



COG Operating LLC

Eddy County, NM (NAN27 NME)

Electra Federal #61

Electra Federal #61

30.015-37441

OH

Design: Actual

Standard Survey Report

02 July, 2010



Scientific Drilling
Directional Drilling Operations



Scientific Drilling
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAN27 NME)
Site: Electra Federal #61
Well: Electra Federal #61
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Site Electra Federal #61
TVD Reference: RKB Elev (12') @ 3742.00usft (Silver Oak #5)
MD Reference: RKB Elev (12') @ 3742.00usft (Silver Oak #5)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM-Julio

Project	Eddy County, NM (NAN27 NME)	System Datum:	Mean Sea Level
Map System:	US State Plane 1927 (Exact solution)		
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Electra Federal #61				
Site Position:		Northing:	674,600.50 usft	Latitude:	32° 51' 14.383 N
From:	Map	Easting:	615,536.30 usft	Longitude:	103° 57' 25.566 W
Position Uncertainty:	0.00 usft	Slot Radius:	0 "	Grid Convergence:	0.20 °

Well	Electra Federal #61					
Well Position	+N/-S	0.00 usft	Northing:	674,600.50 usft	Latitude:	32° 51' 14.383 N
	+E/-W	0.00 usft	Easting:	615,536.30 usft	Longitude:	103° 57' 25.566 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,730.00 usft

Wellbore	OH					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)	
	IGRF200510	2010/06/26	7.92	60.75	49,080	

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	121.30	

Survey Program	Date	2010/07/02				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description		
100.00	1,320.00	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1.0.2		
1,399.00	6,180.00	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	0.36	276.01	100.00	0.03	-0.31	-0.28	0.36	0.36	0.00	
200.00	0.33	24.38	200.00	0.33	-0.51	-0.60	0.56	-0.03	108.37	
300.00	1.12	20.18	299.99	1.51	-0.05	-0.83	0.79	0.79	-4.20	
400.00	1.12	14.20	399.97	3.37	0.53	-1.30	0.12	0.00	-5.98	
500.00	1.20	12.72	499.95	5.34	1.00	-1.92	0.09	0.08	-1.48	
600.00	0.94	13.91	599.93	7.16	1.42	-2.50	0.26	-0.26	1.19	
700.00	0.92	11.97	699.92	8.74	1.79	-3.01	0.04	-0.02	-1.94	
800.00	0.85	12.98	799.91	10.25	2.12	-3.51	0.07	-0.07	1.01	
900.00	0.93	23.58	899.90	11.72	2.61	-3.85	0.18	0.08	10.60	



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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)
1,000.00	1.25	48.34	999.88	13.18	3.75	-3.64	0.56	0.32	24.76
1,100.00	1.70	64.38	1,099.84	14.55	5.90	-2.51	0.61	0.45	16.04
1,200.00	1.94	65.30	1,199.79	15.90	8.78	-0.76	0.24	0.24	0.92
1,300.00	1.80	66.94	1,299.74	17.22	11.76	1.10	0.15	-0.14	1.64
1,320.00	1.82	67.76	1,319.73	17.46	12.35	1.48	0.16	0.10	4.10
Gyro tie-in									
1,399.00	1.65	59.04	1,398.69	18.52	14.48	2.75	0.40	-0.22	-11.04
1,463.00	1.93	92.46	1,462.67	18.95	16.35	4.12	1.66	0.44	52.22
1,533.00	3.47	116.49	1,532.59	17.96	19.42	7.27	2.68	2.20	34.33
1,597.00	4.56	122.01	1,596.43	15.74	23.31	11.74	1.81	1.70	8.63
1,661.00	6.16	123.09	1,660.15	12.52	28.35	17.72	2.50	2.50	1.69
1,724.00	7.10	125.58	1,722.73	8.41	34.35	24.98	1.56	-1.49	3.95
1,852.00	8.52	121.59	1,849.54	-1.16	48.86	42.35	1.19	1.11	-3.12
1,980.00	7.40	119.67	1,976.30	-10.21	64.10	60.07	0.90	-0.88	-1.50
2,107.00	6.94	118.29	2,102.31	-17.89	77.96	75.91	0.39	-0.36	-1.09
2,235.00	6.96	126.36	2,229.37	-26.16	91.02	91.36	0.76	0.02	6.30
2,362.00	7.43	123.90	2,355.37	-35.30	104.03	107.23	0.44	0.37	-1.94
2,489.00	7.63	127.87	2,481.28	-45.05	117.50	123.80	0.44	0.16	3.13
2,617.00	7.54	126.87	2,608.16	-55.31	130.93	140.60	0.12	-0.07	-0.78
2,744.00	8.21	128.12	2,733.96	-65.91	144.73	157.90	0.54	0.53	0.98
2,872.00	7.64	125.39	2,860.74	-76.47	158.85	175.46	0.53	-0.45	-2.13
3,031.00	7.86	124.20	3,018.28	-88.71	176.46	196.86	0.17	0.14	-0.75
3,191.00	7.04	124.67	3,176.93	-100.43	193.57	217.58	0.51	-0.51	0.29
3,318.00	8.05	123.84	3,302.83	-109.81	207.36	234.23	0.80	0.80	-0.65
3,446.00	7.76	123.85	3,429.61	-119.62	221.98	251.82	0.23	-0.23	0.01
3,573.00	8.42	129.10	3,555.35	-130.26	236.32	269.60	0.78	0.52	4.13
3,733.00	8.02	128.37	3,713.71	-144.57	254.16	292.28	0.26	-0.25	-0.46
3,892.00	7.99	128.15	3,871.16	-158.29	271.55	314.26	0.03	-0.02	-0.14
4,051.00	7.83	127.53	4,028.64	-171.71	288.83	336.00	0.11	-0.10	-0.39
4,115.00	6.38	129.41	4,092.15	-176.62	295.03	343.85	2.29	-2.27	2.94
4,178.00	4.55	127.01	4,154.86	-180.35	299.73	349.80	2.93	-2.90	-3.81
4,274.00	3.20	131.11	4,250.64	-184.40	304.79	356.23	1.43	-1.41	4.27
4,401.00	3.50	127.72	4,377.42	-189.11	310.53	363.58	0.28	0.24	-2.67
4,465.00	2.54	128.18	4,441.33	-191.18	313.19	366.93	1.50	-1.50	0.72
4,529.00	0.78	138.48	4,505.30	-192.38	314.59	368.75	2.78	-2.75	16.09
4,593.00	0.35	265.05	4,569.30	-192.72	314.69	369.01	1.61	-0.67	197.77
4,656.00	0.56	260.49	4,632.30	-192.79	314.19	368.62	0.34	0.33	-7.24
4,847.00	0.67	245.47	4,823.29	-193.41	312.25	367.29	0.10	0.06	-7.86
5,038.00	0.51	229.93	5,014.28	-194.42	310.59	366.39	0.12	-0.08	-8.14
5,230.00	0.37	257.44	5,206.27	-195.11	309.33	365.67	0.13	-0.07	14.33
5,389.00	0.21	7.17	5,365.27	-194.93	308.86	365.18	0.30	-0.10	69.01
5,581.00	0.22	81.46	5,557.27	-194.52	309.27	365.32	0.14	0.01	38.69
5,769.00	0.58	35.62	5,745.27	-193.70	310.18	365.67	0.24	0.19	-24.38



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5,963.00	0.38	4.13	5,939.26	-192.26	310.80	365.45	0.17	-0.10	-16.23
6,120.00	0.41	56.70	6,096.26	-191.43	311.31	365.45	0.22	0.02	33.48
Last MWD Survey									
6,180.00	0.41	56.70	6,156.26	-191.19	311.67	365.64	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)	
1,320.00	1,319.73	17.46	12.35	Gyro tie-in
6,120.00	6,096.26	-191.43	311.31	Last MWD Survey
6,180.00	6,156.26	-191.19	311.67	Projection to Bit

Checked By: _____

Approved By: _____

Date: _____