



COG Operating LLC

Eddy County, NM (NAN27 NME)

Skelly Unit #637

Skelly Unit #637

OH

Design: Actual

Standard Survey Report

28 November, 2009



Scientific Drilling

NR



Scientific Drilling Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAN27 NME)
Site: Skelly Unit #637
Well: Skelly Unit #637
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Site Skelly Unit #637
TVD Reference: Ground Elev. @ 3870.00ft (Basic #38)
MD Reference: Ground Elev. @ 3870.00ft (Basic #38)
North Reference: Grid
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 Skelly Unit #637

Site Position: Northing: 667,791.90 ft Latitude: 32° 50' 5.841 N
From: Map Easting: 644,976.00 ft Longitude: 103° 51' 40.809 W
Position Uncertainty: 0.00 ft Slot Radius: 0" Grid Convergence: 0.26 °

Well Skelly Unit #637

Well Position +N/-S 0.00 ft Northing: 667,791.90 ft Latitude: 32° 50' 5.841 N
+E/-W 0.00 ft Easting: 644,976.00 ft Longitude: 103° 51' 40.809 W
Position Uncertainty 0.00 ft Wellhead Elevation: ft Ground Level: 3,870.00 ft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2009/11/28	7.94	60.76	49,134

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	296.89

Survey Program Date 2009/11/28

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100.00	1,694.00	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1.0.2
1,854.00	5,106.00	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	0.32	273.52	100.00	0.02	-0.28	0.26	0.32	0.32	0.00
200.00	0.74	248.91	200.00	-0.20	-1.16	0.94	0.47	0.42	-24.61
300.00	1.51	240.47	299.98	-1.08	-2.91	2.11	0.79	0.77	-8.44
400.00	2.40	238.24	399.92	-2.83	-5.84	3.92	0.89	0.89	-2.23
500.00	2.53	237.67	499.82	-5.11	-9.48	6.14	0.13	0.13	-0.57
600.00	2.10	236.99	599.74	-7.29	-12.88	8.19	0.43	-0.43	-0.68
700.00	2.07	236.95	699.68	-9.28	-15.93	10.01	0.03	-0.03	-0.04
800.00	1.86	236.32	799.62	-11.16	-18.80	11.72	0.21	-0.21	-0.63
900.00	1.54	237.51	899.57	-12.78	-21.28	13.20	0.32	-0.32	1.19



Scientific Drilling
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Skelly Unit #637
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	Ground Elev. @ 3870.00ft (Basic #38)
Site:	Skelly Unit #637	MD Reference:	Ground Elev. @ 3870.00ft (Basic #38)
Well:	Skelly Unit #637	North Reference:	Grid
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	1.34	240.19	999.54	-14.09	-23.43	14.53	0.21	-0.20	2.68
1,100.00	1.15	242.78	1,099.52	-15.13	-25.34	15.76	0.20	-0.19	2.59
1,200.00	0.86	249.07	1,199.50	-15.85	-26.93	16.85	0.31	-0.29	6.29
1,300.00	0.27	322.51	1,299.50	-15.93	-27.77	17.56	0.82	-0.59	73.44
1,400.00	0.40	355.16	1,399.50	-15.40	-27.95	17.96	0.23	0.13	32.65
1,500.00	0.55	29.25	1,499.49	-14.63	-27.74	18.12	0.31	0.15	34.09
1,600.00	0.71	47.60	1,599.49	-13.80	-27.05	17.88	0.26	0.16	18.35
1,694.00	0.77	37.64	1,693.48	-12.90	-26.23	17.56	0.15	0.06	-10.60
Gyro Tie-In									
1,854.00	0.80	36.66	1,853.46	-11.16	-24.91	17.17	0.02	0.02	-0.61
1,917.00	1.73	350.15	1,916.45	-9.87	-24.81	17.67	2.09	1.48	-73.83
1,980.00	2.72	332.79	1,979.40	-7.60	-25.66	19.45	1.88	1.57	-27.56
2,044.00	4.04	321.45	2,043.29	-4.49	-27.76	22.73	2.30	2.06	-17.72
2,107.00	5.01	320.75	2,106.09	-0.62	-30.88	27.26	1.54	1.54	-1.11
2,171.00	5.54	307.91	2,169.82	3.44	-35.08	32.85	2.02	0.83	-20.06
2,234.00	6.63	299.27	2,232.47	7.09	-40.66	39.47	2.26	1.73	-13.71
2,298.00	7.03	291.57	2,296.02	10.34	-47.52	47.06	1.56	0.63	-12.03
2,393.00	6.42	287.70	2,390.36	14.09	-57.99	58.09	0.80	-0.64	-4.07
2,518.00	6.42	300.00	2,514.58	19.71	-70.70	71.97	1.10	0.00	9.84
2,615.00	5.80	295.79	2,611.03	24.55	-79.81	82.28	0.79	-0.64	-4.34
2,710.00	6.60	293.15	2,705.48	28.79	-89.15	92.53	0.89	0.84	-2.78
2,805.00	7.02	304.94	2,799.81	34.26	-98.93	103.73	1.53	0.44	12.41
2,932.00	6.33	304.31	2,925.95	42.65	-111.08	118.35	0.55	-0.54	-0.50
3,059.00	7.48	309.40	3,052.03	51.84	-123.25	133.37	1.02	0.91	4.01
3,122.00	7.13	309.63	3,114.52	56.94	-129.43	141.18	0.56	-0.56	0.37
3,249.00	6.51	307.91	3,240.62	66.39	-141.18	155.94	0.51	-0.49	-1.35
3,376.00	6.32	306.08	3,366.82	74.93	-152.51	169.91	0.22	-0.15	-1.44
3,503.00	7.83	305.01	3,492.85	84.01	-165.24	185.37	1.19	1.19	-0.84
3,630.00	6.68	297.46	3,618.83	92.38	-178.88	201.32	1.17	-0.91	-5.94
3,756.00	7.46	299.30	3,743.88	99.76	-192.52	216.82	0.64	0.62	1.46
3,883.00	7.56	290.51	3,869.79	106.72	-207.53	233.36	0.91	0.08	-6.92
4,010.00	7.56	290.42	3,995.69	112.57	-223.19	249.97	0.01	0.00	-0.07
4,137.00	6.95	294.38	4,121.67	118.65	-238.02	265.95	0.62	-0.48	3.12
4,264.00	7.30	290.51	4,247.69	124.65	-252.57	281.64	0.47	0.28	-3.05
4,391.00	6.33	307.83	4,373.80	131.77	-265.66	296.54	1.78	-0.76	13.64
4,517.00	6.07	310.29	4,499.07	140.34	-276.23	309.84	0.29	-0.21	1.95
4,644.00	7.65	301.06	4,625.16	149.05	-288.59	324.80	1.51	1.24	-7.27
4,676.00	7.74	301.06	4,656.87	151.26	-292.26	329.07	0.28	0.28	0.00
4,739.00	6.77	295.79	4,719.37	155.06	-299.24	337.02	1.87	-1.54	-8.37
4,803.00	5.45	288.84	4,783.00	157.68	-305.51	343.80	2.36	-2.06	-10.86
4,866.00	4.48	282.23	4,845.77	159.17	-310.75	349.14	1.79	-1.54	-10.49
4,930.00	3.08	285.77	4,909.62	160.17	-314.85	353.25	2.22	-2.19	5.53
4,993.00	2.20	298.16	4,972.56	161.20	-317.54	356.12	1.66	-1.40	19.67



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Survey Report



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Site:	Skelly Unit #637	MD Reference:	Ground Elev. @ 3870.00ft (Basic #38)
Well:	Skelly Unit #637	North Reference:	Grid
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)
5,056.00	0.79	302.82	5,035.53	162.01	-318.97	357.76	2.24	-2.24	7.40
MWD Survey									
5,106.00	0.79	302.82	5,085.53	162.38	-319.55	358.44	0.00	0.00	0.00
Projection to Bit									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,694.00	1,693.48	-12.90	-26.23	Gyro Tie-in
5,056.00	5,035.53	162.01	-318.97	MWD Survey
5,106.00	5,085.53	162.38	-319.55	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____



Scientific Drilling for COG Operating LLC
Site: Eddy County, NM (NAN27 NME)
Well: Skelly Unit #637
Wellbore: OH
Design: Plan #2 vs Actual - 7-7/8" Hole

