



COG Operating LLC

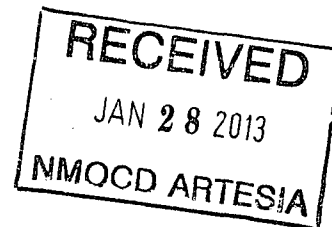
Eddy County, NM
Burch Keely Unit 950H
#950H

OH

Design: OH

Standard Survey Report

12 October, 2012



15-40638



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #950H
Project:	Eddy County, NM	TVD Reference:	Well @ 3606.0usft (UDI #40 - 14' KB)
Site:	Burch Keely Unit 950H	MD Reference:	Well @ 3606.0usft (UDI #40 - 14' KB)
Well:	#950H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Project:	Eddy County, NM	System Datum:	Mean Sea Level
Map System:	US State Plane 1927 (Exact solution)		
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	Burch Keely Unit 950H		
Site Position:		Northing:	661,944.78 usft
From:	Map	Easting:	586,285.03 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 49' 10.051 N
		Longitude:	104° 3' 8.869 W
		Grid Convergence:	0.15 °

Well		#950H				
Well Position	+N/-S	0.0 usft	Northing:	661,944.78 usft	Latitude:	32° 49' 10.051 N
	+E/-W	0.0 usft	Easting:	586,285.03 usft	Longitude:	104° 3' 8.869 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,592.0 usft

Wellbore		OH			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/27/2012	7.76	60.63	48,842

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	91.97	

Survey Program	Date	10/12/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	4,210.0	VES Gyro1 (OH)	CB-GYRO-MS	Camera based gyro multishot
4,229.0	9,145.0	Crescent MWD1 (OH)	MWD	MWD - Standard
9,202.0	9,202.0	PTB (OH)	MWD	MWD - Standard

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	0.18	15.85	100.0	0.2	0.0	0.0	0.18	0.18	0.00
200.0	2.12	4.63	200.0	2.1	0.2	0.2	1.94	1.94	-11.22
300.0	1.80	358.28	299.9	5.6	0.3	0.1	0.39	-0.32	-6.35
400.0	1.82	352.99	399.9	8.7	0.1	-0.2	0.17	0.02	-5.29
500.0	2.14	10.64	499.8	12.1	0.2	-0.2	0.68	0.32	17.65
600.0	2.08	18.38	599.7	15.7	1.2	0.6	0.29	-0.06	7.74
700.0	2.05	17.10	699.7	19.1	2.3	1.6	0.06	-0.03	-1.28
800.0	1.96	19.68	799.6	22.4	3.4	2.6	0.13	-0.09	2.58

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Well:	#950H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

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)	
900.0	1.66	20.96	899.6	25.4	4.5	3.6	0.30	-0.30	1.28	
1,000.0	1.16	26.78	999.5	27.6	5.4	4.5	0.52	-0.50	5.82	
1,100.0	1.17	22.11	1,099.5	29.5	6.3	5.3	0.10	0.01	-4.67	
1,200.0	0.94	22.71	1,199.5	31.2	7.0	5.9	0.23	-0.23	0.60	
1,300.0	0.75	353.20	1,299.5	32.6	7.2	6.1	0.47	-0.19	-29.51	
1,400.0	0.78	41.86	1,399.5	33.8	7.6	6.4	0.63	0.03	48.66	
1,500.0	0.38	354.86	1,499.5	34.6	8.0	6.8	0.59	-0.40	-47.00	
1,600.0	0.17	74.28	1,599.5	35.0	8.1	6.9	0.39	-0.21	79.42	
1,700.0	0.15	5.44	1,699.5	35.1	8.3	7.1	0.18	-0.02	-68.84	
1,800.0	0.46	141.37	1,799.5	35.0	8.5	7.3	0.58	0.31	135.93	
1,900.0	0.53	169.46	1,899.5	34.2	8.9	7.7	0.25	0.07	28.09	
2,000.0	0.49	183.16	1,999.5	33.3	8.9	7.8	0.13	-0.04	13.70	
2,100.0	0.56	190.16	2,099.5	32.4	8.8	7.7	0.09	0.07	7.00	
2,200.0	0.65	164.81	2,199.5	31.4	8.9	7.8	0.28	0.09	-25.35	
2,300.0	0.47	154.09	2,299.4	30.5	9.2	8.2	0.21	-0.18	-10.72	
2,400.0	0.23	180.31	2,399.4	29.9	9.4	8.4	0.28	-0.24	26.22	
2,500.0	0.47	167.98	2,499.4	29.3	9.5	8.5	0.25	0.24	-12.33	
2,600.0	0.05	215.21	2,599.4	28.8	9.5	8.5	0.44	-0.42	47.23	
2,700.0	0.45	170.49	2,699.4	28.4	9.6	8.6	0.42	0.40	-44.72	
2,800.0	0.09	8.04	2,799.4	28.1	9.7	8.7	0.54	-0.36	-162.45	
2,900.0	0.36	177.26	2,899.4	27.9	9.7	8.7	0.45	0.27	169.22	
3,000.0	0.24	125.54	2,999.4	27.4	9.9	8.9	0.28	-0.12	-51.72	
3,100.0	0.31	95.29	3,099.4	27.3	10.3	9.4	0.16	0.07	-30.25	
3,200.0	0.17	86.17	3,199.4	27.3	10.7	9.8	0.14	-0.14	-9.12	
3,300.0	0.44	73.41	3,299.4	27.4	11.2	10.3	0.28	0.27	-12.76	
3,400.0	0.37	84.47	3,399.4	27.5	11.9	11.0	0.10	-0.07	11.06	
3,500.0	0.64	128.67	3,499.4	27.2	12.7	11.7	0.45	0.27	44.20	
3,600.0	0.11	138.81	3,599.4	26.8	13.2	12.3	0.53	-0.53	10.14	
3,700.0	0.44	158.36	3,699.4	26.4	13.4	12.5	0.34	0.33	19.55	
3,800.0	0.17	171.78	3,799.4	25.9	13.6	12.7	0.28	-0.27	13.42	
3,900.0	0.23	226.35	3,899.4	25.6	13.4	12.5	0.19	0.06	54.57	
4,000.0	0.17	306.01	3,999.4	25.5	13.2	12.3	0.26	-0.06	79.66	
4,100.0	0.41	286.56	4,099.4	25.7	12.7	11.8	0.26	0.24	-19.45	
4,200.0	0.46	308.35	4,199.4	26.1	12.0	11.1	0.17	0.05	21.79	
4,210.0	0.65	321.51	4,209.4	26.1	12.0	11.1	2.28	1.90	131.60	
4,229.0	0.90	333.90	4,228.4	26.4	11.8	10.9	1.58	1.32	65.21	
4,261.0	0.70	19.60	4,260.4	26.8	11.8	10.9	2.03	-0.63	142.81	
KOP - 4261.0' MD - 4260.4' TVD - 0.70° INC - 19.60° AZI - 10.9° VS										
4,293.0	3.30	103.60	4,292.4	26.7	12.8	11.8	10.32	8.13	262.50	
4,324.0	6.50	109.70	4,323.3	25.9	15.3	14.4	10.44	10.32	19.68	
4,356.0	9.90	112.50	4,354.9	24.3	19.5	18.7	10.69	10.63	8.75	
4,388.0	13.50	115.00	4,386.3	21.6	25.5	24.7	11.36	11.25	7.81	
4,420.0	16.60	117.80	4,417.2	17.9	32.9	32.3	9.95	9.69	8.75	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

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)	
4,451.0	20.00	119.70	4,446.6	13.2	41.4	40.9	11.13	10.97	6.13	
4,483.0	23.10	118.20	4,476.4	7.6	51.7	51.4	9.84	9.69	-4.69	
4,515.0	26.40	116.10	4,505.4	1.5	63.6	63.5	10.67	10.31	-6.56	
4,546.0	29.70	114.30	4,532.8	-4.7	76.8	76.9	10.99	10.65	-5.81	
4,578.0	33.30	113.60	4,560.1	-11.5	92.1	92.4	11.31	11.25	-2.19	
4,610.0	37.00	113.80	4,586.2	-18.9	109.0	109.6	11.57	11.56	0.63	
4,641.0	40.50	113.80	4,610.4	-26.8	126.7	127.6	11.29	11.29	0.00	
4,673.0	44.50	112.70	4,634.0	-35.3	146.6	147.7	12.71	12.50	-3.44	
4,705.0	47.80	112.40	4,656.1	-44.1	167.9	169.3	10.33	10.31	-0.94	
4,737.0	51.30	111.70	4,676.9	-53.3	190.5	192.2	11.06	10.94	-2.19	
4,768.0	55.00	110.80	4,695.5	-62.2	213.6	215.6	12.16	11.94	-2.90	
4,800.0	57.90	110.30	4,713.2	-71.6	238.5	240.9	9.16	9.06	-1.56	
4,832.0	60.60	110.30	4,729.5	-81.1	264.3	267.0	8.44	8.44	0.00	
4,863.0	63.60	108.10	4,744.0	-90.1	290.2	293.1	11.53	9.68	-7.10	
4,895.0	67.00	106.70	4,757.4	-98.8	317.9	321.2	11.34	10.63	-4.38	
4,927.0	70.40	105.90	4,769.0	-107.2	346.6	350.0	10.88	10.63	-2.50	
4,959.0	73.00	105.50	4,779.1	-115.4	375.8	379.5	8.21	8.13	-1.25	
4,990.0	74.70	104.60	4,787.7	-123.1	404.6	408.5	6.15	5.48	-2.90	
5,022.0	76.50	102.00	4,795.7	-130.3	434.7	438.9	9.67	5.63	-8.13	
5,054.0	79.60	101.70	4,802.3	-136.7	465.4	469.8	9.73	9.69	-0.94	
5,086.0	81.80	101.80	4,807.5	-143.1	496.3	500.9	6.88	6.88	0.31	
5,117.0	83.30	101.40	4,811.5	-149.3	526.4	531.2	5.00	4.84	-1.29	
5,135.9	84.01	100.87	4,813.6	-152.9	544.8	549.7	4.68	3.75	-2.82	
330 PP: 5135.9° MD: 4813.6° TVD: 84.01° INC: 549.7° VS:										
5,149.0	84.50	100.50	4,814.9	-155.4	557.6	562.6	4.68	3.75	-2.81	
5,180.0	85.20	99.30	4,817.7	-160.7	588.0	593.2	4.47	2.26	-3.87	
5,212.0	85.90	97.70	4,820.1	-165.4	619.6	624.9	5.44	2.19	-5.00	
5,244.0	86.50	95.80	4,822.3	-169.1	651.3	656.7	6.21	1.88	-5.94	
5,275.0	87.00	93.90	4,824.0	-171.8	682.1	687.6	6.33	1.61	-6.13	
5,307.0	87.10	91.90	4,825.7	-173.4	714.0	719.6	6.25	0.31	-6.25	
5,339.0	87.30	90.60	4,827.2	-174.1	746.0	751.5	4.11	0.63	-4.06	
5,371.0	87.30	90.10	4,828.7	-174.3	778.0	783.5	1.56	0.00	-1.56	
5,402.0	87.30	90.30	4,830.2	-174.4	808.9	814.4	0.64	0.00	0.65	
5,434.0	87.40	90.00	4,831.7	-174.5	840.9	846.4	0.99	0.31	-0.94	
5,466.0	87.50	90.00	4,833.1	-174.5	872.9	878.3	0.31	0.31	0.00	
5,561.0	90.10	90.70	4,835.1	-175.0	967.8	973.3	2.83	2.74	0.74	
5,656.0	90.30	90.40	4,834.8	-175.9	1,062.8	1,068.2	0.38	0.21	-0.32	
5,751.0	90.40	89.20	4,834.2	-175.6	1,157.8	1,163.2	1.27	0.11	-1.26	
5,847.0	90.50	89.00	4,833.4	-174.1	1,253.8	1,259.0	0.23	0.10	-0.21	
5,942.0	90.50	88.40	4,832.6	-171.9	1,348.8	1,353.9	0.63	0.00	-0.63	
6,037.0	90.70	88.80	4,831.6	-169.6	1,443.7	1,448.7	0.47	0.21	0.42	
6,132.0	90.30	89.90	4,830.8	-168.6	1,538.7	1,543.6	1.23	-0.42	1.16	
6,227.0	90.70	89.30	4,829.9	-167.9	1,633.7	1,638.5	0.76	0.42	-0.63	
6,322.0	90.70	88.50	4,828.8	-166.1	1,728.7	1,733.4	0.84	0.00	-0.84	



Survey Report



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Well:	#950H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

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)
6,418.0	90.90	89.30	4,827.4	-164.2	1,824.7	1,829.2	0.86	0.21	0.83
6,433.8	91.00	89.38	4,827.2	-164.0	1,840.5	1,845.0	0.82	0.63	0.53
EOC - 6433.8° MD - 4827.2° TVD - 91.00° INC - 89.38° AZI - 1845.0° VS									
6,513.0	91.50	89.80	4,825.5	-163.5	1,919.6	1,924.1	0.82	0.63	0.53
6,608.0	91.50	90.50	4,823.0	-163.7	2,014.6	2,019.0	0.74	0.00	0.74
6,703.0	92.20	89.80	4,819.9	-164.0	2,109.6	2,113.9	1.04	0.74	-0.74
6,798.0	91.00	89.20	4,817.2	-163.1	2,204.5	2,208.8	1.41	-1.26	-0.63
6,893.0	89.70	90.20	4,816.7	-162.6	2,299.5	2,303.7	1.73	-1.37	1.05
6,988.0	90.20	90.30	4,816.7	-163.1	2,394.5	2,398.7	0.54	0.53	0.11
7,083.0	90.70	90.30	4,816.0	-163.6	2,489.5	2,493.7	0.53	0.53	0.00
7,178.0	91.00	89.90	4,814.6	-163.7	2,584.5	2,588.6	0.53	0.32	-0.42
7,273.0	91.50	89.70	4,812.5	-163.4	2,679.5	2,683.5	0.57	0.53	-0.21
7,368.0	90.70	89.90	4,810.7	-163.1	2,774.5	2,778.4	0.87	-0.84	0.21
7,464.0	90.70	89.80	4,809.5	-162.8	2,870.4	2,874.3	0.10	0.00	-0.10
7,559.0	90.80	89.40	4,808.3	-162.1	2,965.4	2,969.3	0.43	0.11	-0.42
7,654.0	90.60	90.20	4,807.1	-161.8	3,060.4	3,064.2	0.87	-0.21	0.84
7,749.0	90.70	90.20	4,806.0	-162.1	3,155.4	3,159.1	0.11	0.11	0.00
7,844.0	91.40	90.50	4,804.3	-162.7	3,250.4	3,254.1	0.80	0.74	0.32
7,940.0	91.70	90.20	4,801.7	-163.3	3,346.4	3,350.0	0.44	0.31	-0.31
8,035.0	92.10	89.70	4,798.6	-163.2	3,441.3	3,444.9	0.67	0.42	-0.53
8,130.0	90.40	89.50	4,796.5	-162.6	3,536.3	3,539.8	1.80	-1.79	-0.21
8,225.0	89.50	90.20	4,796.6	-162.3	3,631.3	3,634.7	1.20	-0.95	0.74
8,320.0	89.80	89.90	4,797.1	-162.4	3,726.3	3,729.7	0.45	0.32	-0.32
8,416.0	90.10	89.40	4,797.2	-161.8	3,822.3	3,825.6	0.61	0.31	-0.52
8,511.0	89.30	89.80	4,797.7	-161.2	3,917.3	3,920.5	0.94	-0.84	0.42
8,606.0	90.20	89.90	4,798.1	-160.9	4,012.3	4,015.4	0.95	0.95	0.11
8,701.0	91.10	89.90	4,797.1	-160.7	4,107.3	4,110.4	0.95	0.95	0.00
8,796.0	92.00	89.90	4,794.5	-160.6	4,202.2	4,205.3	0.95	0.95	0.00
8,891.0	92.60	89.30	4,790.7	-159.9	4,297.1	4,300.1	0.89	0.63	-0.63
8,986.0	92.90	89.00	4,786.1	-158.5	4,392.0	4,394.9	0.45	0.32	-0.32
9,082.0	93.10	88.50	4,781.1	-156.4	4,487.9	4,490.6	0.56	0.21	-0.52
9,145.0	93.10	88.20	4,777.7	-154.6	4,550.8	4,553.4	0.48	0.00	-0.48
9,202.0	93.10	88.20	4,774.6	-152.8	4,607.6	4,610.2	0.00	0.00	0.00
BHL - 9202.0° MD - 4774.6° TVD - 93.10° INC - 88.20° AZI - 152.8° N - 4607.6° E - 4610.2° VS									

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Project:	Eddy County NM	TVD Reference:	Well @ 3606.0usft (UDI #40 - 14' KB)
Site:	Burch Keely Unit 950H	MD Reference:	Well @ 3606.0usft (UDI #40 - 14' KB)
Well:	#950H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,261.0	4,260.4	26.8	11.8	KOP - 4261.0' MD, 4260.4' TVD, 0.70° INC, 19.60° AZI, 10.9' VS
5,135.9	4,813.6	-152.9	544.8	330 PP - 5135.9' MD, 4813.6' TVD, 84.01° INC, 549.7' VS
6,433.8	4,827.2	-164.0	1,840.5	EOC - 6433.8' MD, 4827.2' TVD, 91.00° INC, 89.38° AZI, 1845.0' VS
9,202.0	4,774.6	-152.8	4,607.6	BHL - 9202.0' MD, 4774.6' TVD, 93.10° INC, 88.20° AZI, -152.8' N, 4607.6' E, 4'

Checked By: _____	Approved By: _____	Date: _____
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