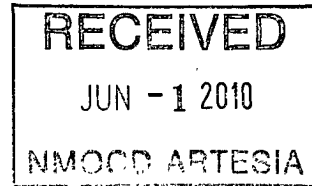


30.015.37318

LM



COG Operating LLC

Eddy County, NM (NAN27 NME)

Miranda Federal #3

Miranda Federal #3

OH

Design: Actual

Standard Survey Report

16 March, 2010

mr



Scientific Drilling



Scientific Drilling Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAN27 NME)
Site: Miranda Federal #3
Well: Miranda Federal #3
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Site Miranda Federal #3
TVD Reference: GL Elev @ 3698 00ft (Basic #35)
MD Reference: GL Elev @ 3698 00ft (Basic #35)
North Reference: Gnd
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

Project: Eddy County, NM (NAN27 NME)

Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site: Miranda Federal #3

Site Position: Northing: 673,193 40 ft Latitude: 32° 51' 0 618 N
From: Map Easting: 610,949.70 ft Longitude: 103° 58' 19 390 W
Position Uncertainty: 0 00 ft Slot Radius: 0 " Grid Convergence: 0 20 °

Well: Miranda Federal #3

Well Position: +N/-S 0 00 ft Northing: 673,193 40 ft Latitude: 32° 51' 0 618 N
+E/-W 0 00 ft Easting: 610,949 70 ft Longitude: 103° 58' 19 390 W
Position Uncertainty: 0 00 ft Wellhead Elevation: ft Ground Level: 3,698 00 ft

Wellbore: OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2010/03/11	7 96	60 75	49,105

Design: Actual

Audit Notes:

Version: 1 0 Phase: ACTUAL Tie On Depth: 0 00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0 00	0 00	0 00	110 26

Survey Program Date: 2010/03/16

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100 00	1,282 00	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1 0 2
1,409 00	4,535 00	MWD Survey (OH)	MWD	MWD - Standard

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)
0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
100 00	0 45	356 48	100 00	0 39	-0 02	-0 16	0 45	0 45	0 00
200 00	1 20	18 45	199 99	1 78	0 28	-0 35	0 80	0 75	21 97
300 00	2 37	19 31	299 94	4 72	1 30	-0 42	1 17	1 17	0 86
400 00	2 15	17 14	399 86	8 47	2 53	-0 55	0 24	-0 22	-2 17
500 00	1 66	8 12	499 80	11 69	3 29	-0 96	0 57	-0 49	-9 02
600 00	1 43	10 70	599 77	14 35	3 73	-1 47	0 24	-0 23	2 58
700 00	1 58	10 11	699 73	16 94	4 20	-1 92	0 15	0 15	-0 59
800 00	1 32	3 96	799 70	19 44	4 52	-2 49	0 30	-0 26	-6 15
900 00	1 29	19 85	899 68	21 65	4 99	-2 82	0 36	-0 03	15 89



Scientific Drilling

Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Miranda Federal #3
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	GL Elev @ 3698 00ft (Basic #35)
Site:	Miranda Federal #3	MD Reference:	GL Elev @ 3698 00ft (Basic #35)
Well:	Miranda Federal #3	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM 5000 1 Single User Db

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	1 21	48 44	999.65	23 41	6 16	-2.33	0 62	-0 08	28 59
1,100.00	1 60	53 67	1,099.62	24 94	8 07	-1.06	0 41	0 39	5 23
1,200.00	1 50	58 36	1,199.59	26 45	10 31	0 51	0 16	-0 10	4 69
1,282.00	1 38	67.17	1,281.56	27 40	12 14	1.90	0 31	-0 15	10 74
Gyro Tie-in									
1,409.00	1 02	71 12	1,408.53	28 36	14 61	3.89	0 29	-0.28	3 11
1,472.00	1.52	123.08	1,471.52	28 08	15.85	5 14	1 90	0.79	82 48
1,535.00	2 75	121 37	1,534.47	26 84	17 84	7 44	1 95	1 95	-2 71
1,599.00	4 04	112 30	1,598.36	25 18	21 23	11 20	2 18	2 02	-14 17
1,662.00	5 52	113.78	1,661.14	23 12	26 06	16 44	2 36	2 35	2 35
1,726.00	6 44	115 59	1,724.79	20 33	32 11	23 09	1 47	1 44	2 83
1,789.00	7 20	116 56	1,787.34	17 04	38 83	30 53	1 22	1 21	1 54
1,884.00	6 40	116 27	1,881.68	12.03	48 90	41.71	0 84	-0 84	-0 31
1,979.00	6 48	117 29	1,976.08	7 23	58 42	52 30	0 15	0 08	1 07
2,074.00	7 37	118 47	2,070.38	1.87	68 54	63 65	0 95	0 94	1 24
2,170.00	6 68	118 43	2,165.66	-3 73	78 86	75 27	0 72	-0 72	-0 04
2,271.00	7 76	117 39	2,265.86	-9.66	90.08	87 85	1 08	1 07	-1 03
2,367.00	6 96	116 78	2,361.07	-15 26	101 03	100 06	0 84	-0 83	-0 64
2,462.00	7.06	116 06	2,455.36	-20.42	111 41	111.59	0 14	0 11	-0 76
2,557.00	6 47	117 99	2,549.70	-25.50	121 38	122 70	0 67	-0 62	2 03
2,650.00	6 98	114.74	2,642.06	-30 32	131 14	133 53	0 68	0.55	-3 49
2,746.00	7 53	114 85	2,737.29	-35 41	142 15	145 61	0 57	0 57	0 11
2,840.00	7 14	115.25	2,830.52	-40.49	153 02	157 57	0 42	-0 41	0 43
2,935.00	6 98	114 13	2,924.80	-45 37	163 63	169 21	0 22	-0 17	-1 18
3,030.00	7 72	114 38	3,019.02	-50 36	174 71	181 34	0 78	0 78	0 26
3,126.00	7 41	113 59	3,114.18	-55 50	186 25	193 95	0 34	-0 32	-0 82
3,221.00	7 25	111 83	3,208.40	-60 18	197 43	206 06	0 29	-0 17	-1 85
3,284.00	7 02	112 82	3,270.92	-63 15	204 67	213 88	0 41	-0 37	1 57
3,379.00	7 04	112 65	3,365.20	-67.64	215 39	225 49	0 03	0 02	-0 18
3,474.00	6 89	112 49	3,459.50	-72.06	226 03	237 00	0 16	-0 16	-0 17
3,570.00	7 54	114.96	3,554.74	-76 93	237 06	249 03	0 75	0.68	2 57
3,665.00	7 58	113.08	3,648.91	-82 01	248 48	261 50	0 26	0 04	-1 98
3,760.00	7.26	111.47	3,743.12	-86 67	259.83	273 76	0 40	-0 34	-1 69
3,855.00	7 23	112 30	3,837.36	-91 13	270 94	285.74	0 11	-0 03	0 87
3,950.00	7 11	113.24	3,931.62	-95 72	281 88	297 58	0 18	-0 13	0 99
4,013.00	6 06	116 82	3,994.20	-98 76	288 43	304 78	1.79	-1 67	5 68
4,108.00	5 02	122 63	4,088.76	-103 26	296 40	313 82	1 24	-1.09	6 12
4,171.00	4 28	120 69	4,151.55	-105.95	300 75	318 83	1 20	-1 17	-3 08
4,235.00	3 39	120 12	4,215.41	-108 12	304 44	323 04	1 39	-1 39	-0 89
4,299.00	2.44	116.41	4,279.32	-109 67	307 29	326 26	1 51	-1.48	-5 80
4,362.00	1 29	117 96	4,342.29	-110.60	309 12	328.30	1.83	-1.83	2 46
4,425.00	0 14	94 73	4,405.28	-110.94	309 83	329.07	1.85	-1.83	-36 87
MWD Survey									



Scientific Drilling
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAN27 NME)
Site: Miranda Federal #3
Well: Miranda Federal #3
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Site Miranda Federal #3
TVD Reference: GL Elev @ 3698.00ft (Basic #35)
MD Reference: GL Elev @ 3698.00ft (Basic #35)
North Reference: Gnd
Survey Calculation Method: Minimum Curvature
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)
4,535.00	0 14	94 73	4,515.28	-110 96	310 09	329 33	0 00	0 00	0 00
Propjection to Bit									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,282.00	1,281.56	27.40	12 14	Gyro Tie-in
4,425.00	4,405.28	-110 94	309 83	MWD Survey
4,535.00	4,515.28	-110 96	310 09	Propjection to Bit

Checked By: _____ Approved By: _____ Date: _____