

30-015-39493



PO Box 1370  
Artesia, NM 88211-1370  
(575) 748-1288

November 26, 2011

COG, LLC  
Fasken Center, Tower II  
550 West Texas Ave, Suite 1300  
Midland, TX 79701

RE: Moncrief State #3  
2310' FSL & 730' FWL  
Sec. 23, T17S, R28E  
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

Very truly yours,

A handwritten signature in black ink, appearing to read "Chris Graham", written over a horizontal line.

Chris Graham  
Drilling Superintendent

State of New Mexico }  
County of Eddy }

*The foregoing was acknowledged before me this 26<sup>th</sup> day of November, 2011.*

A handwritten signature in black ink, appearing to read "Regina L. Garner", written over a horizontal line.  
Notary Public



Moncrief State #3

Date	Depth	Dev/Inc	Dir/AZ
11/15/2011	253	0.80	
11/16/2011	464	0.10	
11/17/2011	885	0.70	196.20
11/17/2011	949	1.10	172.50
11/17/2011	1006	1.00	139.70
11/18/2011	1197	2.80	111.70
11/18/2011	1261	3.60	110.50
11/18/2011	1325	4.40	102.50
11/18/2011	1389	5.20	103.30
11/18/2011	1485	5.40	101.50
11/18/2011	1580	5.30	104.30
11/18/2011	1867	5.50	104.70
11/18/2011	1963	5.80	103.90
11/18/2011	2059	6.00	105.60
11/19/2011	2154	5.60	101.20
11/19/2011	2250	5.60	102.90
11/19/2011	2346	5.60	100.00
11/19/2011	2441	5.30	96.40
11/19/2011	2537	5.40	99.40
11/19/2011	2632	5.30	97.10
11/19/2011	2918	4.90	99.10
11/19/2011	3014	5.10	104.50
11/19/2011	3110	5.10	105.90
11/20/2011	3301	3.40	99.00
11/20/2011	3365	2.90	99.40
11/20/2011	3429	2.40	93.50
11/20/2011	3493	2.00	102.00
11/20/2011	3556	1.30	84.60
11/20/2011	3620	0.80	107.00
11/20/2011	3779	0.40	320.40
11/20/2011	3842	0.20	336.70
11/21/2011	4015	0.30	
11/21/2011	4238	0.40	
11/22/2011	4747	0.60	

# **COG Operating LLC**

**New Mexico**

**Eddy County, New Mexico .**

**Moncrief State #3**

**SL: 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL  
Sec.23-T17S-R28E**

**Survey: Survey #1**

## **Standard Survey Report**

**21 November, 2011**

# Gyrodata Survey Report

<b>Company:</b>	COG Operating LLC	<b>Local Co-ordinate Reference:</b>	Site Eddy County, New Mexico
<b>Project:</b>	New Mexico	<b>TVD Reference:</b>	WELL @ 0.0ft (Original Well Elev)
<b>Site:</b>	Eddy County, New Mexico	<b>MD Reference:</b>	WELL @ 0.0ft (Original Well Elev)
<b>Well:</b>	Moncrief State #3	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	SL 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SL 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E	<b>Database:</b>	EDM 5000.1 Single User Db

<b>Project:</b>	New Mexico		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	New Mexico East 3001		

<b>Site:</b>	Eddy County, New Mexico			
<b>Site Position:</b>	<b>Northing:</b>	661,811.84 ft	<b>Latitude:</b>	32° 49' 9.398 N
<b>From:</b> Lat/Long	<b>Easting:</b>	555,660.44 ft	<b>Longitude:</b>	104° 9' 7.744 W
<b>Position Uncertainty:</b> 0.0 ft	<b>Slot Radius:</b>	0 "	<b>Grid Convergence:</b>	0.10 °

<b>Well:</b>	Moncrief State #3			
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	661,811.84 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	555,660.44 ft
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	ft
			<b>Ground Level:</b>	0.0 ft

<b>Wellbore:</b>	SL 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2011/11/12	7.84	60.65	48,933

<b>Design:</b>	SL 2300'FSL 730'FWL BHL 2260'FSL 940'FWL Sec.23-T17S-R28E			
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<b>Audit Notes:</b>				
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b> 0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	103.39

<b>Survey Program</b>		<b>Date:</b> 2011/11/21		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100.0	3,888.0	Survey #1 (SL 2300'FSL 730'FWL BHL: 2 MWD		MWD

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.19	191.62	100.0	-0.2	0.0	0.0	0.19	0.19	0.00
200.0	0.30	199.70	200.0	-0.6	-0.2	0.0	0.12	0.11	8.08
300.0	0.30	156.95	300.0	-1.1	-0.1	0.1	0.22	0.00	-42.75
400.0	0.68	169.47	400.0	-1.9	0.1	0.5	0.39	0.38	12.52
500.0	0.51	147.19	500.0	-2.8	0.4	1.1	0.28	-0.17	-22.28
600.0	0.30	189.44	600.0	-3.5	0.6	1.4	0.35	-0.21	42.25
700.0	0.58	185.91	700.0	-4.2	0.5	1.5	0.28	0.28	-3.53
800.0	0.43	188.27	800.0	-5.1	0.4	1.6	0.15	-0.15	2.36

# Gyrodata Survey Report

<b>Company:</b>	COG Operating LLC	<b>Local Co-ordinate Reference:</b>	Site Eddy County, New Mexico
<b>Project:</b>	New Mexico	<b>TVD Reference:</b>	WELL @ 0.0ft (Original Well Elev)
<b>Site:</b>	Eddy County, New Mexico	<b>MD Reference:</b>	WELL @ 0.0ft (Original Well Elev)
<b>Well:</b>	Moncref State #3	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	SL 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SL 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E	<b>Database:</b>	EDM 5000.1 Single User Db

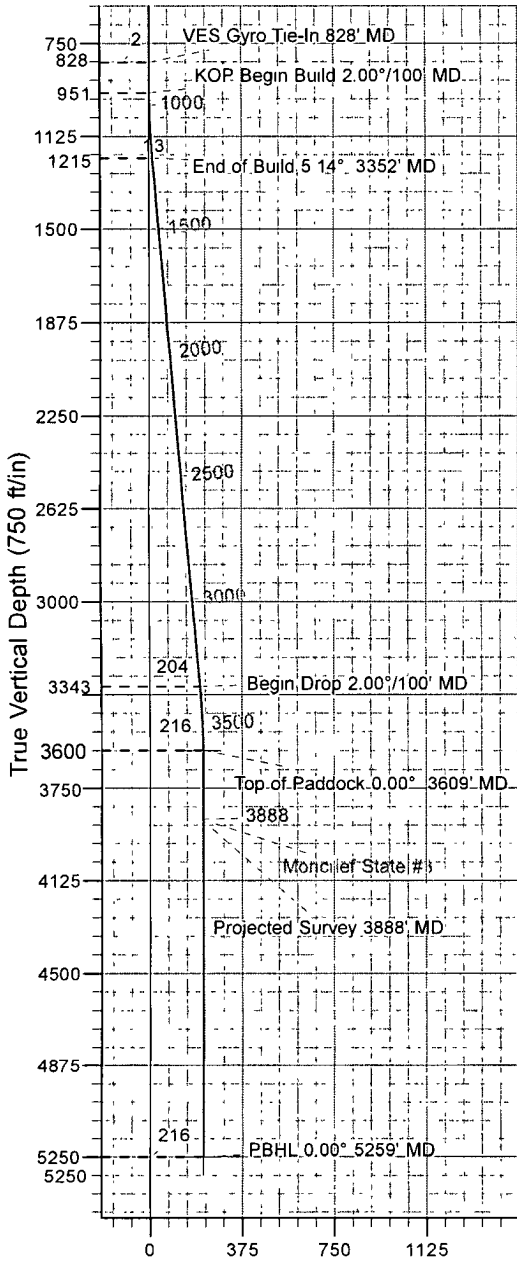
Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (%/100ft)	Build Rate (%/100ft)	Turn Rate (%/100ft)	
828.0	0.37	210.83	828.0	-5.3	0.4	1.6	0.60	-0.21	80.57	
<b>VES Gyro Tie-In 828' MD</b>										
885.0	0.70	196.20	885.0	-5.8	0.2	1.5	0.62	0.58	-25.67	
949.0	1.10	172.50	949.0	-6.8	0.1	1.7	0.84	0.63	-37.03	
1,006.0	1.00	139.70	1,006.0	-7.7	0.5	2.3	1.05	-0.18	-57.54	
1,069.0	1.40	136.40	1,068.9	-8.7	1.4	3.4	0.64	0.63	-5.24	
1,133.0	2.20	112.00	1,132.9	-9.7	3.1	5.3	1.70	1.25	-38.13	
1,197.0	2.80	111.70	1,196.9	-10.7	5.7	8.0	0.94	0.94	-0.47	
1,261.0	3.60	110.50	1,260.8	-12.0	9.0	11.6	1.25	1.25	-1.88	
1,325.0	4.40	102.50	1,324.6	-13.2	13.3	16.0	1.52	1.25	-12.50	
1,389.0	5.20	103.30	1,388.4	-14.4	18.5	21.4	1.25	1.25	1.25	
1,484.0	5.40	101.50	1,483.0	-16.3	27.1	30.1	0.27	0.21	-1.89	
1,580.0	5.30	104.30	1,578.5	-18.3	35.8	39.1	0.29	-0.10	2.92	
1,676.0	5.00	104.10	1,674.2	-20.4	44.2	47.7	0.31	-0.31	-0.21	
1,772.0	5.00	108.30	1,769.8	-22.8	52.2	56.0	0.38	0.00	4.38	
1,867.0	5.50	104.70	1,864.4	-25.2	60.5	64.7	0.63	0.53	-3.79	
1,963.0	5.80	103.90	1,959.9	-27.6	69.7	74.2	0.32	0.31	-0.83	
2,059.0	6.00	105.60	2,055.4	-30.1	79.2	84.0	0.28	0.21	1.77	
2,155.0	5.60	101.20	2,150.9	-32.3	88.7	93.7	0.62	-0.42	-4.58	
2,250.0	5.60	102.90	2,245.5	-34.3	97.7	103.0	0.17	0.00	1.79	
2,346.0	5.60	100.00	2,341.0	-36.1	106.9	112.4	0.29	0.00	-3.02	
2,441.0	5.30	96.40	2,435.6	-37.4	115.8	121.3	0.48	-0.32	-3.79	
2,537.0	5.40	99.40	2,531.2	-38.7	124.7	130.2	0.31	0.10	3.13	
2,632.0	5.30	97.10	2,625.8	-39.9	133.5	139.1	0.25	-0.11	-2.42	
2,728.0	5.80	96.80	2,721.3	-41.0	142.7	148.3	0.52	0.52	-0.31	
2,823.0	5.30	102.30	2,815.9	-42.5	151.7	157.4	0.77	-0.53	5.79	
2,918.0	4.90	99.10	2,910.5	-44.1	160.0	165.9	0.52	-0.42	-3.37	
3,014.0	5.10	104.50	3,006.1	-45.8	168.2	174.2	0.53	0.21	5.63	
3,110.0	5.10	105.90	3,101.7	-48.1	176.4	182.8	0.13	0.00	1.46	
3,174.0	4.80	105.50	3,165.5	-49.6	181.7	188.3	0.47	-0.47	-0.63	
3,237.0	4.00	101.10	3,228.3	-50.7	186.4	193.1	1.38	-1.27	-6.98	
3,301.0	3.40	99.00	3,292.2	-51.4	190.5	197.2	0.96	-0.94	-3.28	
3,365.0	2.90	99.40	3,356.1	-52.0	194.0	200.7	0.78	-0.78	0.63	
3,429.0	2.40	93.50	3,420.0	-52.3	196.9	203.7	0.89	-0.78	-9.22	
3,493.0	2.00	102.00	3,484.0	-52.7	199.3	206.1	0.80	-0.63	13.28	
3,556.0	1.30	84.60	3,546.9	-52.8	201.1	207.9	1.35	-1.11	-27.62	
3,620.0	0.80	107.00	3,610.9	-52.9	202.3	209.0	1.00	-0.78	35.00	
3,683.0	0.10	201.10	3,673.9	-53.1	202.7	209.5	1.29	-1.11	149.37	
3,779.0	0.40	320.40	3,769.9	-52.9	202.4	209.2	0.48	0.31	124.27	
3,842.0	0.20	336.70	3,832.9	-52.6	202.3	208.9	0.34	-0.32	25.87	
3,888.0	0.20	336.70	3,878.9	-52.5	202.2	208.8	0.00	0.00	0.00	
<b>Projected Survey 3888' MD</b>										

# Gyrodata Survey Report

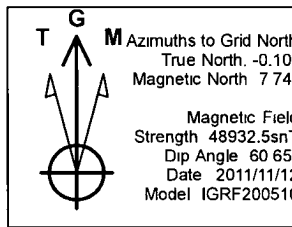
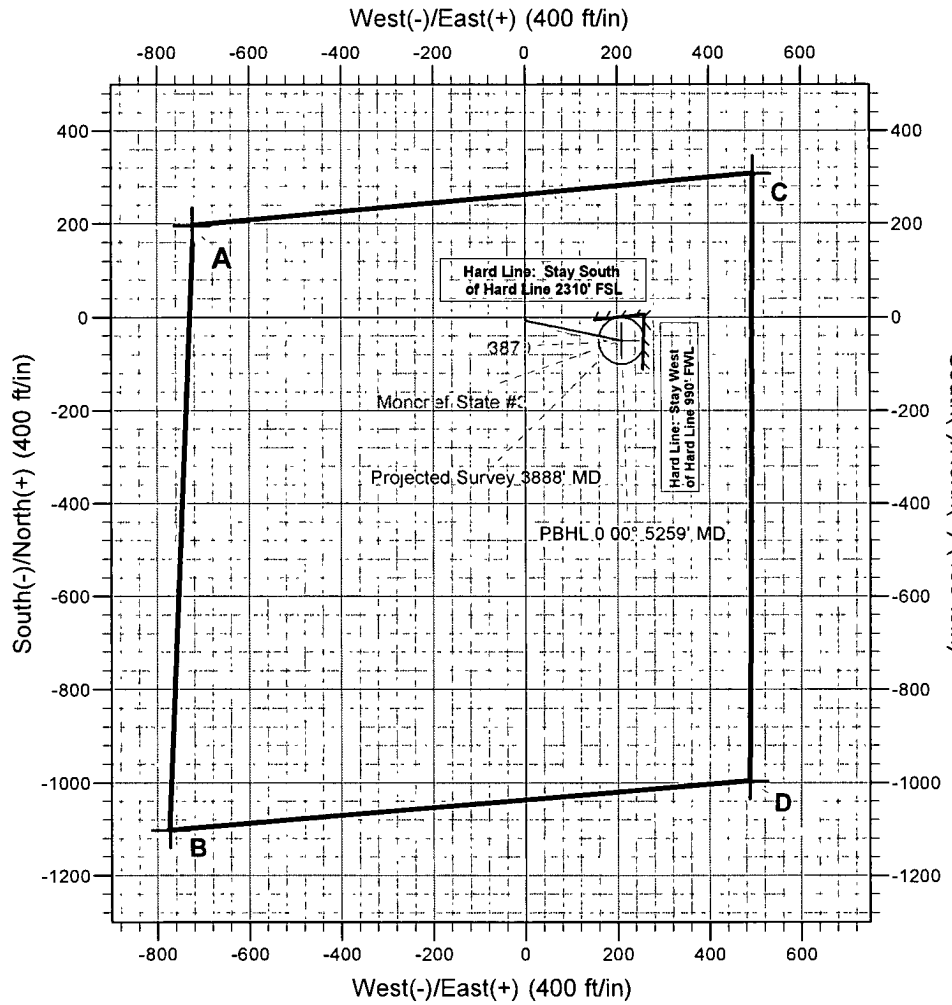
<b>Company:</b>	COG Operating LLC	<b>Local Co-ordinate Reference:</b>	Site Eddy County, New Mexico
<b>Project:</b>	New Mexico	<b>TVD Reference:</b>	WELL @ 0.0ft (Original Well Elev)
<b>Site:</b>	Eddy County, New Mexico	<b>MD Reference:</b>	WELL @ 0.0ft (Original Well Elev)
<b>Well:</b>	Moncrief State #3	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	SL: 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SL: 2300'FSL 730'FWL BHL: 2260'FSL 940'FWL Sec.23-T17S-R28E	<b>Database:</b>	EDM 5000.1 Single User Db

Survey Annotations:				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
828.0	828.0	-5.3	0.4	VES Gyro Tie-In 828' MD
3,888.0	3,878.9	-52.5	202.2	Projected Survey 3888' MD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



Vertical Section at 103.39° (750 ft/in)



Design #2

Surface Location											
Northing		Easting		Latitude		Longitude					
661811.83		555660.44		32° 49' 9.398 N		104° 9' 7.744 W					
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	V Sect	Target	
1	828.0	0.37	210.83	828.0	-5.3	0.4			1.6		
2	951.3	0.37	210.83	951.3	-6.0	-0.1	0.00	0.00	1.3		
3	1215.1	5.14	101.62	1214.7	-9.1	11.1	2.00	-112.99	12.9		
4	3352.2	5.14	101.62	3343.2	-47.7	198.7	0.00	0.00	204.3		
5	3609.3	0.00	0.00	3600.0	-50.0	210.0	2.00	180.00	215.9	Top of Paddock..	
6	5259.3	0.00	0.00	5250.0	-50.0	210.0	0.00	0.00	215.9	PBHL...	

To convert a Magnetic Direction to a Grid Direction, Add 7.74°