



COG OPERATING LLC

Eddy County, NM (NAN27 NME)

Electra Federal #56

Electra Federal #56

OH - Job #32D0311256

SUR: H-10-17s-30e, 2290/N & 825/R
BHL; H-10-17s-30em 2316/N & 378/E
API # 30-025-38181
017

Survey: MWD Survey

SDI Standard Survey Report

17 April, 2011

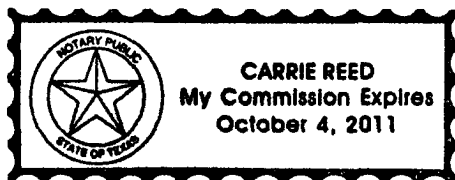
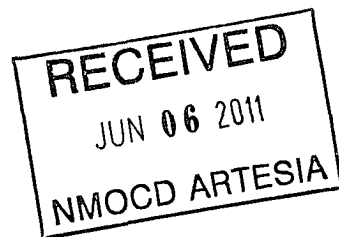
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notarized this date 18th of April, 2011.

Carrie Reed

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 Electra Federal #56
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (14') @ 3744 0usft (United #40)
Site:	Electra Federal #56	MD Reference:	KB Elev (14') @ 3744 0usft (United #40)
Well:	Electra Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D0311256	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	Electra Federal #56		
Site Position:		Northing:	673,099 60 usft
From:	Map	Easting:	616,692 90 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 59 490 N
		Longitude:	103° 57' 12 070 W
		Grid Convergence:	0 21 °

Well	Electra Federal #56		
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' 59 490 N
		Longitude:	103° 57' 12 070 W
		Ground Level:	3,730 0 usft

Wellbore	OH - Job #32D0311256		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	3/21/2011	(°)
			7 84
			Dip Angle
			(°)
			60 71
			Field Strength
			(nT)
			48,972

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
			(°)
			85 99

Survey Program	Date 4/17/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100 0	1,263 0	Gyro Survey (OH - Job #32D0311256)	Keeper
1,373 0	6,183 0	MWD Survey (OH - Job #32D0311256)	MWD
			Description
			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 57	148 63	100 0
200 0	3 09	298 90	200 0
300 0	3 84	300 43	299 8
400 0	3 24	304 65	399 6
500 0	2 66	307 77	499 4
600 0	2 31	314 05	599 4
700 0	1 93	317 81	699 3
800 0	1 55	320 49	799 2
900 0	1 20	322 34	899 2
1,000 0	1 21	341 62	999 2
			North/South
			(usft)
			0 0
			-0 4
			0 5
			-1 8
			-7 1
			6 8
			-12 3
			9 8
			12 6
			15 3
			17 5
			19 4
			-26 8
			East/West
			(usft)
			0 0
			0 3
			283 83
			295 96
			298 77
			300 72
			302 56
			304 35
			305 81
			306 95
			308 42
			Closure Azimuth
			(°)
			0 00
			148 63
			283 83
			295 96
			298 77
			300 72
			302 56
			304 35
			305 81
			306 95
			308 42
			Closure Distance
			(usft)
			0 0
			0 5
			1 9
			7 9
			14 0
			19 1
			23 4
			27 0
			30 0
			32 3
			34 2



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Site:	Electra Federal #56	MD Reference:	KB Elev (14') @ 3744 0usft (United #40)
Well:	Electra Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D0311256	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)
1,100 0	1 02	352 56	1,099 2	23 1	-27 2	310 34	35 7
1,200 0	0 35	339 79	1,199 2	24 3	-27 5	311 51	36 7
1,263 0	0 54	5 75	1,262 2	24 8	-27 5	312 03	37 0



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Well:	Electra Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D0311256	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	Electra Federal #56		
Site Position:		Northing:	673,099 60 usft
From:	Map	Easting:	616,692 90 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 59 490 N
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		Grid Convergence:	0 21 °

Well	Electra Federal #56		
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' 59 490 N
		Longitude:	103° 57' 12 070 W
		Ground Level:	3,730 0 usft

Wellbore	OH - Job #32D0311256				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/21/2011	7 84	60 71	48,972

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	85 99

Survey Program	Date 4/17/2011				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100 0	1,263 0	Gyro Survey (OH - Job #32D0311256)	Keeper	Standard Wireline Keeper ver 1 0 2	
1,373 0	6,183 0	MWD Survey (OH - Job #32D0311256)	MWD	MWD - Standard	

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,263 0	0 54	5 75	1,262 2	24 8	-27 5	312 03	37 0
1,373 0	0 55	30 17	1,372 2	25 8	-27 2	313 46	37 4
1,437 0	0 94	76 17	1,436 2	26 1	-26 5	314 60	37 2
1,500 0	1 64	96 64	1,499 1	26 2	-25 1	316 17	36 3
1,563 0	2 79	93 65	1,562 1	26 0	-22 7	318 85	34 5
1,627 0	3 73	89 33	1,626 0	25 9	-19 1	323 65	32 1
1,690 0	4 73	88 51	1,688 8	26 0	-14 4	330 99	29 7
1,753 0	5 47	85 10	1,751 6	26 3	-8 8	341 46	27 7
1,817 0	6 59	85 50	1,815 2	26 8	-2 1	355 49	26 9
1,880 0	7 42	88 76	1,877 7	27 2	5 6	11 53	27 8
1,944 0	7 93	90 09	1,941 2	27 3	14 1	27 31	30 7



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Well:	Electra Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D0311256	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)
2,007 0	8 46	93 51	2,003.5	27 0	23 1	40 50	35 5
2,070 0	8 11	94 52	2,065 9	26 4	32 1	50 61	41 6
2,134 0	7 51	95 77	2,129 3	25 6	40 8	57 89	48 2
2,197 0	7 35	94 08	2,191 7	24 9	48 9	63 02	54 9
2,261 0	7 61	93 84	2,255 2	24 3	57 2	66 97	62 2
2,324 0	7 80	89 17	2,317 6	24 1	65 7	69 84	69 9
2,388 0	7 52	85 27	2,381 1	24 5	74 2	71 71	78 1
2,483 0	6 65	85 44	2,475 3	25 5	85 8	73 48	89 5
2,578 0	7 05	83 71	2,569 6	26 5	97 1	74 72	100 7
2,673 0	7 59	88 29	2,663 9	27 4	109 2	75 93	112 6
2,768 0	8 65	87 11	2,757 9	27 9	122 6	77 17	125 7
2,863 0	8 35	87 02	2,851 9	28 6	136 6	78 16	139 6
2,958 0	8 35	85 77	2,945 9	29 5	150 4	78 90	153 3
3,053 0	8 15	86 48	3,039 9	30 4	164 0	79 49	166 8
3,148 0	7 81	86 70	3,134 0	31 2	177 2	80 01	179 9
3,243 0	7 73	87 63	3,228 1	31 8	190 0	80 48	192 6
3,339 0	8 14	89 94	3,323 2	32 1	203 2	81 02	205 8
3,434 0	7 86	88 94	3,417 3	32 2	216 5	81 53	218 8
3,536 0	7 56	89 62	3,518 3	32 4	230 1	81 98	232 4
3,631 0	7 12	90 99	3,612 6	32 4	242 3	82 39	244 4
3,725 0	8 23	90 87	3,705 7	32 2	254 8	82 81	256.8
3,821 0	7 74	90 55	3,800 8	32 0	268 2	83 20	270 1
3,916 0	7 79	90 05	3,894 9	31 9	281 0	83 52	282 8
4,011 0	7 74	90 55	3,989 0	31 9	293 8	83 81	295 5
4,106 0	7 51	91 72	4,083 2	31 6	306 4	84 11	308 1
4,201 0	7 48	91 92	4,177 4	31 2	318 8	84 41	320 3
4,265 0	7 43	92 84	4,240 8	30 9	327 1	84 61	328 6
4,328 0	6 92	92 72	4,303 3	30 5	335 0	84 80	336 4
4,392 0	6 43	92 20	4,366 9	30 2	342 4	84 96	343 7
4,455 0	5 79	92 34	4,429 6	29 9	349 1	85 10	350 4
4,518 0	5 47	91 57	4,492 3	29 7	355 3	85 22	356 5
4,582 0	5 00	88 57	4,556 0	29 7	361 1	85 30	362 3
4,645 0	3 97	89 95	4,618 8	29 7	366 0	85 35	367 2
4,709 0	3 82	91 71	4,682 6	29 7	370 4	85 42	371 6
4,804 0	3 71	91 32	4,777 4	29 5	376 6	85 52	377 8
4,899 0	3 71	90 74	4,872 2	29 4	382 8	85 61	383 9
4,988 0	3 53	92 46	4,961 1	29 3	388 4	85 69	389 5
5,083 0	3 55	92 77	5,055 9	29 0	394 2	85 79	395 3
5,178 0	3 53	91 70	5,150 7	28 8	400 1	85 89	401 1
5,273 0	2 69	87 44	5,245 6	28 8	405 3	85 94	406 3
5,368 0	2 85	88 80	5,340 4	28 9	409 8	85 96	410 9
5,464 0	2 89	97 34	5,436 3	28 7	414 6	86 05	415 6
5,559 0	2 75	98 13	5,531 2	28 0	419 3	86 17	420 2
5,662 0	2 71	98 50	5,634 1	27 3	424 1	86 31	425 0



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Well:	Electra Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D0311256	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)
5,749 0	2 77	94 91	5,721 0	26 8	428 2	86 41	429 1
5,844 0	2 85	91 83	5,815 9	26 6	432 9	86 49	433 7
5,939 0	2 55	94 88	5,910 8	26 3	437 4	86 56	438 2
6,035 0	2 32	93 84	6,006 7	26 0	441 4	86 63	442 2
6,139 0	2 28	94 19	6,110 6	25 7	445 6	86 70	446 3
Last MWD Survey							
6,183 0	2 28	94 19	6,154 6	25 6	447 3	86 73	448 1
Projection to Bit							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
	1,262 2			Gyro Tie-in
6,139 0	6,110 6	25 7	445 6	Last MWD Survey
6,183 0	6,154 6	25 6	447 3	Projection to Bit