

COG Operating LLC

Eddy County, NM (NAN27 NME)

Skelly Unit #996

Skelly Unit #996

OH

Design: Actual

Standard Survey Report

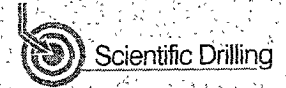
14 September, 2009



Scientific Drilling



Scientific Drilling
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAN27 NME)
Site: Skelly Unit #996
Well: Skelly Unit #996
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Site Skelly Unit #996
TVD Reference: Ground Elev @ 3883.00ft (Rig ?)
MD Reference: Ground Elev. @ 3883.00ft (Rig ?)
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)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Skelly Unit #996		
Site Position:		Northing:	668,132.30 ft
From:	Map	Easting:	646,989.80 ft
Position Uncertainty:	0.00 ft	Slot Radius:	0.00 ft
		Latitude:	32° 50' 9.120 N
		Longitude:	103° 51' 17.189 W
		Grid Convergence:	0.26 °

Well	Skelly Unit #996		
Well Position	+N-S	0.00 ft	Northing:
	+E-W	0.00 ft	Easting:
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	32° 50' 9.120 N
		Longitude:	103° 51' 17.189 W
		Ground Level:	3,883.00 ft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF200510	2009/09/14	(°)
			7.96
			Dip Angle
			(°)
			60.76
			Field Strength
			(nT)
			49,155

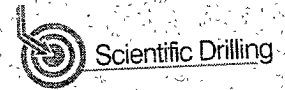
Design	Actual		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			Direction
			(°)
			324.66

Survey Program	Date: 2009/09/14		
From	To	Survey (Wellbore)	Tool Name
(ft)	(ft)		
100.00	1,780.00	Keeper gyro survey (OH)	Keeper
1,868.00	6,728.00	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	(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	0.39	171.80	100.00	-0.34	0.05	-0.30	0.39	0.39	0.00
	200.00	0.07	168.81	200.00	-0.73	0.11	-0.66	0.32	-0.32	-2.99
	300.00	0.43	223.78	300.00	-1.06	-0.14	-0.79	0.39	0.36	54.97
	400.00	0.32	194.65	400.00	-1.61	-0.47	-1.04	0.22	-0.11	-29.13
	500.00	0.27	179.90	499.99	-2.11	-0.54	-1.41	0.09	-0.05	-14.75
	600.00	0.47	194.06	599.99	-2.74	-0.64	-1.87	0.22	0.20	14.16
	700.00	0.50	185.75	699.99	-3.58	-0.78	-2.47	0.08	0.03	-8.31
	800.00	0.81	209.55	799.98	-4.63	-1.17	-3.09	0.41	0.31	23.80
	900.00	0.81	230.85	899.97	-5.69	-2.07	-3.44	0.30	0.00	21.30



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Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Site Skelly Unit #996
Ground Elev @ 3883.00ft (Rig ?)
Ground Elev @ 3883.00ft (Rig ?)
Gnd
Minimum Curvature
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	0.99	245.03	999.96	-6.50	-3.40	-3.33	0.29	0.18	14.18
	1,100.00	0.60	256.76	1,099.95	-6.98	-4.70	-2.98	0.42	-0.39	11.73
	1,200.00	0.24	286.09	1,199.95	-7.04	-5.41	-2.62	0.41	-0.36	29.33
	1,300.00	0.63	46.47	1,299.95	-6.61	-5.21	-2.38	0.78	0.39	120.38
	1,400.00	0.93	51.39	1,399.94	-5.72	-4.18	-2.25	0.31	0.30	4.92
	1,500.00	1.15	54.30	1,499.92	-4.63	-2.73	-2.20	0.23	0.22	2.91
	1,600.00	1.28	56.43	1,599.90	-3.43	-0.98	-2.23	0.14	0.13	2.13
	1,700.00	1.21	65.32	1,699.87	-2.37	0.91	-2.46	0.21	-0.07	8.89
	1,780.00	1.46	54.96	1,779.85	-1.43	2.51	-2.62	0.43	0.31	-12.95
	1,868.00	1.46	52.16	1,867.82	-0.10	4.31	-2.58	0.08	0.00	-3.18
	1,931.00	1.41	9.01	1,930.81	1.16	5.07	-1.99	1.68	-0.08	-68.49
	1,994.00	2.06	348.76	1,993.78	3.03	4.97	-0.40	1.40	1.03	-32.14
	2,056.00	3.23	335.53	2,055.71	5.72	4.03	2.33	2.12	1.89	-21.34
	2,116.00	3.21	331.87	2,115.62	8.74	2.54	5.66	0.34	-0.03	-6.10
	2,182.00	4.26	334.12	2,181.47	12.57	0.60	9.91	1.61	1.59	3.41
	2,245.00	4.91	327.24	2,244.27	16.94	-1.88	14.91	1.35	1.03	-10.92
	2,307.00	6.12	329.50	2,305.98	22.02	-5.00	20.86	1.98	1.95	3.65
	2,370.00	6.97	333.09	2,368.57	28.33	-8.43	27.98	1.50	1.35	5.70
	2,434.00	7.38	327.40	2,432.07	35.25	-12.40	35.93	1.28	0.64	-8.89
	2,496.00	8.56	323.47	2,493.47	42.31	-17.30	44.52	2.10	1.90	-6.34
	2,558.00	9.39	325.65	2,554.71	50.20	-22.90	54.19	1.45	1.34	3.52
	2,621.00	9.86	320.89	2,616.83	58.63	-29.20	64.71	1.47	0.75	-7.56
	2,691.00	9.29	321.77	2,685.85	67.72	-36.48	76.34	0.84	-0.81	1.26
	2,784.00	9.70	319.80	2,777.58	79.60	-46.18	91.64	0.56	0.44	-2.12
	2,878.00	8.05	321.42	2,870.45	90.79	-55.40	106.10	1.78	-1.76	1.72
	2,940.00	9.03	323.59	2,931.76	98.10	-60.99	115.30	1.66	1.58	3.50
	3,003.00	9.91	326.45	2,993.90	106.60	-66.92	125.66	1.58	1.40	4.54
	3,065.00	9.34	325.40	3,055.03	115.19	-72.73	136.03	0.96	-0.92	-1.69
	3,128.00	10.28	327.47	3,117.11	124.13	-78.65	146.75	1.59	1.49	3.29
	3,190.00	9.53	325.58	3,178.18	133.03	-84.53	157.41	1.32	-1.21	-3.05
	3,284.00	10.32	324.91	3,270.78	146.34	-93.77	173.61	0.85	0.84	-0.71
	3,347.00	10.17	326.43	3,332.77	155.59	-100.09	184.82	0.49	-0.24	2.41
	3,410.00	10.50	325.82	3,394.75	164.98	-106.39	196.11	0.55	0.52	-0.97
	3,503.00	9.89	323.67	3,486.28	178.42	-115.88	212.57	0.77	-0.66	-2.31
	3,566.00	9.77	325.49	3,548.36	187.18	-122.11	223.33	0.53	-0.19	2.89
	3,628.00	9.77	321.55	3,609.46	195.64	-128.37	233.84	1.08	0.00	-6.35
	3,722.00	8.91	323.28	3,702.21	207.72	-137.68	249.08	0.96	-0.91	1.84
	3,784.00	10.13	324.16	3,763.36	215.99	-143.74	259.33	1.98	1.97	1.42
	3,878.00	10.33	322.40	3,855.86	229.37	-153.72	276.02	0.39	0.21	-1.87
	3,972.00	9.72	324.80	3,948.43	242.53	-163.44	292.38	0.79	-0.65	2.55
	4,066.00	9.83	321.33	4,041.06	255.28	-173.03	308.32	0.64	0.12	-3.69
	4,160.00	9.51	321.62	4,133.73	267.63	-182.86	324.09	0.34	-0.34	0.31
	4,253.00	9.29	324.41	4,225.48	279.76	-192.00	339.27	0.54	-0.24	3.00



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Survey Report



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Design: Actual

Local Co-ordinate Reference: Site Skelly Unit #996
TVD Reference: Ground Elev @ 3883.00ft (Rig ?)
MD Reference: Ground Elev @ 3883.00ft (Rig ?)
North Reference: Grd
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)
4,348.00	9.06	320.73	4,319.26	291.78	-201.20	354.40	0.66	-0.24	-3.87
4,441.00	9.98	321.91	4,410.98	303.80	-210.81	369.75	1.01	0.99	1.27
4,535.00	9.88	325.35	4,503.58	316.84	-220.42	385.95	0.64	-0.11	3.66
4,629.00	9.40	324.77	4,596.25	329.74	-229.43	401.69	0.52	-0.51	-0.62
4,723.00	9.64	323.13	4,688.95	342.31	-238.58	417.24	0.39	0.26	-1.74
4,817.00	9.38	326.59	4,781.66	355.00	-247.52	432.76	0.67	-0.28	3.68
4,880.00	9.12	323.48	4,843.84	363.30	-253.32	442.88	0.89	-0.41	-4.94
4,942.00	8.18	326.29	4,905.14	370.92	-258.69	452.20	1.66	-1.52	4.53
5,005.00	7.68	322.18	4,967.54	377.97	-263.76	460.89	1.20	-0.79	-6.52
5,067.00	7.60	323.21	5,028.99	384.53	-268.75	469.13	0.26	-0.13	1.66
5,130.00	6.36	326.26	5,091.52	390.77	-273.19	476.78	2.05	-1.97	4.84
5,193.00	5.02	321.33	5,154.21	395.82	-276.85	483.02	2.26	-2.13	-7.83
5,256.00	3.87	327.37	5,217.02	399.76	-279.72	487.90	1.97	-1.83	-9.59
5,318.00	3.01	321.88	5,278.90	402.81	-281.85	491.61	1.48	-1.39	-8.85
5,381.00	3.74	321.99	5,341.79	405.73	-284.14	495.32	1.16	1.16	0.17
5,443.00	4.05	323.84	5,403.65	409.09	-286.67	499.53	0.54	0.50	2.98
5,539.00	3.90	331.13	5,499.42	414.68	-290.25	506.16	0.55	-0.16	7.59
5,636.00	3.71	326.85	5,596.21	420.20	-293.56	512.57	0.35	-0.20	-4.41
5,724.00	3.58	328.67	5,684.03	424.93	-296.55	518.16	0.20	-0.15	2.07
5,787.00	3.30	330.21	5,746.92	428.18	-298.47	521.93	0.47	-0.44	2.44
5,850.00	3.45	335.47	5,809.81	431.48	-300.16	525.59	0.55	0.24	8.35
5,917.00	4.48	324.67	5,876.65	435.45	-302.51	530.19	1.89	1.54	-16.12
6,006.00	5.30	323.27	5,965.32	441.58	-306.98	537.78	0.93	-0.92	-1.57
6,074.00	3.81	313.52	6,033.11	445.65	-310.49	543.13	2.46	-2.19	-14.34
6,132.00	3.63	311.08	6,090.98	448.19	-313.27	546.81	0.41	-0.31	-4.21
6,194.00	3.99	318.97	6,152.85	451.10	-316.17	550.86	1.02	0.58	12.73
6,289.00	4.27	312.61	6,247.60	455.99	-320.94	557.61	0.56	0.29	-6.69
6,383.00	3.98	313.57	6,341.36	460.61	-325.88	564.23	0.32	-0.31	1.02
6,489.00	3.97	316.89	6,447.10	465.82	-331.05	571.48	0.22	-0.01	3.13
6,572.00	3.45	314.05	6,529.93	469.66	-334.81	576.78	0.66	-0.63	-3.42
6,687.00	3.28	320.25	6,644.73	474.59	-339.40	583.46	0.35	-0.15	5.39
MWD Survey									
6,728.00	3.28	320.25	6,685.66	476.40	-340.90	585.80	0.00	0.00	0.00
Projection to Bit									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
6,687.00	6,644.73	474.59	-339.40	MWD Survey
6,728.00	6,685.66	476.40	-340.90	Projection to Bit



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Survey Report



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Local Co-ordinate Reference:
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Site Skelly Unit #996
Ground Elev. @ 3883.00ft (Rig ?)
Ground Elev. @ 3883.00ft (Rig ?)
Grid
Minimum Curvature
EDM 5000 1 Single User Db

Checked By: _____

Approved By: _____

Date: _____