

30-025-39423



HOBBS OCD

MAY 31 2011

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COG Operating LLC

Lea County, NM (NAD27 NME)

MC Federal #40

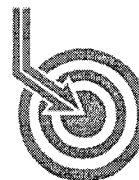
MC Federal #40

OH

Design: Actual

Standard Survey Report

02 August, 2010



Scientific Drilling
Directional Drilling Operations

MAY 31 2011



Scientific Drilling
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well MC Federal #40
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB Elev (13') @ 4061.00usft (JW #4)
Site:	MC Federal #40	MD Reference:	RKB Elev (13') @ 4061.00usft (JW #4)
Well:	MC Federal #40	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Julio

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 #40		
Site Position:		Northing:	664,408.80 usft
From:	Map	Easting:	670,352.20 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 49' 31.146 N
		Longitude:	103° 46' 43.607 W
		Grid Convergence:	0.30 °

Well	MC Federal #40		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 31.146 N
		Longitude:	103° 46' 43.607 W
		Ground Level:	4,048.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	2010/07/25	7.84
			Dip Angle
			(°)
			60.73
			Field Strength
			(nT)
			49,041

Design	Actual		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			145.99

Survey Program	Date 2010/08/02		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	2,020.00	Gyro Survey (OH)	Keeper
2,185.00	5,892.00	MWD Survey (OH)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn	
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate	
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.31	167.74	100.00	-0.26	0.06	0.25	0.31	0.31	0.00	
200.00	0.32	170.02	200.00	-0.80	0.16	0.76	0.02	0.01	2.28	
300.00	0.35	113.59	300.00	-1.20	0.49	1.27	0.32	0.03	-56.43	
400.00	0.32	95.93	399.99	-1.35	1.05	1.71	0.11	-0.03	-17.66	
500.00	0.38	115.03	499.99	-1.52	1.63	2.17	0.13	0.06	19.10	
600.00	0.36	87.38	599.99	-1.65	2.24	2.62	0.18	-0.02	-27.65	
700.00	0.60	5.14	699.99	-1.11	2.60	2.38	0.66	0.24	-82.24	
800.00	0.88	355.17	799.98	0.18	2.58	1.30	0.31	0.28	-9.97	
900.00	0.78	334.43	899.97	1.55	2.23	-0.04	0.31	-0.10	-20.74	



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Well: MC Federal #40
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Design: Actual

Local Co-ordinate Reference: Well MC Federal #40
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MD Reference: RKB Elev (13') @ 4061.00usft (JW #4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM-Julio

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)
1,000.00	0.55	316.14	999.96	2.51	1.60	-1.19	0.31	-0.23	-18.29
1,100.00	0.46	320.39	1,099.96	3.17	1.01	-2.06	0.10	-0.09	4.25
1,200.00	0.33	290.89	1,199.96	3.58	0.49	-2.70	0.24	-0.13	-29.50
1,300.00	0.41	273.99	1,299.95	3.71	-0.14	-3.15	0.13	0.08	-16.90
1,400.00	0.36	282.82	1,399.95	3.80	-0.80	-3.60	0.08	-0.05	8.83
1,500.00	0.42	279.68	1,499.95	3.94	-1.47	-4.08	0.06	0.06	-3.14
1,600.00	0.41	339.17	1,599.95	4.33	-1.96	-4.69	0.41	-0.01	59.49
1,700.00	0.60	0.37	1,699.94	5.19	-2.08	-5.47	0.26	0.19	21.20
1,800.00	0.75	356.21	1,799.94	6.37	-2.12	-6.46	0.16	0.15	-4.16
1,900.00	0.93	17.80	1,899.93	7.79	-1.92	-7.53	0.36	0.18	21.59
2,000.00	1.14	16.42	1,999.91	9.52	-1.39	-8.67	0.21	0.21	-1.38
2,020.00	1.06	32.29	2,019.91	9.87	-1.23	-8.87	1.57	-0.40	79.35
Gyro Tie-in									
2,185.00	1.02	22.71	2,184.88	12.51	0.15	-10.29	0.11	-0.02	-5.81
2,279.00	0.95	40.56	2,278.87	13.87	0.98	-10.95	0.33	-0.07	18.99
2,374.00	1.78	90.76	2,373.84	14.45	2.97	-10.32	1.45	0.87	52.84
2,467.00	2.19	122.30	2,466.79	13.48	5.91	-7.87	1.24	0.44	33.91
2,560.00	3.88	148.60	2,559.66	9.85	9.05	-3.10	2.31	1.82	28.28
2,654.00	5.18	155.30	2,653.36	3.28	12.48	4.26	1.49	1.38	7.13
2,747.00	6.20	148.40	2,745.90	-4.81	16.87	13.43	1.32	1.10	-7.42
2,841.00	5.61	148.10	2,839.41	-13.04	21.96	23.09	0.63	-0.63	-0.32
2,935.00	6.74	153.30	2,932.86	-21.87	26.86	33.15	1.34	1.20	5.53
3,029.00	6.33	154.40	3,026.25	-31.47	31.58	43.75	0.46	-0.44	1.17
3,122.00	6.30	147.60	3,118.69	-40.40	36.53	53.92	0.80	-0.03	-7.31
3,215.00	5.74	148.90	3,211.17	-48.69	41.67	63.67	0.62	-0.60	1.40
3,309.00	6.46	143.20	3,304.64	-56.95	47.26	73.64	1.00	0.77	-6.06
3,402.00	5.84	144.40	3,397.10	-64.99	53.15	83.60	0.68	-0.67	1.29
3,496.00	6.64	144.00	3,490.55	-73.27	59.13	93.81	0.85	0.85	-0.43
3,591.00	6.32	143.90	3,584.94	-81.94	65.44	104.53	0.34	-0.34	-0.11
3,684.00	6.26	145.90	3,677.38	-90.27	71.30	114.71	0.24	-0.06	2.15
3,778.00	6.29	144.90	3,770.82	-98.73	77.13	124.98	0.12	0.03	-1.06
3,871.00	6.24	153.43	3,863.26	-107.42	82.32	135.09	1.00	-0.05	9.17
3,964.00	5.92	154.40	3,955.74	-116.26	86.66	144.85	0.36	-0.34	1.04
4,058.00	5.74	155.80	4,049.25	-124.92	90.68	154.27	0.24	-0.19	1.49
4,152.00	5.42	145.20	4,142.81	-132.86	95.14	163.34	1.15	-0.34	-11.28
4,245.00	5.41	148.30	4,235.40	-140.19	99.95	172.12	0.31	-0.01	3.33
4,337.00	5.50	147.60	4,326.98	-147.61	104.59	180.86	0.12	0.10	-0.76
4,431.00	5.34	147.60	4,420.56	-155.10	109.35	189.73	0.17	-0.17	0.00
4,525.00	5.45	148.90	4,514.14	-162.62	114.00	198.56	0.17	0.12	1.38
4,618.00	5.39	150.40	4,606.73	-170.20	118.44	207.33	0.17	-0.06	1.61
4,712.00	5.25	149.40	4,700.32	-177.74	122.81	216.02	0.18	-0.15	-1.06
4,805.00	5.36	149.90	4,792.92	-185.16	127.15	224.61	0.13	0.12	0.54
4,899.00	5.05	149.30	4,886.54	-192.51	131.46	233.12	0.33	-0.33	-0.64



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Survey Report



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Well: MC Federal #40
Wellbore: OH
Design: Actual

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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)
4,992.00	5.06	147.60	4,979.17	-199.50	135.75	241.30	0.16	0.01	-1.83
5,086.00	4.84	148.10	5,072.82	-206.36	140.07	249.41	0.24	-0.23	0.53
5,180.00	4.85	148.50	5,166.49	-213.12	144.24	257.34	0.04	0.01	0.43
5,273.00	3.20	148.80	5,259.26	-218.69	147.64	263.86	1.77	-1.77	0.32
5,366.00	1.48	151.50	5,352.17	-221.97	149.56	267.65	1.85	-1.85	2.90
5,458.00	1.05	194.70	5,444.15	-223.83	149.91	269.39	1.10	-0.47	46.96
5,552.00	0.26	245.40	5,538.15	-224.75	149.50	269.92	0.97	-0.84	53.94
5,646.00	0.38	224.20	5,632.15	-225.06	149.09	269.95	0.18	0.13	-22.55
5,832.00	0.27	278.20	5,818.14	-225.44	148.22	269.78	0.17	-0.06	29.03
Last MWD Survey									
5,892.00	0.27	278.20	5,878.14	-225.40	147.94	269.59	0.00	0.00	0.00
Projection to Bit									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,020.00	2,019.91	9.87	-1.23	Gyro Tie-in
5,832.00	5,818.14	-225.44	148.22	Last MWD Survey
5,892.00	5,878.14	-225.40	147.94	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____