



30-025-41666

COG Operating LLC

Lea County, NM

Sebastian Federal Com

#2H

OH

Survey: MWD #1

Survey Report - Geographic

16 March, 2015

OCT 07 2015



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3609.5usft (Original Well Elev)
Site:	Sebastian Federal Com	MD Reference:	WELL @ 3609.5usft (Original Well Elev)
Well:	#2H	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	Sebastian Federal Com		
Site Position:	Northing:	446,247.40 usft	Latitude: 32° 13' 27.036 N
From: Map	Easting:	754,263.30 usft	Longitude: 103° 30' 40.034 W
Position Uncertainty:	0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.44 °

Well	#2H		
Well Position	+N/-S	0.0 usft	Northing: 446,247.40 usft
	+E/-W	0.0 usft	Easting: 754,263.30 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
			Ground Level: 3,591.5 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010	2/10/2015	7.11
			Dip Angle (°)
			60.11
			Field Strength (nT)
			48,256

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)
	0.0	0.0	0.0
			Direction (°)
			174.39

Survey Program	Date 3/16/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	10,132.0	GYRO (OH)	NS-GYRO-SS
10,211.0	15,402.0	MWD #1 (OH)	MWD
			Description
			NS Gyro single shots
			MWD - Standard

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
10,132.0	1.56	340.05	10,130.4	10.2	-27.0	446,257.61	754,236.34	32° 13' 27.140 N	103° 30' 40.347 W	
10,211.0	1.70	318.20	10,209.4	12.1	-28.1	446,259.49	754,235.20	32° 13' 27.158 N	103° 30' 40.360 W	
10,243.0	1.70	293.20	10,241.4	12.6	-28.9	446,260.04	754,234.44	32° 13' 27.164 N	103° 30' 40.369 W	
10,274.0	2.40	239.50	10,272.4	12.5	-29.8	446,259.89	754,233.46	32° 13' 27.162 N	103° 30' 40.380 W	
10,306.0	4.10	213.80	10,304.3	11.2	-31.0	446,258.60	754,232.25	32° 13' 27.150 N	103° 30' 40.395 W	
10,338.0	6.40	200.80	10,336.2	8.6	-32.3	446,255.98	754,230.98	32° 13' 27.124 N	103° 30' 40.410 W	
10,369.0	8.90	195.40	10,366.9	4.7	-33.6	446,252.05	754,229.73	32° 13' 27.085 N	103° 30' 40.425 W	
10,401.0	11.50	193.10	10,398.4	-0.8	-35.0	446,246.56	754,228.35	32° 13' 27.031 N	103° 30' 40.441 W	
10,433.0	13.90	190.90	10,429.6	-7.7	-36.4	446,239.67	754,226.90	32° 13' 26.963 N	103° 30' 40.459 W	
10,464.0	16.60	189.50	10,459.5	-15.8	-37.8	446,231.65	754,225.46	32° 13' 26.883 N	103° 30' 40.476 W	
10,496.0	19.20	188.40	10,490.0	-25.5	-39.4	446,221.93	754,223.94	32° 13' 26.787 N	103° 30' 40.495 W	



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3609.5usft (Original Well Elev)
Site:	Sebastian Federal Corn	MD Reference:	WELL @ 3609.5usft (Original Well Elev)
Well:	#2H	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
10,527.0	21.90	187.00	10,519.0	-36.2	-40.8	446,211.15	754,222.49	32° 13' 26.681 N	103° 30' 40.512 W
10,559.0	24.70	186.90	10,548.4	-48.8	-42.3	446,198.59	754,220.96	32° 13' 26.557 N	103° 30' 40.531 W
10,590.0	27.80	184.70	10,576.2	-62.5	-43.7	446,184.95	754,219.59	32° 13' 26.422 N	103° 30' 40.549 W
10,622.0	30.60	180.60	10,604.1	-78.0	-44.4	446,169.36	754,218.89	32° 13' 26.268 N	103° 30' 40.558 W
10,654.0	33.80	177.40	10,631.2	-95.1	-44.1	446,152.32	754,219.21	32° 13' 26.099 N	103° 30' 40.556 W
10,685.0	37.40	175.30	10,656.4	-113.1	-42.9	446,134.32	754,220.37	32° 13' 25.921 N	103° 30' 40.544 W
10,717.0	40.90	174.00	10,681.2	-133.2	-41.0	446,114.21	754,222.26	32° 13' 25.722 N	103° 30' 40.524 W
10,749.0	44.70	173.20	10,704.7	-154.8	-38.6	446,092.61	754,224.69	32° 13' 25.508 N	103° 30' 40.497 W
10,780.0	48.70	172.20	10,726.0	-177.2	-35.7	446,070.23	754,227.56	32° 13' 25.286 N	103° 30' 40.466 W
10,812.0	53.00	170.90	10,746.2	-201.7	-32.1	446,045.70	754,231.22	32° 13' 25.043 N	103° 30' 40.426 W
10,843.0	57.00	170.20	10,763.9	-226.7	-27.9	446,020.65	754,235.39	32° 13' 24.795 N	103° 30' 40.379 W
10,875.0	61.20	170.30	10,780.4	-253.8	-23.3	445,993.60	754,240.04	32° 13' 24.527 N	103° 30' 40.327 W
10,906.0	65.80	170.50	10,794.2	-281.2	-18.6	445,966.25	754,244.66	32° 13' 24.256 N	103° 30' 40.276 W
10,938.0	70.30	170.60	10,806.1	-310.4	-13.8	445,936.98	754,249.53	32° 13' 23.966 N	103° 30' 40.222 W
10,969.0	74.80	170.40	10,815.4	-339.6	-8.9	445,907.82	754,254.41	32° 13' 23.677 N	103° 30' 40.168 W
11,000.0	78.90	171.70	10,822.5	-369.4	-4.2	445,878.01	754,259.11	32° 13' 23.381 N	103° 30' 40.116 W
11,032.0	81.50	171.60	10,827.9	-400.6	0.4	445,846.81	754,263.69	32° 13' 23.072 N	103° 30' 40.065 W
11,063.0	82.60	171.50	10,832.2	-431.0	4.9	445,816.44	754,268.20	32° 13' 22.772 N	103° 30' 40.016 W
11,095.0	84.20	171.60	10,835.9	-462.4	9.6	445,785.00	754,272.87	32° 13' 22.460 N	103° 30' 39.964 W
11,127.0	86.30	171.80	10,838.6	-494.0	14.2	445,753.45	754,277.47	32° 13' 22.148 N	103° 30' 39.913 W
11,158.0	87.60	172.30	10,840.2	-524.6	18.5	445,722.79	754,281.75	32° 13' 21.844 N	103° 30' 39.866 W
11,190.0	88.10	172.20	10,841.4	-556.3	22.8	445,691.10	754,286.07	32° 13' 21.530 N	103° 30' 39.819 W
11,285.0	89.40	172.00	10,843.5	-650.4	35.8	445,597.03	754,299.12	32° 13' 20.598 N	103° 30' 39.675 W
11,380.0	89.50	171.40	10,844.4	-744.4	49.5	445,503.03	754,312.83	32° 13' 19.667 N	103° 30' 39.524 W
11,475.0	89.00	171.20	10,845.6	-838.3	63.9	445,409.13	754,327.20	32° 13' 18.737 N	103° 30' 39.365 W
11,570.0	89.90	170.50	10,846.5	-932.1	79.0	445,315.34	754,342.31	32° 13' 17.807 N	103° 30' 39.198 W
11,665.0	87.60	170.10	10,848.6	-1,025.7	95.0	445,221.73	754,358.31	32° 13' 16.880 N	103° 30' 39.020 W
11,760.0	87.50	170.10	10,852.7	-1,119.2	111.3	445,128.23	754,374.63	32° 13' 15.953 N	103° 30' 38.838 W
11,855.0	87.60	169.60	10,856.7	-1,212.6	128.1	445,034.80	754,391.35	32° 13' 15.028 N	103° 30' 38.652 W
11,950.0	88.50	168.90	10,860.0	-1,305.9	145.8	444,941.53	754,409.06	32° 13' 14.103 N	103° 30' 38.454 W
12,046.0	89.60	169.70	10,861.6	-1,400.2	163.6	444,847.21	754,426.88	32° 13' 13.169 N	103° 30' 38.255 W
12,140.0	90.40	170.20	10,861.6	-1,492.7	180.0	444,754.65	754,443.29	32° 13' 12.252 N	103° 30' 38.072 W
12,235.0	90.70	170.60	10,860.6	-1,586.4	195.8	444,660.99	754,459.13	32° 13' 11.324 N	103° 30' 37.896 W
12,330.0	90.00	171.00	10,860.1	-1,680.2	211.0	444,567.21	754,474.32	32° 13' 10.394 N	103° 30' 37.728 W
12,425.0	89.80	172.10	10,860.2	-1,774.2	225.0	444,473.25	754,488.28	32° 13' 9.464 N	103° 30' 37.573 W
12,520.0	89.60	171.80	10,860.7	-1,868.2	238.3	444,379.18	754,501.58	32° 13' 8.532 N	103° 30' 37.427 W
12,615.0	89.10	172.10	10,861.8	-1,962.3	251.6	444,285.13	754,514.88	32° 13' 7.600 N	103° 30' 37.281 W
12,710.0	88.40	173.30	10,863.9	-2,056.5	263.7	444,190.92	754,526.95	32° 13' 6.667 N	103° 30' 37.148 W
12,805.0	87.60	173.10	10,867.2	-2,150.8	274.9	444,096.65	754,538.19	32° 13' 5.733 N	103° 30' 37.026 W
12,900.0	88.20	174.50	10,870.7	-2,245.1	285.1	444,002.27	754,548.44	32° 13' 4.798 N	103° 30' 36.915 W
12,995.0	89.90	174.90	10,872.3	-2,339.7	293.9	443,907.69	754,557.22	32° 13' 3.862 N	103° 30' 36.821 W
13,090.0	91.90	175.20	10,870.8	-2,434.3	302.1	443,813.06	754,565.41	32° 13' 2.925 N	103° 30' 36.734 W
13,185.0	90.30	174.50	10,868.9	-2,528.9	310.6	443,718.47	754,573.94	32° 13' 1.988 N	103° 30' 36.644 W
13,280.0	87.70	173.70	10,870.6	-2,623.4	320.4	443,624.00	754,583.70	32° 13' 1.053 N	103° 30' 36.538 W
13,375.0	88.30	173.10	10,873.9	-2,717.7	331.3	443,529.68	754,594.61	32° 13' 0.119 N	103° 30' 36.420 W
13,469.0	87.40	173.80	10,877.4	-2,811.0	342.0	443,436.36	754,605.33	32° 12' 59.194 N	103° 30' 36.303 W
13,564.0	87.70	174.60	10,881.5	-2,905.5	351.6	443,341.94	754,614.92	32° 12' 58.259 N	103° 30' 36.200 W
13,659.0	87.50	174.90	10,885.5	-3,000.0	360.3	443,247.42	754,623.61	32° 12' 57.323 N	103° 30' 36.108 W
13,716.4	87.38	175.14	10,888.0	-3,057.1	365.3	443,190.29	754,628.58	32° 12' 56.758 N	103° 30' 36.055 W
Government L2 #2									
13,754.0	87.30	175.30	10,889.8	-3,094.5	368.4	443,152.86	754,631.71	32° 12' 56.387 N	103° 30' 36.022 W
13,849.0	88.50	175.20	10,893.3	-3,189.1	376.3	443,058.26	754,639.57	32° 12' 55.450 N	103° 30' 35.939 W
13,943.0	88.70	175.90	10,895.6	-3,282.8	383.6	442,964.57	754,646.87	32° 12' 54.523 N	103° 30' 35.862 W
14,039.0	89.20	176.40	10,897.3	-3,378.6	390.0	442,868.80	754,653.31	32° 12' 53.574 N	103° 30' 35.796 W
14,134.0	90.60	176.40	10,897.5	-3,473.4	396.0	442,773.99	754,659.27	32° 12' 52.636 N	103° 30' 35.735 W



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3609.5usft (Original Well Elev)
Site:	Sebastian Federal Com	MD Reference:	WELL @ 3609.5usft (Original Well Elev)
Well:	#2H	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
14,229.0	90.60	175.90	10,896.5	-3,568.2	402.4	442,679.21	754,665.65	32° 12' 51.697 N	103° 30' 35.669 W
14,324.0	89.50	176.00	10,896.4	-3,663.0	409.1	442,584.45	754,672.36	32° 12' 50.759 N	103° 30' 35.599 W
14,418.0	88.70	175.60	10,897.9	-3,756.7	415.9	442,490.71	754,679.25	32° 12' 49.831 N	103° 30' 35.527 W
14,513.0	87.60	174.90	10,901.0	-3,851.3	423.8	442,396.09	754,687.11	32° 12' 48.894 N	103° 30' 35.444 W
14,608.0	87.70	175.90	10,904.8	-3,945.9	431.4	442,301.48	754,694.72	32° 12' 47.957 N	103° 30' 35.364 W
14,703.0	89.80	176.70	10,906.9	-4,040.7	437.6	442,206.71	754,700.85	32° 12' 47.019 N	103° 30' 35.301 W
14,798.0	89.40	176.60	10,907.6	-4,135.5	443.1	442,111.87	754,706.40	32° 12' 46.080 N	103° 30' 35.245 W
14,893.0	89.10	176.40	10,908.8	-4,230.3	448.9	442,017.06	754,712.20	32° 12' 45.142 N	103° 30' 35.186 W
14,988.0	87.80	176.40	10,911.4	-4,325.1	454.9	441,922.28	754,718.16	32° 12' 44.203 N	103° 30' 35.125 W
15,083.0	86.60	176.70	10,916.0	-4,419.8	460.6	441,827.57	754,723.87	32° 12' 43.266 N	103° 30' 35.067 W
15,178.0	87.20	176.60	10,921.2	-4,514.5	466.1	441,732.87	754,729.42	32° 12' 42.328 N	103° 30' 35.011 W
15,273.0	88.50	176.50	10,924.7	-4,609.3	471.8	441,638.11	754,735.13	32° 12' 41.390 N	103° 30' 34.953 W
15,358.0	89.30	175.60	10,926.4	-4,694.1	477.7	441,553.33	754,740.98	32° 12' 40.551 N	103° 30' 34.893 W
15,402.0	89.30	175.60	10,926.9	-4,737.9	481.1	441,509.46	754,744.36	32° 12' 40.116 N	103° 30' 34.857 W
PBHL(SFC#2)									

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------