

HOBBS OCD

MAY 13 2011

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COG Operating LLC

Lea County, NM (NAD27 NME)

MC Federal #55

MC Federal #55

OH

Design: Actual

Standard Survey Report

01 April, 2011



MAY 19 2011



Scientific Drilling
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well MC Federal #55
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 4053.00usft (United #42)
Site:	MC Federal #55	MD Reference:	KB Elev (20') @ 4053.00usft (United #42)
Well:	MC Federal #55	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 #55				
Site Position:		Northing:	663,323.30 usft	Latitude:	32° 49' 20.199 N
From:	Map	Easting:	674,269.60 usft	Longitude:	103° 45' 57.768 W
Position Uncertainty:	0.00 usft	Slot Radius:	0 "	Grid Convergence:	0.31 °

Well	MC Federal #55					
Well Position	+N/-S	0.00 usft	Northing:	663,323.30 usft	Latitude:	32° 49' 20.199 N
	+E/-W	0.00 usft	Easting:	674,269.60 usft	Longitude:	103° 45' 57.768 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,033.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2011/03/25	7.75	60.71	48,974

Design	Actual				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	161.60	

Survey Program	Date 2011/04/01				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	2,086.00	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1.0.2	
2,164.00	7,138.00	MWD Survey (OH)	MWD	MWD - Standard	

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.28	255.17	100.00	-0.06	-0.24	-0.02	0.28	0.28	0.00
200.00	0.27	236.47	200.00	-0.26	-0.67	0.03	0.09	-0.01	-18.70
300.00	0.49	211.62	300.00	-0.75	-1.09	0.37	0.27	0.22	-24.85
400.00	1.42	161.81	399.98	-2.29	-0.93	1.88	1.17	0.93	-49.81
500.00	2.32	154.40	499.93	-5.29	0.33	5.13	0.93	0.90	-7.41
600.00	2.54	144.72	599.84	-8.93	2.49	9.26	0.46	0.22	-9.68
700.00	3.07	133.22	699.72	-12.57	5.72	13.73	0.77	0.53	-11.50
800.00	3.29	131.70	799.57	-16.31	9.81	18.58	0.24	0.22	-1.52
900.00	3.25	133.19	899.40	-20.16	14.02	23.56	0.09	-0.04	1.49



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Well:	MC Federal #55	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	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	2.66	134.58	999.27	-23.73	17.74	28.12	0.59	-0.59	1.39
1,100.00	2.59	135.35	1,099.16	-26.97	20.98	32.21	0.08	-0.07	0.77
1,200.00	2.43	133.43	1,199.07	-30.03	24.11	36.11	0.18	-0.16	-1.92
1,300.00	2.48	130.54	1,298.98	-32.90	27.29	39.83	0.13	0.05	-2.89
1,400.00	2.16	127.40	1,398.89	-35.45	30.44	43.24	0.34	-0.32	-3.14
1,500.00	1.92	103.12	1,498.83	-36.97	33.56	45.68	0.89	-0.24	-24.28
1,600.00	2.40	92.41	1,598.76	-37.44	37.29	47.30	0.63	0.48	-10.71
1,700.00	2.59	84.83	1,698.67	-37.32	41.63	48.56	0.38	0.19	-7.58
1,800.00	2.75	85.94	1,798.56	-36.95	46.27	49.67	0.17	0.16	1.11
1,900.00	2.25	75.31	1,898.46	-36.28	50.56	50.39	0.68	-0.50	-10.63
2,000.00	2.55	80.26	1,998.38	-35.41	54.66	50.85	0.36	0.30	4.95
2,086.00	2.28	85.20	2,084.30	-34.94	58.25	51.54	0.40	-0.31	5.74
Gyro Tie-in									
2,164.00	1.95	85.66	2,162.25	-34.71	61.12	52.23	0.42	-0.42	0.59
2,226.00	2.05	112.37	2,224.21	-35.05	63.19	53.21	1.50	0.16	43.08
2,321.00	2.78	152.52	2,319.13	-37.74	65.83	56.59	1.89	0.77	42.26
2,415.00	3.44	159.37	2,412.99	-42.41	67.87	61.66	0.80	0.70	7.29
2,510.00	4.81	163.94	2,507.74	-48.90	69.98	68.49	1.48	1.44	4.81
2,605.00	5.96	157.87	2,602.32	-57.30	72.94	77.39	1.35	1.21	-6.39
2,700.00	6.63	160.70	2,696.75	-67.04	76.61	87.80	0.78	0.71	2.98
2,795.00	6.71	163.69	2,791.11	-77.55	79.98	98.83	0.38	0.08	3.15
2,890.00	7.21	167.64	2,885.41	-88.70	82.82	110.30	0.73	0.53	4.16
2,985.00	7.87	165.74	2,979.59	-100.82	85.69	122.72	0.74	0.69	-2.00
3,080.00	8.63	166.45	3,073.60	-114.06	88.97	136.31	0.81	0.80	0.75
3,175.00	7.79	165.87	3,167.63	-127.23	92.21	149.83	0.89	-0.88	-0.61
3,269.00	8.02	160.90	3,260.74	-139.60	95.91	162.74	0.77	0.24	-5.29
3,364.00	6.97	157.38	3,354.92	-151.19	100.29	175.12	1.21	-1.11	-3.71
3,459.00	7.56	163.17	3,449.16	-162.49	104.32	187.11	0.99	0.62	6.09
3,554.00	7.17	158.11	3,543.38	-173.97	108.34	199.28	0.80	-0.41	-5.33
3,648.00	6.92	156.07	3,636.67	-184.59	112.82	210.77	0.38	-0.27	-2.17
3,751.00	6.90	152.64	3,738.92	-195.76	118.19	223.06	0.40	-0.02	-3.33
3,815.00	6.53	155.38	3,802.48	-202.48	121.47	230.47	0.76	-0.58	4.28
3,910.00	5.58	164.54	3,896.95	-211.84	124.95	240.45	1.42	-1.00	9.64
3,973.00	5.77	162.92	3,959.65	-217.82	126.70	246.68	0.39	0.30	-2.57
4,036.00	6.27	164.59	4,022.30	-224.17	128.54	253.28	0.84	0.79	2.65
4,100.00	7.25	165.35	4,085.85	-231.44	130.49	260.80	1.54	1.53	1.19
4,163.00	8.19	170.19	4,148.28	-239.71	132.26	269.20	1.81	1.49	7.68
4,226.00	8.30	171.71	4,210.63	-248.63	133.68	278.12	0.39	0.17	2.41
4,320.00	8.02	170.67	4,303.68	-261.82	135.72	291.27	0.34	-0.30	-1.11
4,416.00	8.57	172.81	4,398.67	-275.52	137.70	304.90	0.66	0.57	2.23
4,511.00	8.49	172.85	4,492.62	-289.50	139.46	318.72	0.08	-0.08	0.04
4,637.00	8.46	174.99	4,617.25	-307.96	141.43	336.86	0.25	-0.02	1.70
4,732.00	8.40	176.12	4,711.22	-321.85	142.51	350.38	0.19	-0.06	1.19



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Well:	MC Federal #55	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	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)
4,827.00	8.42	177.19	4,805.20	-335.72	143.32	363.79	0.17	0.02	1.13
4,922.00	7.63	170.33	4,899.27	-348.88	144.72	376.73	1.31	-0.83	-7.22
5,017.00	7.54	163.75	4,993.44	-361.09	147.52	389.19	0.92	-0.09	-6.93
5,112.00	7.51	164.65	5,087.62	-373.06	150.91	401.62	0.13	-0.03	0.95
5,208.00	6.43	162.49	5,182.91	-384.23	154.19	413.26	1.16	-1.13	-2.25
5,303.00	6.14	171.13	5,277.34	-394.33	156.57	423.59	1.04	-0.31	9.09
5,366.00	5.46	173.83	5,340.02	-400.63	157.41	429.84	1.16	-1.08	4.29
5,462.00	3.51	172.53	5,435.72	-408.09	158.29	437.19	2.03	-2.03	-1.35
5,556.00	3.74	168.68	5,529.53	-413.95	159.26	443.06	0.36	0.24	-4.10
5,651.00	2.73	176.61	5,624.38	-419.25	160.01	448.32	1.16	-1.06	8.35
5,746.00	2.53	181.57	5,719.28	-423.60	160.08	452.47	0.32	-0.21	5.22
5,841.00	2.38	174.98	5,814.20	-427.66	160.20	456.36	0.34	-0.16	-6.94
5,935.00	2.36	172.51	5,908.12	-431.52	160.62	460.16	0.11	-0.02	-2.63
6,030.00	2.23	174.04	6,003.04	-435.30	161.07	463.89	0.15	-0.14	1.61
6,125.00	2.19	179.03	6,097.97	-438.95	161.29	467.42	0.21	-0.04	5.25
6,221.00	2.06	180.39	6,193.90	-442.51	161.31	470.81	0.15	-0.14	1.42
6,316.00	1.79	185.96	6,288.85	-445.70	161.14	473.78	0.35	-0.28	5.86
6,409.00	2.46	177.44	6,381.78	-449.14	161.08	477.02	0.79	0.72	-9.16
6,504.00	2.37	164.44	6,476.70	-453.07	161.70	480.94	0.58	-0.09	-13.68
6,599.00	3.39	161.38	6,571.58	-457.62	163.12	485.71	1.09	1.07	-3.22
6,694.00	3.44	168.94	6,666.41	-463.08	164.57	491.35	0.48	0.05	7.96
6,789.00	3.38	169.17	6,761.24	-468.63	165.64	496.95	0.06	-0.06	0.24
6,884.00	3.40	170.27	6,856.08	-474.15	166.64	502.51	0.07	0.02	1.16
6,979.00	2.91	171.38	6,950.93	-479.31	167.48	507.67	0.52	-0.52	1.17
7,087.00	2.82	170.46	7,058.80	-484.64	168.33	513.00	0.09	-0.08	-0.85
Last MWD Survey									
7,138.00	2.82	170.46	7,109.74	-487.12	168.75	515.48	0.00	0.00	0.00
Projection to Bit									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates	
		+N/-S (usft)	+E/-W (usft)
2,086.00	2,084.30	-34.94	58.25
7,087.00	7,058.80	-484.64	168.33
7,138.00	7,109.74	-487.12	168.75

Comment

Gyro Tie-in
Last MWD Survey
Projection to Bit

Checked By: _____ Approved By: _____ Date: _____

PROJECT DETAILS: Lea County, NM (NAD27 NME)		Plan: Plan #2 - 7-7/8" Hole (MC Federal #55/OH)	
Geodetic System:	US State Plane 1927 (Exact solution)	Created By:	Julio Pina
Datum:	NAD 1927 (NADCON CONUS)	Date:	25-Mar-11
Ellipsoid:	Clarke 1866	Checked:	_____
Zone:	New Mexico East 3001	Date:	_____
System Datum:	Mean Sea Level	Reviewed:	_____
		Date:	_____
		Approved:	_____
		Date:	_____