730,363.22	32° 17' 2.825 N	103° 35' 16.493 W
10,914.0	50.80	356.00	10,860.2	160.9	-51.3	467,904.00	730,361.47	32° 17' 3.064 N	103° 35' 16.512 W
10,946.0	53.70	356.20	10,879.8	186.1	-53.1	467,929.24	730,359.75	32° 17' 3.314 N	103° 35' 16.530 W
10,977.0	55.30	356.80	10,897.8	211.3	-54.6	467,954.43	730,358.21	32° 17' 3.563 N	103° 35' 16.546 W
11,009.0	57.10	357.50	10,915.6	237.9	-55.9	467,980.98	730,356.89	32° 17' 3.826 N	103° 35' 16.559 W
11,041.0	59.90	358.50	10,932.3	265.1	-56.9	468,008.25	730,355.94	32° 17' 4.096 N	103° 35' 16.568 W
11,072.0	62.90	359.00	10,947.1	292.4	-57.5	468,035.46	730,355.35	32° 17' 4.365 N	103° 35' 16.573 W
11,104.0	64.90	359.60	10,961.2	321.1	-57.8	468,064.19	730,355.00	32° 17' 4.650 N	103° 35' 16.574 W
11,136.0	66.70	359.80	10,974.3	350.3	-58.0	468,093.37	730,354.79	32° 17' 4.939 N	103° 35' 16.574 W
11,168.0	69.50	359.90	10,986.3	380.0	-58.1	468,123.06	730,354.66	32° 17' 5.232 N	103° 35' 16.573 W
11,199.0	73.10	0.40	10,996.2	409.3	-58.1	468,152.42	730,354.74	32° 17' 5.523 N	103° 35' 16.570 W
11,231.0	75.00	0.40	11,005.0	440.1	-57.8	468,183.19	730,354.96	32° 17' 5.827 N	103° 35' 16.565 W
11,263.0	77.20	0.80	11,012.7	471.1	-57.5	468,214.25	730,355.28	32° 17' 6.135 N	103° 35' 16.559 W
11,313.0	83.50	0.90	11,021.1	520.4	-56.8	468,263.51	730,356.01	32° 17' 6.622 N	103° 35' 16.546 W
11,345.0	84.30	359.90	11,024.5	552.2	-56.6	468,295.33	730,356.24	32° 17' 6.937 N	103° 35' 16.541 W
11,377.0	85.00	357.70	11,027.4	584.1	-57.2	468,327.18	730,355.57	32° 17' 7.252 N	103° 35' 16.546 W
11,408.0	87.60	354.50	11,029.4	614.9	-59.3	468,358.03	730,353.46	32° 17' 7.558 N	103° 35' 16.568 W
11,440.0	88.80	353.30	11,030.4	646.7	-62.7	468,389.84	730,350.06	32° 17' 7.873 N	103° 35' 16.605 W
11,535.0	93.50	356.20	11,028.5	741.3	-71.4	468,484.38	730,341.37	32° 17' 8.809 N	103° 35' 16.699 W
11,631.0	91.00	357.90	11,024.8	837.1	-76.4	468,580.17	730,336.44	32° 17' 9.757 N	103° 35' 16.749 W
11,726.0	91.40	359.10	11,022.8	932.0	-78.8	468,675.11	730,333.95	32° 17' 10.697 N	103° 35' 16.770 W
11,821.0	91.50	1.30	11,020.4	1,027.0	-78.5	468,770.08	730,334.28	32° 17' 11.636 N	103° 35' 16.758 W
11,916.0	90.70	1.30	11,018.5	1,121.9	-76.4	468,865.03	730,336.44	32° 17' 12.576 N	103° 35' 16.726 W
12,011.0	89.70	1.60	11,018.2	1,216.9	-74.0	468,960.00	730,338.84	32° 17' 13.515 N	103° 35' 16.690 W
12,107.0	89.90	1.50	11,018.6	1,312.9	-71.4	469,055.97	730,341.44	32° 17' 14.465 N	103° 35' 16.652 W
12,202.0	89.90	1.40	11,018.7	1,407.8	-69.0	469,150.94	730,343.84	32° 17' 15.404 N	103° 35' 16.616 W
12,297.0	89.50	0.70	11,019.2	1,502.8	-67.2	469,245.92	730,345.59	32° 17' 16.344 N	103° 35' 16.588 W
12,392.0	90.20	1.10	11,019.5	1,597.8	-65.7	469,340.91	730,347.08	32° 17' 17.284 N	103° 35' 16.563 W
12,487.0	90.00	0.80	11,019.3	1,692.8	-64.1	469,435.89	730,348.65	32° 17' 18.224 N	103° 35' 16.537 W
12,582.0	90.30	0.80	11,019.0	1,787.8	-62.8	469,530.88	730,349.98	32° 17' 19.164 N	103° 35' 16.514 W
12,677.0	90.30	0.80	11,018.6	1,882.8	-61.5	469,625.87	730,351.31	32° 17' 20.104 N	103° 35' 16.491 W
12,773.0	90.60	0.90	11,017.8	1,978.8	-60.1	469,721.86	730,352.73	32° 17' 21.053 N	103° 35' 16.466 W
12,868.0	89.40	1.50	11,017.8	2,073.7	-58.1	469,816.83	730,354.72	32° 17' 21.993 N	103° 35' 16.436 W
12,963.0	89.70	1.80	11,018.5	2,168.7	-55.3	469,911.79	730,357.45	32° 17' 22.932 N	103° 35' 16.396 W
13,058.0	90.00	1.30	11,018.8	2,263.7	-52.8	470,006.76	730,360.02	32° 17' 23.872 N	103° 35' 16.358 W
13,153.0	90.40	1.10	11,018.5	2,358.6	-50.8	470,101.74	730,362.01	32° 17' 24.812 N	103° 35' 16.328 W
13,248.0	89.80	0.90	11,018.3	2,453.6	-49.1	470,196.72	730,363.67	32° 17' 25.751 N	103° 35' 16.301 W
13,343.0	89.40	1.20	11,019.0	2,548.6	-47.4	470,291.70	730,365.41	32° 17' 26.691 N	103° 35' 16.273 W
13,438.0	90.20	1.30	11,019.3	2,643.6	-45.3	470,386.68	730,367.48	32° 17' 27.631 N	103° 35' 16.241 W
13,533.0	89.00	1.30	11,020.0	2,738.5	-43.2	470,481.65	730,369.64	32° 17' 28.571 N	103° 35' 16.208 W
13,628.0	89.90	1.10	11,020.9	2,833.5	-41.2	470,576.62	730,371.63	32° 17' 29.510 N	103° 35' 16.177 W
13,724.0	88.50	1.00	11,022.2	2,929.5	-39.4	470,672.59	730,373.39	32° 17' 30.460 N	103° 35' 16.149 W
13,819.0	89.20	0.40	11,024.1	3,024.5	-38.2	470,767.57	730,374.55	32° 17' 31.400 N	103° 35' 16.128 W
13,914.0	89.30	359.10	11,025.4	3,119.5	-38.7	470,862.56	730,374.13	32° 17' 32.340 N	103° 35' 16.125 W



TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Lea County, NM	TVD Reference:	KB @ 3713.2usft
Site:	Brinninstool Unit	MD Reference:	KB @ 3713.2usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,009.0	90.10	358.90	11,025.9	3,214.4	-40.3	470,957.54	730,372.48	32° 17' 33.280 N	103° 35' 16.136 W
14,104.0	91.00	359.00	11,024.9	3,309.4	-42.1	471,052.52	730,370.74	32° 17' 34.220 N	103° 35' 16.149 W
14,199.0	90.90	0.30	11,023.4	3,404.4	-42.6	471,147.50	730,370.15	32° 17' 35.159 N	103° 35' 16.148 W
14,294.0	90.70	1.60	11,022.0	3,499.4	-41.1	471,242.48	730,371.73	32° 17' 36.099 N	103° 35' 16.122 W
14,389.0	90.00	1.30	11,021.5	3,594.3	-38.7	471,337.44	730,374.13	32° 17' 37.039 N	103° 35' 16.086 W
14,484.0	90.00	1.20	11,021.5	3,689.3	-36.6	471,432.42	730,376.21	32° 17' 37.978 N	103° 35' 16.054 W
14,579.0	89.60	1.10	11,021.8	3,784.3	-34.7	471,527.40	730,378.11	32° 17' 38.918 N	103° 35' 16.025 W
14,674.0	88.60	1.80	11,023.3	3,879.3	-32.3	471,622.36	730,380.52	32° 17' 39.858 N	103° 35' 15.989 W
14,769.0	88.90	1.80	11,025.4	3,974.2	-29.3	471,717.29	730,383.50	32° 17' 40.797 N	103° 35' 15.946 W
14,864.0	88.30	1.80	11,027.7	4,069.1	-26.3	471,812.21	730,386.48	32° 17' 41.736 N	103° 35' 15.904 W
14,959.0	88.70	1.70	11,030.2	4,164.0	-23.4	471,907.14	730,389.38	32° 17' 42.675 N	103° 35' 15.863 W
15,054.0	89.50	1.70	11,031.7	4,259.0	-20.6	472,002.08	730,392.20	32° 17' 43.614 N	103° 35' 15.822 W
15,150.0	90.70	1.80	11,031.5	4,354.9	-17.7	472,098.03	730,395.13	32° 17' 44.564 N	103° 35' 15.780 W
15,245.0	90.80	1.80	11,030.2	4,449.9	-14.7	472,192.98	730,398.12	32° 17' 45.503 N	103° 35' 15.738 W
15,353.0	91.50	2.00	11,028.1	4,557.8	-11.1	472,300.90	730,401.70	32° 17' 46.571 N	103° 35' 15.687 W
Final MWD Survey									
15,407.0	91.50	2.00	11,026.7	4,611.7	-9.2	472,354.85	730,403.58	32° 17' 47.104 N	103° 35' 15.661 W
Projection to Bit/TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
15,353.0	11,028.1	4,557.8	-11.1	Final MWD Survey
15,407.0	11,026.7	4,611.7	-9.2	Projection to Bit/TD

Checked By: _____ Approved By: _____ Date: _____