

30-015-39270



COG Operating LLC

Eddy County, NM (NAN27 NME)

Folk Federal #19

Folk Federal #19

OH

Design: Actual

Standard Survey Report

04 November, 2011



Scientific Drilling
Directional Drilling Operations



Scientific Drilling
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Folk: Federal #19
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (18') @ 3636 00usft (SO #4)
Site:	Folk Federal #19	MD Reference:	KB Elev (18') @ 3636 00usft (SO #4)
Well:	Folk Federal #19	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Julio

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:	Folk Federal #19		
Site Position:		Northing:	669,347 80 usft
From:	Map	Easting:	572,410 60 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 50' 23 642 N
		Longitude:	104° 5' 51 262 W
		Grid Convergence:	0 13 °

Well:	Folk Federal #19					
Well Position	+N/-S	0 00 usft	Northing:	669,347 80 usft	Latitude:	32° 50' 23 642 N
	+E/-W	0 00 usft	Easting:	572,410 60 usft	Longitude:	104° 5' 51 262 W
Position Uncertainty		0 00 usft	Wellhead Elevation:	usft	Ground Level:	3,618 00 usft

Wellbore:	OH		
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Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	2011/04/25	7 89	60 67	48,941

Design:	Actual		
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Audit Notes:			
Version:	1 0	Phase:	ACTUAL
		Tie On Depth:	0 00

Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0 00	0.00	0 00	357 85

Survey Program		Date	2011/11/04	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 00	794 00	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1 0 2
794 00	4,780 00	MWD Survey (OH)	MWD	MWD - Standard

Survey	Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate
	(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)
	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
North HL-FF #19	0 07	0 00	325 43	0 07	0 00	0 00	0 00	0 00	0 00	0 00
East HL-FF #19	100.00	0 03	325 43	100 00	0 02	-0 01	0 02	0 03	0 03	0 00
	200 00	0 48	345 41	200 00	0 45	-0 14	0 45	0 45	0 45	19 98
	300 00	0 42	354.78	300 00	1.22	-0 27	1 23	0 09	-0 06	9 37
	400 00	0 71	348 47	399 99	2 19	-0 43	2.21	0 30	0 29	-6 31
	500 00	1 04	28 06	499.98	3 60	-0 13	3 60	0 67	0 33	39 59



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Survey Report



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Site:	Folk Federal #19	MD Reference:	KB Elev (18') @ 3636.00usft (SO #4)
Well:	Folk Federal #19	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Julio

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)
600.00	1.14	24.47	599.96	5.31	0.71	5.27	0.12	0.10	-3.59
700.00	1.15	53.01	699.94	6.81	1.92	6.74	0.56	0.01	28.54
794.00	1.25	65.96	793.92	7.80	3.61	7.66	0.31	0.11	13.78
Gyro Tie-in									
908.00	0.88	64.14	907.90	8.69	5.54	8.47	0.33	-0.32	-1.60
971.00	1.63	63.54	970.89	9.30	6.78	9.04	1.19	1.19	-0.95
1,035.00	1.89	28.12	1,034.86	10.63	8.09	10.32	1.72	0.41	-55.34
1,099.00	3.12	13.74	1,098.80	13.26	9.00	12.91	2.14	1.92	-22.47
1,162.00	4.00	5.07	1,161.67	17.11	9.60	16.74	1.63	1.40	-13.76
1,226.00	4.61	0.49	1,225.49	21.91	9.82	21.52	1.09	0.95	-7.16
1,290.00	5.30	354.84	1,289.25	27.42	9.58	27.04	1.32	1.08	-8.83
1,353.00	6.17	356.21	1,351.94	33.70	9.09	33.33	1.40	1.38	2.17
1,449.00	5.60	356.53	1,447.43	43.52	8.47	43.17	0.59	-0.59	0.33
1,545.00	6.33	354.03	1,542.91	53.46	7.63	53.14	0.81	0.76	-2.60
1,640.00	5.74	352.45	1,637.39	63.38	6.46	63.09	0.65	-0.62	-1.66
1,736.00	6.52	350.51	1,732.84	73.51	4.93	73.28	0.84	0.81	-2.02
1,831.00	5.83	349.22	1,827.28	83.57	3.14	83.40	0.74	-0.73	-1.36
1,927.00	6.33	345.88	1,922.74	93.50	0.94	93.40	0.64	0.52	-3.48
2,022.00	5.75	344.65	2,017.22	103.16	-1.60	103.15	0.63	-0.61	-1.29
2,118.00	6.17	345.89	2,112.70	112.81	-4.13	112.88	0.46	0.44	1.29
2,214.00	6.68	350.92	2,208.09	123.32	-6.27	123.47	0.79	0.53	5.24
2,309.00	6.59	355.81	2,302.46	134.22	-7.54	134.40	0.60	-0.09	5.15
2,405.00	6.35	352.68	2,397.85	144.98	-8.62	145.20	0.44	-0.25	-3.26
2,501.00	6.32	351.91	2,493.26	155.47	-10.04	155.74	0.09	-0.03	-0.80
2,596.00	6.34	354.59	2,587.68	165.87	-11.27	166.18	0.31	0.02	2.82
2,692.00	6.43	353.81	2,683.09	176.49	-12.35	176.83	0.13	0.09	-0.81
2,787.00	6.43	355.55	2,777.49	187.08	-13.33	187.45	0.21	0.00	1.83
2,883.00	6.44	357.44	2,872.89	197.82	-13.99	198.21	0.22	0.01	1.97
2,978.00	6.24	356.87	2,967.30	208.30	-14.51	208.70	0.22	-0.21	-0.60
3,105.00	6.29	358.13	3,093.55	222.14	-15.12	222.56	0.12	0.04	0.99
3,201.00	6.25	356.39	3,188.97	232.62	-15.62	233.04	0.20	-0.04	-1.81
3,297.00	6.44	359.24	3,284.38	243.21	-16.02	243.64	0.38	0.20	2.97
3,392.00	5.32	359.32	3,378.88	252.95	-16.14	253.37	1.18	-1.18	0.08
3,488.00	4.44	0.63	3,474.53	261.11	-16.15	261.53	0.92	-0.92	1.36
3,583.00	3.47	357.41	3,569.31	267.66	-16.24	268.08	1.05	-1.02	-3.39
3,679.00	2.55	1.79	3,665.17	272.70	-16.31	273.12	0.99	-0.96	4.56
3,774.00	1.89	4.78	3,760.10	276.37	-16.11	276.78	0.71	-0.69	3.15
3,863.99	1.02	26.05	3,850.06	278.57	-15.63	278.96	1.12	-0.97	23.64
TG1-FF #19									
3,870.00	0.97	28.76	3,856.07	278.66	-15.59	279.05	1.12	-0.81	45.02
3,965.00	0.27	11.36	3,951.07	279.59	-15.15	279.96	0.75	-0.74	-18.32
4,061.00	0.51	1.41	4,047.06	280.23	-15.10	280.60	0.26	0.25	-10.36
4,156.00	0.60	11.65	4,142.06	281.14	-14.99	281.51	0.14	0.09	10.78
4,252.00	0.41	353.06	4,238.05	281.98	-14.93	282.34	0.26	-0.20	-19.36



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Well:	Folk Federal #19	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Julio

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)
4,347.00	0.76	343.33	4,333.05	282.92	-15.15	283.29	0.38	0.37	-10.24
4,443.00	0.71	337.40	4,429.04	284.08	-15.56	284.46	0.09	-0.05	-6.18
4,538.00	0.90	331.52	4,524.03	285.28	-16.14	285.68	0.22	0.20	-6.19
4,634.00	0.08	330.69	4,620.03	286.00	-16.54	286.42	0.85	-0.85	-0.86
4,730.00	0.32	349.13	4,716.03	286.32	-16.62	286.74	0.26	0.25	19.21
Last MWD Survey									
4,780.00	0.32	349.13	4,766.03	286.59	-16.67	287.02	0.00	0.00	0.00
Projection to Bit - PBHL-FF #19									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
794.00	793.92	7.80	3.61	Gyro Tie-in
4,730.00	4,716.03	286.32	-16.62	Last MWD Survey
4,780.00	4,766.03	286.59	-16.67	Projection to Bit

Checked By	Approved By:	Date:
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