



COG OPERATING LLC

Eddy County, NM (NAN27 NME)

Beech Federal #5

Beech Federal #5

OH - Job #32D11111124

Survey: MWD Survey

SDI Standard Survey Report

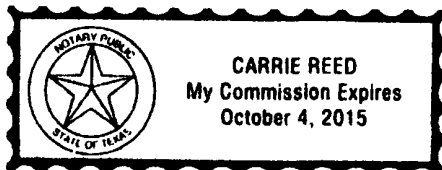
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 12th of December, 2011.

[Signature]

Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Beech Federal #5
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (13') @ 3590 0usft (Cavaloz #1)
Site:	Beech Federal #5	MD Reference:	KB Elev (13') @ 3590 0usft (Cavaloz #1)
Well:	Beech Federal #5	North Reference:	Grid
Wellbore:	OH - Job #32D11111124	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	Beech Federal #5		
Site Position:	From: Map	Northing:	655,719 80 usft
		Easting:	531,796 40 usft
		Latitude:	32° 48' 9 433 N
		Longitude:	104° 13' 47 464 W
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Grid Convergence:	0 06 °

Well	Beech Federal #5		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
			Latitude:
			Longitude:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
			Ground Level:

Wellbore	OH - Job #32D11111124		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	11/17/2011	7 88
			Dip Angle
			(°)
			60 60
			Field Strength
			(nT)
			48,847

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
			(°)
			241 41

Survey Program	Date 12/27/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		Description
100 0	965 0	Gyro Survey (OH - Job #32D11111124)	Keeper
1,096 0	3,408 0	MWD Survey (OH - Job #32D11111124)	MWD
			Standard Wireline Keeper ver 1 0 2
			MWD - Standard

Survey			
Measured Depth	Inclination	Azimuth	True Vertical
(usft)	(°)	(°)	Depth
0 0	0 00	0 00	0 0
100 0	0 32	310 05	100 0
200 0	0 47	336 30	200 0
300 0	0 57	331 43	300 0
400 0	0 67	334 58	400 0
500 0	0 43	346 83	500 0
600 0	0 56	334 43	600 0
700 0	0 33	293 71	700 0
800 0	0 41	248 28	800 0
900 0	0 30	213 00	900 0
965 0	0 34	204 98	965 0
			North/South
			(usft)
			0 0
			0 2
			0 7
			1 5
			2 5
			3 4
			4 2
			4 8
			4 8
			4 4
			4 1
			East/West
			(usft)
			0 0
			-0 2
			-0 6
			-1 0
			-1 5
			-1 8
			-2 1
			-2 6
			-3 2
			-3 7
			-3 8
			Closure Azimuth
			(°)
			0 00
			310 05
			321 13
			327 25
			329 43
			331 87
			333 32
			331 48
			326 15
			320 23
			316 78
			Closure Distance
			(usft)
			0 0
			0 3
			0 9
			1 8
			2 9
			3 9
			4 7
			5 4
			5 7
			5 7
			5 6



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Wellbore:	OH - Job #32D1111124	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Eddy County, NM (NAN27 NME)		
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Site	Beech Federal #5				
Site Position:		Northing:	655,719 80 usft	Latitude:	32° 48' 9 433 N
From:	Map	Easting:	531,796 40 usft	Longitude:	104° 13' 47 464 W
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0 06 °

Well	Beech Federal #5				
Well Position	+N/-S	0 0 usft	Northing:	655,719 80 usft	Latitude: 32° 48' 9 433 N
	+E/-W	0 0 usft	Easting:	531,796 40 usft	Longitude: 104° 13' 47 464 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level: 3,577 0 usft

Wellbore	OH - Job #32D1111124				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/17/2011	7 88	60 60	48,847

Design	Actual				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0 0	0 0	0 0	241 41	

Survey Program	Date	12/27/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100 0	965 0	Gyro Survey (OH - Job #32D1111124)	Keeper	Standard Wireline Keeper ver 1 0 2	
1,096 0	3,408 0	MWD Survey (OH - Job #32D1111124)	MWD	MWD - Standard	

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
965 0	0 34	204 98	965 0	4 1	-3 8	316 78	5 6
Gyro Tie-in							
1,096 0	0 66	211 23	1,096 0	3 1	-4 4	305 08	5 4
1,189 0	0 94	254 74	1,189 0	2 4	-5 4	294 17	5 9
1,283 0	1 61	261 12	1,282 9	2 0	-7 5	285 16	7 7
1,377 0	2 95	249 23	1,376 9	1 0	-11 0	274 97	11 1
1,472 0	4 33	245 49	1,471 7	-1 4	-16 6	265 18	16 6
1,566 0	5 96	243 42	1,565 3	-5 1	-24 2	258 19	24 7
1,660 0	7 03	244 84	1,658 7	-9 7	-33 7	253 99	35 1
1,753 0	8 25	242 35	1,750 9	-15 2	-44 8	251 26	47 3
1,847 0	9 63	241 92	1,843 7	-22 0	-57 7	249 11	61 8



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Wellbore:	OH - Job #32D11111124	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)
1,940.0	9.99	241.52	1,935.3	-29.5	-71.7	247.60	77.5
2,035.0	10.16	241.11	2,028.9	-37.5	-86.2	246.49	94.0
2,129.0	10.35	238.64	2,121.4	-45.9	-100.7	245.49	110.7
2,223.0	10.63	238.65	2,213.8	-54.8	-115.3	244.58	127.7
2,318.0	11.17	236.81	2,307.1	-64.4	-130.5	243.73	145.5
2,419.0	10.48	237.99	2,406.3	-74.6	-146.5	243.00	164.4
2,513.0	8.91	238.71	2,499.0	-83.0	-160.0	242.59	180.2
2,607.0	8.87	239.28	2,591.8	-90.4	-172.4	242.32	194.7
2,701.0	9.01	241.03	2,684.7	-97.7	-185.1	242.17	209.3
2,796.0	7.66	240.39	2,778.7	-104.4	-197.1	242.08	223.0
2,890.0	7.13	245.00	2,871.9	-110.0	-207.8	242.11	235.1
2,985.0	6.20	240.98	2,966.3	-115.0	-217.7	242.15	246.2
3,080.0	4.43	239.79	3,060.8	-119.3	-225.3	242.10	255.0
3,174.0	2.93	244.66	3,154.6	-122.2	-230.6	242.09	261.0
3,269.0	1.00	261.82	3,249.6	-123.3	-233.6	242.17	264.2
3,363.0	0.39	149.64	3,343.6	-123.7	-234.3	242.16	264.9
Last MWD Survey							
3,408.0	0.39	149.64	3,388.6	-124.0	-234.1	242.10	264.9
Projection to Bit							

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
965.0	965.0	4.1	-3.8	Gyro Tie-in
3,363.0	3,343.6	-123.7	-234.3	Last MWD Survey
3,408.0	3,388.6	-124.0	-234.1	Projection to Bit