

WELL NAME AND NUMBER Firecracker State No. 5 30-015-38289
LOCATION Section 14, T17S, R28E, Lot O, 1042 FSL, 2117 FEL, Eddy County
OPERATOR COG Operating LLC
DRILLING CONTRACTOR United Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and had conducted deviation test and obtained the following results:

Degrees @ Depth
.3° @ 96'
1.1° @ 197'
.8° @ 408'
1° @ 630'
.8° @ 817'
.57° @ 956'
.34° @ 1019'
.55° @ 1082'
1.33° @ 1146'
2.00° @ 1209'
2.80° @ 1273'
3.83° @ 1336'
4.01° @ 1470'
3.50° @ 1565'
3.28° @ 1642'
4.58° @ 1769'

Degrees @ Depth
4.68° @ 1864'
4.44° @ 1928'
4.23° @ 2041'
4.70° @ 2231'
4.72° @ 2326'
4.58° @ 2421'
4.64° @ 2516'
4.66° @ 2611'
4.16° @ 2802'
4.23° @ 2833'
4.26° @ 2897'
4.33° @ 2992'
4.26° @ 3087'
4.60° @ 3182'
4.31° @ 3373'
4.55° @ 3436'

Degrees @ Depth
4.08° @ 3499'
3.21° @ 3551'
3.26° @ 3563'
2.74° @ 3626'
1.96° @ 3690'
.90° @ 3785'
.61° @ 3848'
.33° @ 3912'
.58° @ 4007'
.67° @ 4070'
.2° @ 4456'
.5° @ 4900'
1° @ 5377'

Drilling Contractor- UNITED DRILLING, INC.

By: Luisa Noriega
(Luisa Noriega)

Title: Asst. Office Manager

Subscribed and sworn to before me this 27th day of September 2011.

My Commission Expires: 10/8/12

Charles Martin
Notary Public
Charles New Mexico
County State



COG OPERATING LLC

Eddy County, NM (NAN27 NME)

Firecracker State #5

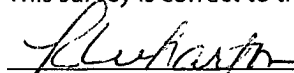
Firecracker State #5

OH - Job #32D0911889

Survey: MWD Survey

SDI Standard Survey Report

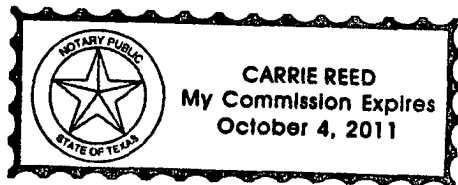
This survey is correct to the best of my knowledge and is supported by actual field data.

_____

Notarized this date 4th of October, 2011.

_____

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 Firecracker State #5
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (14') @ 3641 0usft (UDI #40)
Site:	Firecracker State #5	MD Reference:	KB Elev (14') @ 3641 0usft (UDI #40)
Well:	Firecracker State #5	North Reference:	Grid
Wellbore:	OH - Job #32D0911889	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	Firecracker State #5		
Site Position:		Northing:	665,984.40 usft
From:	Map	Easting:	557,920.50 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 49' 50.648 N
		Longitude:	104° 8' 41.172 W
		Grid Convergence:	0.10 °

Well	Firecracker State #5		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 50.648 N
		Longitude:	104° 8' 41.172 W
		Ground Level:	3,627 0 usft

Wellbore	OH - Job #32D0911889				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/19/2011	7 86	60.64	48,890

Design	Actual			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth:
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0 0	240.37

Survey Program	Date 10/24/2011				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	791 0	Keeper Survey (OH - Job #32D0911889)	Keeper	Standard Wireline Keeper ver 1.0.2	
956.0	4,120 0	MWD Survey (OH - Job #32D0911889)	MWD	MWD - Standard	

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0	
100 0	0.54	48 35	100.0	0 3	0.4	48.35	0 5	
200 0	1 11	41.66	200 0	1.3	1 3	44 96	1 9	
300 0	1 31	37.36	300 0	3.0	2 7	42 00	4 0	
400.0	1 44	47 29	399.9	4 7	4.3	42.21	6.4	
500 0	1 28	60 24	499 9	6 1	6 2	45.21	8.7	
600 0	1 05	57 90	599.9	7.2	7.9	47.84	10.7	
700 0	0 94	55.34	699 9	8.1	9 4	49 07	12 4	
791.0	0.72	56 36	790 9	8.9	10.5	49 71	13 7	



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Site:	Firecracker State #5	MD Reference:	KB Elev (14') @ 3641.0usft (UDI #40)
Well:	Firecracker State #5	North Reference:	Grid
Wellbore:	OH - Job #32D0911889	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		Firecracker State #5			
Site Position:		Northing:	665,984.40 usft	Latitude:	32° 49' 50.648 N
From:	Map	Easting:	557,920.50 usft	Longitude:	104° 8' 41.172 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0 10 °

Well	Firecracker State #5					
Well Position	+N/-S	0 0 usft	Northing:	665,984.40 usft	Latitude:	32° 49' 50.648 N
	+E/-W	0 0 usft	Easting:	557,920.50 usft	Longitude:	104° 8' 41.172 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	3,627.0 usft

Wellbore	OH - Job #32D0911889				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/19/2011	7 86	60 64	48,890

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	240 37

Survey Program	Date 10/24/2011				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	791 0	Keeper Survey (OH - Job #32D0911889)	Keeper	Standard Wireline Keeper ver 1 0.2	
956 0	4,120 0	MWD Survey (OH - Job #32D0911889)	MWD	MWD - Standard	

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
791 0	0 72	56.36	790 9	8.9	10 5	49 71	13 7	
956.0	0 57	91.29	955 9	9.4	12.2	52.19	15.4	
1,019.0	0 34	71 97	1,018.9	9.5	12.7	53.13	15.8	
1,082 0	0 55	275 98	1,081 9	9.6	12.5	52.60	15.8	
1,146 0	1 33	266 92	1,145 8	9 6	11 5	50 19	15 0	
1,209 0	2 00	256.03	1,208 8	9 3	9 7	46.27	13 4	
1,273 0	2 80	251 26	1,272 8	8 5	7 1	39 98	11.1	
1,336 0	3 83	245 97	1,335 7	7.1	3.7	27.67	8.1	
1,399 0	4.31	238 11	1,398 5	5 0	-0 2	357.89	5 0	
1,465.0	4 01	233.59	1,464.3	2.4	-4 1	299 62	4.8	
1,563 0	3 50	234.44	1,562.1	-1.4	-9 3	261.38	9.4	



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Well:	Firecracker State #5	North Reference:	Grid
Wellbore:	OH - Job #32D0911889	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,660.0	3.28	244.23	1,658.9	-4.3	-14.2	253.05	14.9
1,724.0	3.79	243.63	1,722.8	-6.1	-17.8	251.14	18.8
1,787.0	4.58	237.68	1,785.6	-8.3	-21.8	249.03	23.3
1,851.0	4.68	239.15	1,849.4	-11.1	-26.2	247.11	28.4
1,946.0	4.44	239.20	1,944.1	-14.9	-32.7	245.45	35.9
2,041.0	4.23	235.56	2,038.9	-18.8	-38.7	244.11	43.0
2,136.0	4.09	233.20	2,133.6	-22.8	-44.3	242.78	49.8
2,231.0	4.70	242.60	2,228.3	-26.6	-50.5	242.20	57.1
2,326.0	4.72	243.78	2,323.0	-30.1	-57.4	242.32	64.9
2,421.0	4.58	240.48	2,417.7	-33.7	-64.3	242.30	72.6
2,516.0	4.64	241.71	2,512.4	-37.4	-70.9	242.19	80.2
2,611.0	4.66	239.28	2,607.1	-41.2	-77.6	242.04	87.9
2,706.0	4.26	240.27	2,701.8	-44.9	-84.0	241.86	95.3
2,802.0	4.16	234.43	2,797.5	-48.7	-90.0	241.55	102.3
2,897.0	4.26	236.20	2,892.3	-52.7	-95.7	241.16	109.2
2,992.0	4.33	237.07	2,987.0	-56.6	-101.6	240.88	116.3
3,087.0	4.26	235.63	3,081.8	-60.6	-107.6	240.62	123.4
3,182.0	4.60	239.30	3,176.5	-64.5	-113.7	240.45	130.7
3,277.0	4.31	242.04	3,271.2	-68.1	-120.2	240.46	138.1
3,373.0	4.31	240.49	3,366.9	-71.6	-126.5	240.50	145.3
3,436.0	4.55	240.61	3,429.7	-74.0	-130.7	240.50	150.2
3,499.0	4.08	239.31	3,492.5	-76.3	-134.8	240.48	154.9
3,563.0	3.26	232.00	3,556.4	-78.6	-138.2	240.37	159.0
3,626.0	2.74	233.24	3,619.3	-80.6	-140.8	240.21	162.3
3,690.0	1.96	235.37	3,683.3	-82.2	-143.0	240.12	164.9
3,785.0	0.90	226.95	3,778.2	-83.6	-144.9	240.01	167.2
3,848.0	0.61	204.29	3,841.2	-84.2	-145.4	239.91	168.0
3,912.0	0.33	229.54	3,905.2	-84.7	-145.6	239.83	168.5
4,007.0	0.58	232.50	4,000.2	-85.1	-146.2	239.79	169.2
4,070.0	0.67	238.10	4,063.2	-85.5	-146.8	239.77	169.9
Last MWD Survey 4,120.0	0.67	238.10	4,113.2	-85.8	-147.3	239.77	170.5
Projection to Bit							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,070.0	4,063.2	-85.5	-146.8	Last MWD Survey
4,120.0	4,113.2	-85.8	-147.3	Projection to Bit