



COG OPERATING LLC

Eddy County, NM (NAN27 NME)

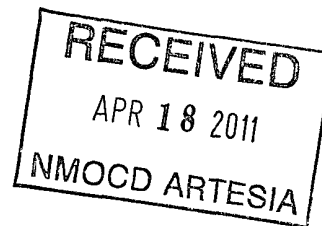
Folk Federal #26

Folk Federal #26

DH - Job #32D0211163

30-015-38175

Survey: MWD Survey



SDI Standard Survey Report

21 March, 2011

This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 22nd of March, 2011.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling
Directional Drilling Operations



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Folk Federal #26
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (12') @ 3665.0usft (Silver Oak #4)
Site:	Folk Federal #26	MD Reference:	KB Elev (12') @ 3665.0usft (Silver Oak #4)
Well:	Folk Federal #26	North Reference:	Grid
Wellbore:	DH - Job #32D0211163	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

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 #26		
Site Position:		Northing:	667,376.90 usft
From:	Map	Easting:	570,885.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 4.173 N
		Longitude:	104° 6' 9.192 W
		Grid Convergence:	0.13 °

Well	Folk Federal #26		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 50' 4.173 N
		Longitude:	104° 6' 9.192 W
		Ground Level:	3,653.0 usft

Wellbore	DH - Job #32D0211163		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF200510	2/21/2011	7.90
			Dip Angle
			(°)
			60.69
			Field Strength
			(nT)
			48,989

Design	Actual		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			31.18

Survey Program	Date 3/21/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	825.0	Gyro Survey (DH - Job #32D0211163)	Keeper
964.0	4,172.0	MWD Survey (DH - Job #32D0211163)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey							
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
100.0	0.77	218.40	100.0	-0.5	-0.4	218.40	0.7
200.0	1.06	193.22	200.0	-2.0	-1.0	208.17	2.2
300.0	0.86	149.39	300.0	-3.5	-0.9	194.05	3.6
400.0	0.94	145.62	400.0	-4.8	0.0	180.36	4.8
500.0	1.15	116.36	499.9	-5.9	1.3	167.37	6.1
600.0	1.08	102.74	599.9	-6.6	3.2	154.48	7.3
700.0	1.36	99.55	699.9	-7.0	5.2	143.20	8.7
800.0	1.36	98.90	799.9	-7.4	7.6	134.24	10.6
825.0	1.42	99.12	824.9	-7.5	8.2	132.43	11.1



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Site:	Folk Federal #26	MD Reference:	KB Elev (12') @ 3665.0usft (Silver Oak #4)
Well:	Folk Federal #26	North Reference:	Grid
Wellbore:	DH - Job #32D0211163	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

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 #26		
Site Position:		Northing:	667,376.90 usft
From:	Map	Easting:	570,885.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 4.173 N
		Longitude:	104° 6' 9.192 W
		Grid Convergence:	0.13 °

Well	Folk Federal #26		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 50' 4.173 N
		Longitude:	104° 6' 9.192 W
		Ground Level:	3,653.0 usft

Wellbore	DH - Job #32D0211163		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF200510	2/21/2011	7.90
			Dip Angle
			(°)
			60.69
			Field Strength
			(nT)
			48,989

Design	Actual		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			31.18

Survey Program	Date 3/21/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	825.0	Gyro Survey (DH - Job #32D0211163)	Keeper
964.0	4,172.0	MWD Survey (DH - Job #32D0211163)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey			
Measured Depth	Inclination	Azimuth	True Vertical
(usft)	(°)	(°)	Depth
825.0	1.42	99.12	824.9
			North/South
			(usft)
			East/West
			(usft)
			Closure Azimuth
			(°)
			Closure Distance
			(usft)
			11.1
Gyro tie-in			
964.0	1.00	94.85	963.8
1,060.0	1.96	76.49	1,059.8
1,155.0	3.22	55.11	1,154.7
1,251.0	4.67	39.90	1,250.5
1,346.0	5.59	30.38	1,345.1
1,442.0	6.86	28.01	1,440.5
1,537.0	8.91	28.36	1,534.6
1,633.0	8.54	29.08	1,629.5
1,729.0	7.49	29.17	1,724.6
			50.9
			51.6
			45.36
			72.5



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Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (12') @ 3665.0usft (Silver Oak #4)
Site:	Folk Federal #26	MD Reference:	KB Elev (12') @ 3665.0usft (Silver Oak #4)
Well:	Folk Federal #26	North Reference:	Grid
Wellbore:	DH - Job #32D0211163	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,824.0	7.81	25.32	1,818.7	62.1	57.3	42.69	84.6	
1,920.0	9.16	26.22	1,913.7	74.9	63.5	40.29	98.2	
2,016.0	8.13	25.51	2,008.6	87.9	69.8	38.46	112.2	
2,111.0	9.90	23.99	2,102.4	101.4	76.0	36.86	126.7	
2,207.0	10.00	24.23	2,197.0	116.5	82.8	35.39	143.0	
2,302.0	9.86	23.18	2,290.5	131.5	89.4	34.19	159.0	
2,398.0	9.01	22.01	2,385.2	146.1	95.4	33.16	174.5	
2,493.0	9.65	31.84	2,479.0	159.7	102.4	32.67	189.7	
2,589.0	9.27	31.54	2,573.7	173.2	110.7	32.59	205.5	
2,684.0	9.18	31.68	2,667.5	186.1	118.7	32.52	220.8	
2,779.0	8.93	31.22	2,761.3	198.9	126.5	32.46	235.7	
2,874.0	8.81	31.93	2,855.1	211.4	134.2	32.41	250.3	
2,970.0	8.30	30.71	2,950.1	223.6	141.6	32.35	264.6	
3,066.0	10.41	28.03	3,044.8	237.2	149.2	32.17	280.2	
3,161.0	10.23	26.46	3,138.3	252.3	157.0	31.89	297.2	
3,257.0	10.05	27.49	3,232.8	267.4	164.7	31.63	314.0	
3,352.0	9.97	25.25	3,326.3	282.2	172.0	31.37	330.4	
3,448.0	8.11	27.44	3,421.1	295.7	178.7	31.14	345.5	
3,543.0	7.04	27.78	3,515.3	306.8	184.5	31.02	358.0	
3,639.0	7.25	28.03	3,610.5	317.3	190.1	30.92	369.9	
3,734.0	5.57	30.41	3,704.9	326.6	195.2	30.87	380.5	
3,830.0	4.08	27.92	3,800.6	333.6	199.2	30.83	388.6	
3,926.0	1.64	56.93	3,896.5	337.4	201.9	30.90	393.2	
3,989.0	1.24	73.94	3,959.5	338.1	203.3	31.02	394.5	
4,085.0	0.68	283.23	4,055.4	338.5	203.8	31.05	395.1	
Last MWD Survey								
4,172.0	0.68	283.23	4,142.4	338.7	202.8	30.90	394.8	
Projection to Bit								

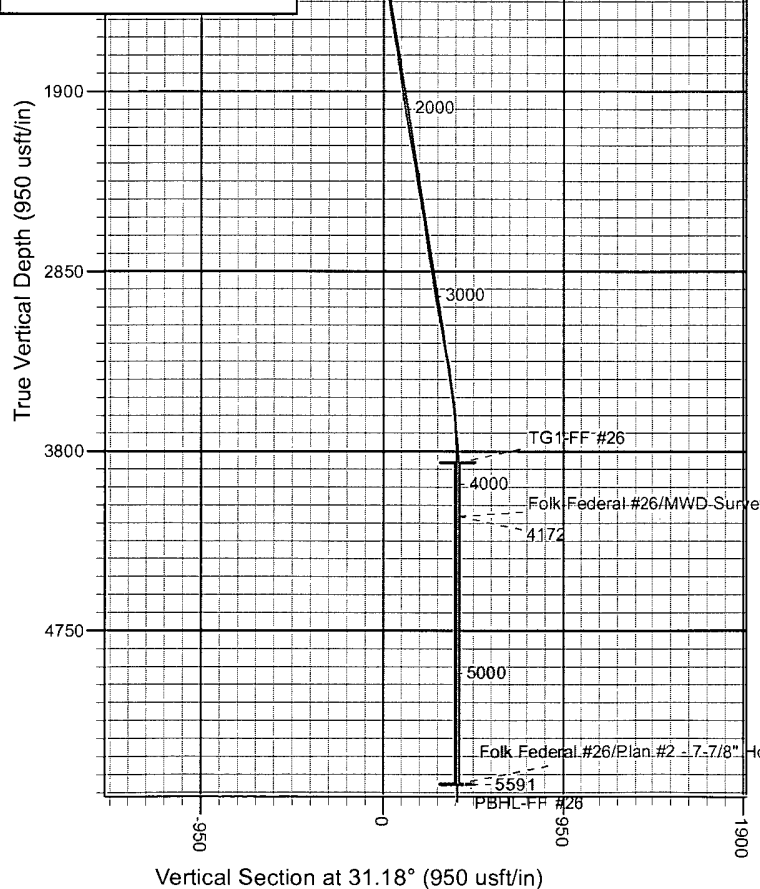
Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
825.0	824.9	-7.5	8.2	Gyro tie-in
4,085.0	4,055.4	338.5	203.8	Last MWD Survey
4,172.0	4,142.4	338.7	202.8	Projection to Bit



Project: Eddy County, NM (NAN27 NME)
 Site: Folk Federal #26
 Well: Folk Federal #26
 Wellbore: DH - Job #32D0211163
 Design: Plan #2 - 7-7/8" Hole

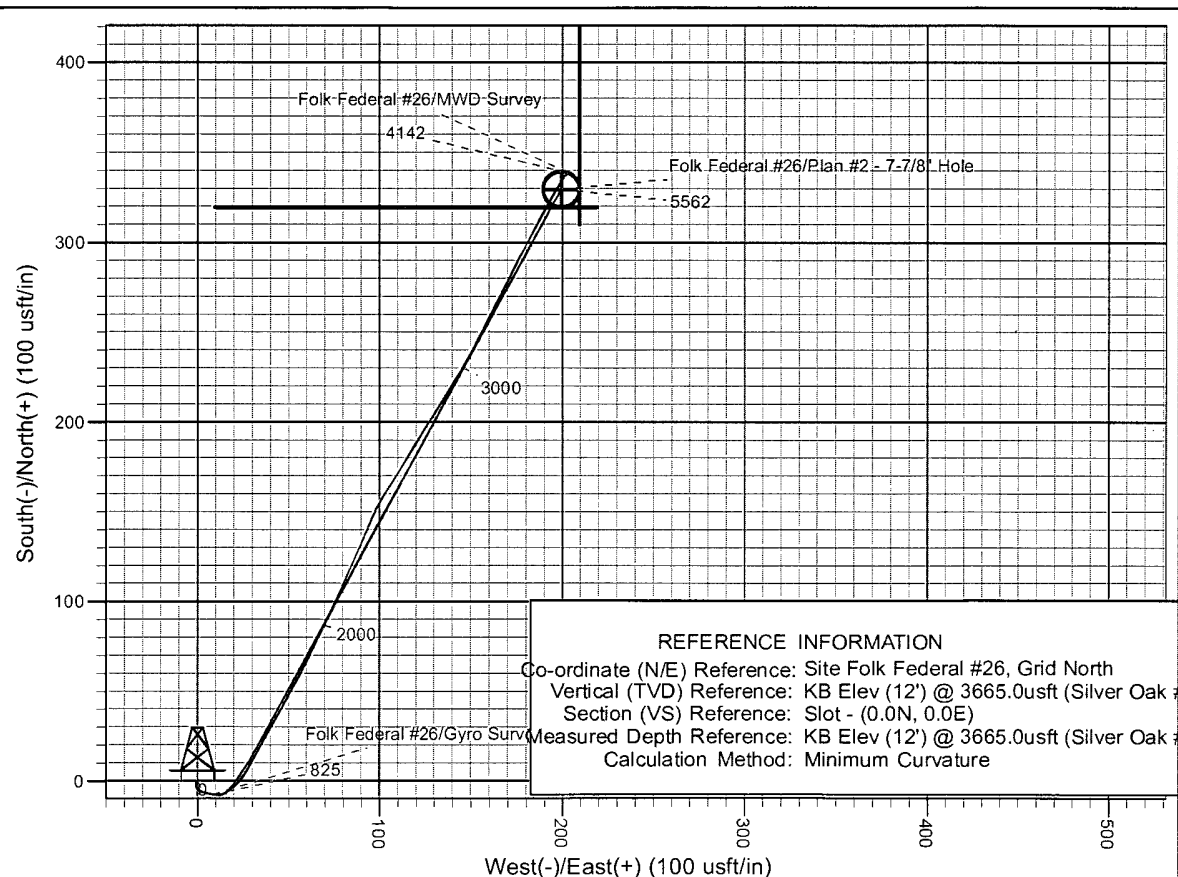


T G M
 Azimuths to Grid North
 True North: -0.12°
 Magnetic North: 7.78°
 Magnetic Field
 Strength: 48989.2snT
 Dip Angle: 60.69°
 Date: 2/21/2011
 Model: IGRF200510



WELL DETAILS: Folk Federal #26
 KB Elev (12') @ 3665.0usft (Silver Oak #4)
 Ground Level: 3653.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	667376.90	570885.20	32° 50' 4.173 N	104° 6' 9.192 W	



REFERENCE INFORMATION
 Co-ordinate (N/E) Reference: Site Folk Federal #26, Grid North
 Vertical (TVD) Reference: KB Elev (12') @ 3665.0usft (Silver Oak #4)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: KB Elev (12') @ 3665.0usft (Silver Oak #4)
 Calculation Method: Minimum Curvature

COMPANY DETAILS: COG OPERATING LLC
 223032

Calculation Method: Minimum Curvature
 Error System: ISCWSA
 Scan Method: Closest Approach 3D
 Error Surface: Elliptical Conic
 Warning Method: Error Ratio

PROJECT DETAILS: Eddy County, NM (NAN27 NME)
 Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

SITE DETAILS: Folk Federal #26
 Site Centre Latitude: 32° 50' 4.173 N
 Longitude: 104° 6' 9.192 W
 Positional Uncertainty: 0.0
 Convergence: 0.13
 Local North: Grid