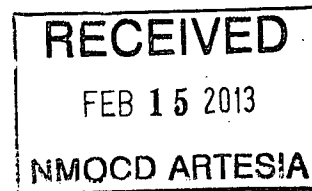


15- 39152



COG Operating LLC

Eddy County, NM (NAD27 NME)

Grave Digger State Com

#4H

OH - Job #32H11121414

Design: OH

SDI Standard Survey Report

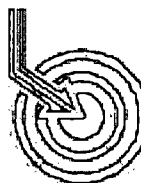
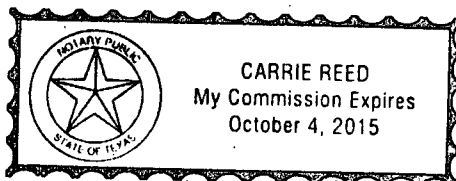
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 5th of December, 2012.

[Signature]

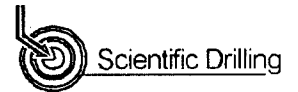
Notary Signature
County of Midland
State of Texas



Scientific Drilling



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3451.00usft (JW #4)
Site:	Grave Digger State Com	MD Reference:	RF @ 3451.00usft (JW #4)
Well:	#4H	North Reference:	Grid
Wellbore:	OH - Job #32H11121414	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Project	Eddy County, NM (NAD27 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	Grave Digger State Com		
Site Position:		Northing:	585,274.50 usft
From:	Map	Easting:	463,340.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 36' 32.284 N
		Longitude:	104° 27' 8.584 W
		Grid Convergence:	-0.06 °

Well	#4H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 36' 31.458 N
		Longitude:	104° 26' 51.404 W
		Ground Level:	3,438.00 usft

Wellbore	OH - Job #32H11121414		
Magnetics	Model Name	Sample Date	Declination
			(°)
	BGGM2012	11/21/12	
			Dip Angle
			(°)
			Field Strength
			(nT)

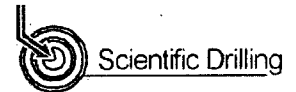
Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			180.14

Survey Program	Date 11/27/12		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	2,256.00	Gyro (OH - Job #32H11121414)	Keeper
2,344.00	7,207.00	MWD (OH - Job #32H11121414)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey			
Measured Depth	Inclination	Azimuth	True Vertical
(usft)	(°)	(°)	Depth
0.00	0.00	0.00	0.00
100.00	1.51	19.50	99.99
200.00	1.79	16.69	199.95
300.00	1.45	29.60	299.91
400.00	1.12	40.86	399.88
500.00	1.14	68.30	499.86
600.00	1.05	73.96	599.85
700.00	0.89	91.61	699.83
800.00	0.64	94.04	799.82
900.00	0.58	98.94	899.82
1,000.00	0.72	117.10	999.81
			North/South
			(usft)
			0.00
			1.24
			3.98
			6.58
			8.42
			9.52
			10.14
			10.37
			10.31
			10.20
			12.14
			East/West
			(usft)
			0.00
			0.44
			1.33
			2.40
			3.67
			5.23
			7.03
			8.69
			10.02
			11.08
			51.00
			Closure Azimuth
			(°)
			0.00
			19.50
			18.45
			20.06
			23.54
			28.78
			34.74
			39.95
			44.19
			47.39
			15.06
			15.62
			Closure Distance
			(usft)



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3451.00usft (JW #4)
Site:	Grave Digger State Com	MD Reference:	RF @ 3451.00usft (JW #4)
Well:	#4H	North Reference:	Grid
Wellbore:	OH - Job #32H11121414	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,100.00	1.23	109.07	1,099.80	9.19	13.72	56.16	16.51
1,200.00	1.57	121.29	1,199.77	8.13	15.90	62.91	17.86
1,300.00	2.04	118.60	1,299.72	6.57	18.63	70.58	19.76
1,400.00	2.24	120.38	1,399.65	4.73	21.88	77.81	22.39
1,500.00	2.29	116.97	1,499.57	2.83	25.35	83.62	25.51
1,600.00	2.53	123.07	1,599.48	0.72	28.98	88.57	28.99
1,700.00	2.60	123.77	1,699.38	-1.74	32.71	93.05	32.76
1,800.00	2.98	123.37	1,799.26	-4.43	36.77	96.87	37.04
1,900.00	3.23	127.27	1,899.11	-7.57	41.18	100.41	41.87
2,000.00	3.10	127.60	1,998.96	-10.92	45.57	103.48	46.86
2,100.00	2.64	127.71	2,098.84	-13.98	49.53	105.76	51.47
2,200.00	2.52	130.07	2,198.73	-16.81	53.04	107.58	55.63
2,256.00	2.51	125.53	2,254.68	-18.31	54.98	108.42	57.95
2,344.00	3.78	161.29	2,342.55	-22.18	57.47	111.10	61.61
2,375.00	6.77	170.34	2,373.42	-24.95	58.11	113.24	63.24
2,407.00	9.50	181.15	2,405.10	-29.45	58.37	116.77	65.38
2,438.00	12.66	184.58	2,435.51	-35.40	58.05	121.37	67.99
2,469.00	16.09	183.52	2,465.54	-43.07	57.51	126.83	71.85
2,500.00	19.92	184.44	2,495.02	-52.63	56.84	132.80	77.46
2,531.00	23.21	186.60	2,523.84	-63.96	55.73	138.94	84.84
2,562.00	26.82	188.80	2,551.93	-76.95	53.96	144.96	93.98
2,593.00	29.90	186.69	2,579.21	-91.54	51.99	150.41	105.27
2,624.00	32.98	182.82	2,605.66	-107.64	50.67	154.79	118.97
2,656.00	36.39	179.77	2,631.97	-125.84	50.28	158.22	135.52
2,687.00	40.54	178.78	2,656.24	-145.12	50.53	160.80	153.67
2,718.00	44.41	180.09	2,679.10	-166.05	50.73	163.01	173.62
2,749.00	48.36	182.73	2,700.48	-188.47	50.16	165.10	195.04
2,780.00	52.55	184.71	2,720.21	-212.32	48.60	167.11	217.81
2,811.00	56.86	185.93	2,738.12	-237.51	46.25	168.98	241.97
2,843.00	60.95	186.63	2,754.64	-264.74	43.25	170.72	268.25
2,874.00	65.40	186.92	2,768.63	-292.20	39.98	172.21	294.92
2,905.00	69.82	186.69	2,780.43	-320.66	36.59	173.49	322.74
2,936.00	73.86	185.54	2,790.09	-349.94	33.45	174.54	351.53
2,967.00	77.73	186.34	2,797.70	-379.82	30.34	175.43	381.03
2,998.00	81.25	185.54	2,803.35	-410.13	27.19	176.21	411.03
3,030.00	84.59	183.70	2,807.30	-441.78	24.63	176.81	442.47
3,061.00	86.79	180.89	2,809.63	-472.66	23.40	177.17	473.24
3,092.00	87.93	180.09	2,811.06	-503.63	23.13	177.37	504.16
3,186.00	90.54	182.95	2,812.31	-597.57	20.64	178.02	597.92
3,280.00	89.80	184.18	2,812.03	-691.38	14.79	178.77	691.54
3,373.00	88.02	184.14	2,813.80	-784.12	8.05	179.41	784.16
3,467.00	89.43	182.12	2,815.89	-877.95	2.92	179.81	877.95
3,561.00	90.13	181.29	2,816.25	-971.90	0.12	179.99	971.90
3,654.00	89.78	179.57	2,816.33	-1,064.90	-0.58	180.03	1,064.90



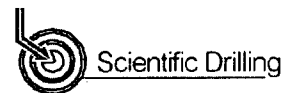
Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3451.00usft (JW #4)
Site:	Grave Digger State Com	MD Reference:	RF @ 3451.00usft (JW #4)
Well:	#4H	North Reference:	Grid
Wellbore:	OH - Job #32H11121414	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
3,748.00	89.46	179.19	2,816.95	-1,158.89	0.44	179.98	1,158.89
3,842.00	89.16	180.59	2,818.08	-1,252.88	0.62	179.97	1,252.88
3,935.00	87.85	180.53	2,820.51	-1,345.84	-0.29	180.01	1,345.84
4,029.00	89.08	180.53	2,823.03	-1,439.80	-1.16	180.05	1,439.80
4,123.00	88.29	181.68	2,825.18	-1,533.76	-2.97	180.11	1,533.76
4,216.00	88.55	181.27	2,827.75	-1,626.69	-5.36	180.19	1,626.70
4,310.00	88.99	181.15	2,829.77	-1,720.65	-7.35	180.24	1,720.66
4,404.00	88.72	181.15	2,831.64	-1,814.61	-9.23	180.29	1,814.63
4,497.00	88.46	179.39	2,833.93	-1,907.58	-9.67	180.29	1,907.60
4,591.00	88.59	178.78	2,836.35	-2,001.53	-8.17	180.23	2,001.55
4,685.00	88.56	177.93	2,838.69	-2,095.47	-5.47	180.15	2,095.47
4,778.00	89.97	178.74	2,839.88	-2,188.42	-2.77	180.07	2,188.42
4,872.00	90.31	178.16	2,839.65	-2,282.38	-0.23	180.01	2,282.38
4,966.00	88.81	179.13	2,840.37	-2,376.35	2.00	179.95	2,376.35
5,059.00	89.60	180.71	2,841.67	-2,469.34	2.13	179.95	2,469.34
5,153.00	90.54	181.02	2,841.55	-2,563.32	0.71	179.98	2,563.32
5,246.00	88.99	180.81	2,841.93	-2,656.31	-0.78	180.02	2,656.31
5,340.00	89.49	180.76	2,843.18	-2,750.29	-2.07	180.04	2,750.29
5,433.00	88.29	180.71	2,844.98	-2,843.26	-3.26	180.07	2,843.27
5,527.00	88.37	180.80	2,847.72	-2,937.22	-4.50	180.09	2,937.22
5,620.00	88.90	181.33	2,849.94	-3,030.17	-6.23	180.12	3,030.18
5,714.00	89.09	181.16	2,851.58	-3,124.14	-8.27	180.15	3,124.15
5,807.00	89.52	180.97	2,852.71	-3,217.11	-10.00	180.18	3,217.13
5,901.00	87.49	181.50	2,855.16	-3,311.05	-12.02	180.21	3,311.07
5,995.00	87.58	181.22	2,859.21	-3,404.94	-14.25	180.24	3,404.97
6,088.00	87.38	180.78	2,863.30	-3,497.84	-15.87	180.26	3,497.87
6,182.00	87.05	180.71	2,867.86	-3,591.72	-17.09	180.27	3,591.76
6,275.00	88.46	180.18	2,871.51	-3,684.64	-17.81	180.28	3,684.68
6,369.00	88.96	178.91	2,873.62	-3,778.61	-17.07	180.26	3,778.65
6,463.00	89.36	178.98	2,875.00	-3,872.58	-15.34	180.23	3,872.61
6,556.00	89.26	178.38	2,876.12	-3,965.55	-13.19	180.19	3,965.57
6,650.00	89.06	177.81	2,877.50	-4,059.49	-10.07	180.14	4,059.50
6,743.00	89.25	177.55	2,878.87	-4,152.40	-6.31	180.09	4,152.41
6,837.00	89.78	177.72	2,879.67	-4,246.32	-2.43	180.03	4,246.32
6,930.00	90.61	179.34	2,879.35	-4,339.28	-0.04	180.00	4,339.28
7,024.00	92.05	179.93	2,877.17	-4,433.25	0.56	179.99	4,433.25
7,086.00	92.52	180.30	2,874.70	-4,495.20	0.43	179.99	4,495.20
7,159.00	92.86	180.93	2,871.27	-4,568.12	-0.35	180.00	4,568.12
Last MWD Survey							
7,207.00	92.86	180.93	2,868.87	-4,616.05	-1.13	180.01	4,616.05
Projection to Bit - PBHL-GDSC #4H							



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3451.00usft (JW #4)
Site:	Grave Digger State Com	MD Reference:	RF @ 3451.00usft (JW #4)
Well:	#4H	North Reference:	Grid
Wellbore:	OH - Job #32H11121414	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,159.00	2,871.27	-4,568.12	-0.35	Last MWD Survey
7,207.00	2,868.87	-4,616.05	-1.13	Projection to Bit



Grave Digger State Com#4H
Eddy County, NM (NAN27 NME)
Northing: (Y) 585189.40
Easting: (X) 464810.20
Plan #4 vs Actual 8-3/4" Hole



Azimuths to Grid North
True North: 0.06°
Magnetic North: 8.01°
Magnetic Field
Strength: 48594.0nT
Dip Angle: 60.31°
Date: 11/21/2012
Model: BGGM2012

To convert a Magnetic Direction to a Grid Direction, Add 8.01°
To convert a True Direction to a Grid Direction, Add 0.06°

WELL DETAILS:									
				Ground Level: 3438.00					
+N/-S	+E/-W	Northing		Easting		Latitude		Longitude	
0.00	0.00	585189.40		464810.20		32° 36' 31.458 N		104° 26' 51.404 W	

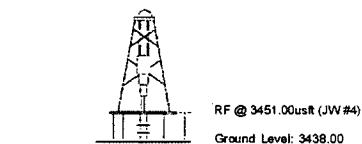
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
2256.00	2.51	125.53	2254.88	-18.31	54.98	0.00	0.00	18.17	
2336.00	2.51	125.53	2334.80	-20.35	57.83	0.00	0.00	20.20	
3078.30	89.00	187.45	2808.50	-494.41	14.00	11.83	61.98	494.38	
3321.97	89.00	180.14	2812.76	-737.35	-2.11	3.00	-90.08	737.35	
7202.64	89.00	180.14	2880.59	-4617.41	-11.50	0.00	0.00	4617.43	PBHL

DESIGN TARGET DETAILS						
Name	TVD		+N/-S	+E/-W	Northing	Easting
PBHL	2880.59		-4617.41	-11.50	580572.40	464798.70

SITE DETAILS: Grave Digger State Com	
Site Centre Northing: 585274.50	
Easting: 463340.80	
Positional Uncertainty: 0.00	
Convergence: -0.06	
Local North: Grid	

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	

Map System: US State Plane 1927 (Exact solution)	
Datum: NAD 1927 (NADCON CONUS)	
Ellipsoid: Clarke 1866	
Zone Name: New Mexico East 3001	
Local Origin: Well #4H, Grid North	
Latitude: 32° 36' 31.458 N	
Longitude: 104° 26' 51.404 W	
Grid East: 464810.20	
Grid North: 585189.40	
Scale Factor: 1.000	
Geomagnetic Model: BGCM2012	
Sample Date: 21-Nov-12	
Magnetic Declination: 7.94°	
Dip Angle from Horizontal: 60.31°	
Magnetic Field Strength: 48584	
To convert a Magnetic Direction to a Grid Direction, Add 8.01°	
To convert a Magnetic Direction to a True Direction, Add 7.94° East	
To convert a True Direction to a Grid Direction, Add 0.06°	



Julio Pita
8-44, November 27, 2012
Scientific Drilling
2034 Trade Drive
Midland, TX 79703

