



COG Operating LLC

Lea County, NM (NAD27 NME)

MC Federal #26

MC Federal #26

OH

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SEP 29 2009

HOBBSOCD

Design: Actual

Standard Survey Report

15 August, 2009

SUR: G-21-17s-32e, 2560/N & 1880/E
BHL: G-21-17s-32e, 2304/N & 1666/E
API # 30-025-38833



Scientific Drilling



Scientific Drilling
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well MC Federal #26
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	Ground Elev @ 4050.00ft (Silver Oak #8)
Site:	MC Federal #26	MD Reference:	Ground Elev @ 4050.00ft (Silver Oak #8)
Well:	MC Federal #26	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM 5000 1 Single User Db

Project:	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	MC Federal #26		
Site Position:		Northing:	662,571 90 ft
From:	Map	Easting:	673,534 20 ft
Position Uncertainty:	0.00 ft	Slot Radius:	0 "
		Latitude:	32° 49' 12.803 N
		Longitude:	103° 46' 6.433 W
		Grid Convergence:	0.31 °

Well:	MC Federal #26					
Well Position	+N/-S	0.00 ft	Northing:	662,571.90 ft	Latitude:	32° 49' 12.803 N
	+E/-W	0.00 ft	Easting:	673,534.20 ft	Longitude:	103° 46' 6.433 W
Position Uncertainty	0 00 ft	Wellhead Elevation:	ft	Ground Level:	4,050.00 ft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2009/08/15	7 93	60.77	49,162

Design:	Actual				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0 00	0.00	0 00		40 00

Survey Program	Date	2009/08/15		
From	To	Survey (Wellbore)	Tool Name	Description
(ft)	(ft)			
100.00	2,052.00	Keeper gyro (OH)	Keeper	Standard Wireline Keeper ver 1 0 2
2,143.00	6,220 00	MWD Survey (OH)	MWD	MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate
(ft)			(ft)			(ft)	(°/100ft)	(°/100ft)	(°/100ft)
0.00	0.00	0 00	0 00	0.00	0 00	0 00	0.00	0.00	0 00
100.00	0 35	284 70	100 00	0.08	-0.30	-0.13	0.35	0.35	0.00
200.00	1 36	257 39	199 99	-0 10	-1 75	-1.20	1.06	1 01	-27.31
300 00	2 05	252 09	299 94	-0 91	-4 61	-3 66	0 71	0.69	-5 30
400.00	2 78	256.56	399.85	-2 03	-8.67	-7.13	0.75	0.73	4 47
500.00	3 23	256.62	499.72	-3 24	-13 77	-11.33	0.45	0.45	0 06
600 00	3 29	259.74	599.55	-4 41	-19 33	-15 80	0.19	0.06	3.12
700 00	2 93	259 98	699 41	-5 36	-24 67	-19.97	0.36	-0.36	0.24
800.00	2 61	255 71	799.29	-6.37	-29.40	-23.77	0.38	-0.32	-4.27
900.00	2 14	253 96	899.20	-7.45	-33.40	-27.17	0.48	-0 47	-1 75



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Site:	MC Federal #26	MD Reference:	Ground Elev @ 4050.00ft (Silver Oak #8)
Well:	MC Federal #26	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM 5000 1 Single User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,000.00	2.07	249.28	999.14	-8.60	-36.88	-30.30	0.19	-0.07	-4.68
1,100.00	1.86	250.89	1,099.08	-9.77	-40.10	-33.26	0.22	-0.21	1.61
1,200.00	1.78	249.78	1,199.03	-10.84	-43.09	-36.00	0.09	-0.08	-1.11
1,300.00	1.67	249.01	1,298.98	-11.90	-45.91	-38.63	0.11	-0.11	-0.77
1,400.00	1.22	257.38	1,398.95	-12.65	-48.31	-40.75	0.50	-0.45	8.37
1,500.00	1.18	254.99	1,498.93	-13.15	-50.35	-42.44	0.06	-0.04	-2.39
1,600.00	0.69	266.69	1,598.91	-13.45	-51.94	-43.69	0.52	-0.49	11.70
1,700.00	0.22	11.24	1,698.91	-13.30	-52.50	-43.94	0.78	-0.47	104.55
1,800.00	0.43	51.68	1,798.91	-12.88	-52.17	-43.40	0.30	0.21	40.44
1,900.00	0.60	50.65	1,898.91	-12.31	-51.47	-42.52	0.17	0.17	-1.03
2,000.00	0.85	50.49	1,998.90	-11.51	-50.50	-41.28	0.25	0.25	-0.16
2,052.00	0.75	44.05	2,050.89	-11.02	-49.96	-40.56	0.26	-0.19	-12.38
Gyro tie-in									
2,143.00	1.25	52.41	2,141.88	-9.99	-48.76	-38.99	0.57	0.55	9.19
2,245.00	2.58	39.72	2,243.82	-7.54	-46.41	-35.61	1.36	1.30	-12.44
2,331.00	4.61	38.75	2,329.65	-3.36	-43.01	-30.22	2.36	2.36	-1.13
2,427.00	5.73	51.91	2,425.26	2.61	-36.83	-21.67	1.69	1.17	13.71
2,521.00	6.48	40.06	2,518.73	9.56	-29.72	-11.78	1.56	0.80	-12.61
2,617.00	8.70	45.59	2,613.88	18.79	-21.04	0.87	2.43	2.31	5.76
2,711.00	8.08	41.23	2,706.88	28.73	-11.61	14.55	0.94	-0.66	-4.64
2,806.00	7.82	44.27	2,800.96	38.38	-2.70	27.67	0.52	-0.27	3.20
2,900.00	6.40	44.73	2,894.24	46.69	5.45	39.27	1.51	-1.51	0.49
2,995.00	7.10	44.23	2,988.58	54.65	13.27	50.40	0.74	0.74	-0.53
3,090.00	7.94	47.09	3,082.76	63.33	22.17	62.77	0.97	0.88	3.01
3,185.00	6.89	48.21	3,176.97	71.59	31.23	74.92	1.12	-1.11	1.18
3,279.00	8.26	48.72	3,270.14	79.81	40.51	87.17	1.46	1.46	0.54
3,372.00	7.70	41.66	3,362.24	88.87	49.67	100.00	1.21	-0.60	-7.59
3,467.00	7.87	45.57	3,456.37	98.18	58.54	112.84	0.59	0.18	4.12
3,561.00	7.68	40.92	3,549.51	107.43	67.25	125.52	0.70	-0.20	-4.95
3,656.00	7.08	44.24	3,643.72	116.42	75.50	137.71	0.77	-0.63	3.49
3,751.00	6.92	35.75	3,738.01	125.26	82.93	149.26	1.10	-0.17	-8.94
3,847.00	7.45	49.64	3,833.27	133.98	91.05	161.16	1.89	0.55	14.47
3,941.00	7.46	49.17	3,926.47	141.92	100.31	173.19	0.07	0.01	-0.50
4,035.00	7.10	41.13	4,019.72	150.28	108.75	185.03	1.15	-0.38	-8.55
4,129.00	6.60	52.93	4,113.05	157.92	116.88	196.10	1.59	-0.53	12.55
4,224.00	8.38	44.41	4,207.24	166.15	126.08	208.32	2.20	1.87	-8.97
4,319.00	8.67	44.04	4,301.19	176.25	135.90	222.37	0.31	0.31	-0.39
4,413.00	7.17	51.31	4,394.29	185.01	145.41	235.19	1.92	-1.60	7.73
4,508.00	7.34	45.99	4,488.53	192.93	154.40	247.04	0.73	0.18	-5.60
4,603.00	8.03	42.65	4,582.68	202.03	163.26	259.70	0.86	0.73	-3.52
4,666.00	6.19	43.27	4,645.19	207.74	168.57	267.49	2.92	-2.92	0.98
4,730.00	6.01	44.10	4,708.83	212.65	173.27	274.28	0.31	-0.28	1.30
4,793.00	6.22	42.99	4,771.47	217.52	177.89	280.97	0.38	0.33	-1.76



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,888.00	6.62	50.37	4,865.88	224.78	185.62	291.50	0.96	0.42	7.77
4,982.00	6.41	42.95	4,959.27	232.07	193.36	302.07	0.92	-0.22	-7.89
5,044.00	5.63	47.14	5,020.93	236.68	197.95	308.54	1.44	-1.26	6.76
5,106.00	5.24	47.42	5,082.65	240.66	202.27	314.37	0.63	-0.63	0.45
5,170.00	5.84	42.13	5,146.35	245.05	206.60	320.52	1.23	0.94	-8.27
5,233.00	4.76	41.77	5,209.08	249.38	210.49	326.34	1.72	-1.71	-0.57
5,327.00	2.64	46.70	5,302.88	253.77	214.67	332.39	2.28	-2.26	5.24
5,390.00	2.45	39.48	5,365.82	255.81	216.58	335.17	0.59	-0.30	-11.46
5,454.00	0.69	84.48	5,429.79	256.90	217.83	336.82	3.16	-2.75	70.31
5,580.00	0.63	108.08	5,555.79	256.76	219.25	337.62	0.22	-0.05	18.73
5,707.00	1.35	91.89	5,682.77	256.49	221.41	338.80	0.60	0.57	-12.75
5,802.00	0.74	39.77	5,777.75	256.93	222.92	340.10	1.13	-0.64	-54.86
5,927.00	0.71	284.33	5,902.75	257.74	222.68	340.58	0.98	-0.02	-92.35
6,052.00	0.30	213.14	6,027.74	257.66	221.75	339.92	0.54	-0.33	-56.95
6,146.00	0.72	274.47	6,121.74	257.50	221.03	339.33	0.67	0.45	65.24
MWD Survey									
6,220.00	0.72	274.47	6,195.73	257.57	220.10	338.79	0.00	0.00	0.00
Projection to Bit									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
2,052.00	2,050.89	-11.02	-49.96	Gyro tie-in
6,146.00	6,121.74	257.50	221.03	MWD Survey
6,220.00	6,195.73	257.57	220.10	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____