



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

30-015-36542

November 14, 2011

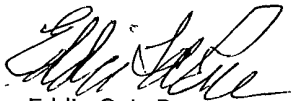
COG, LLC
Fasken Center, Tower II
550 West Texas Ave, Suite 1300
Midland, TX 79701

RE: Reindeer 21 Federal #4
1980' FSL & 430' FWL
Sec. 21, T16S, R28E
Eddy County, New Mexico

Dear Sir,

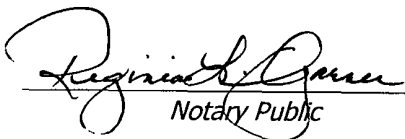
The attached is the Deviation Survey for the above captioned well.

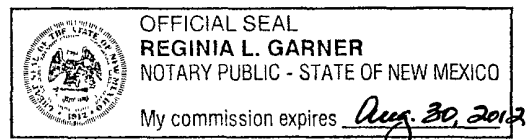
Very truly yours,


Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 14th day of November, 2011.


Notary Public



Reindeer 21 Federal #4

#	Date	Depth	Deviation	Direction	TVD	Horiz
10/16/2011		115	1.00			
10/19/2011		588	0.00			
10/19/2011		1070	1.00			
10/19/2011		1610	0.90			
10/20/2011		2112	0.70			
10/20/2011		2653	0.70			
10/21/2011		3096	0.90			
10/21/2011		3568	0.50			
10/22/2011		4076	0.90			
10/22/2011		4519	0.10			
10/23/2011		4960	0.90			
10/23/2011		5403	0.90			
10/24/2011		5846	1.20			
10/27/2011		6125	0.50			
10/28/2011		6380	0.30			
10/28/2011		6667	0.60			
11/1/2011		6047	0.70	104.60	6046.00	
11/1/2011		6079	1.60	94.60	6078.00	
11/1/2011		6111	5.00	106.90	6110.79	
11/1/2011		6143	10.60	109.00	6142.48	
11/1/2011		6174	16.60	108.00	6172.70	
11/1/2011		6206	21.70	106.40	6202.83	
11/1/2011		6238	25.50	103.20	6232.50	
11/1/2011		6270	28.30	99.90	6260.67	
11/1/2011		6302	31.60	98.30	6288.40	
11/2/2011		6334	85.10	97.40	6315.12	
11/2/2011		6366	39.30	97.60	6340.61	
11/2/2011		6398	42.70	97.80	6364.76	
11/2/2011		6430	44.50	96.70	6387.94	
11/2/2011		6461	48.30	93.00	6409.31	
11/2/2011		6493	53.60	91.50	6429.46	
11/3/2011		6575	57.80	91.30	6447.49	
11/3/2011		6447	61.10	90.90	6463.75	
11/3/2011		6589	64.10	90.80	6478.48	
11/3/2011		6621	67.00	89.70	6991.72	
11/3/2011		6653	69.90	89.50	6502.97	
11/3/2011		6684	73.00	88.60	6513.33	
11/3/2011		6716	75.50	87.80	6522.29	
11/3/2011		6748	77.70	87.90	6529.44	
11/3/2011		6779	80.40	88.50	6535.51	
11/3/2011		6811	82.70	89.70	0.00	
11/3/2011		6843	85.60	89.20	0.00	
11/3/2011		6875	86.10	89.70	6545.65	
11/3/2011		6970	88.20	90.10	6550.00	
11/3/2011		7065	88.40	90.20	6553.19	
11/4/2011		7162	90.60	88.10	6554.03	
11/4/2011		7257	92.10	88.30	6551.26	
11/4/2011		7336	91.30	88.60	6591.95	
11/4/2011		7448	84.50	87.80	6548.28	
11/4/2011		7544	89.40	87.20	6549.20	
11/4/2011		7734	91.40	87.60	6549.36	

#	Date	Depth	Deviation	Direction	TVD	Horiz
11/4/2011		7830	89.90	86.90	6548.36	
11/5/2011		7926	90.60	87.40	6548.02	
11/5/2011		8021	89.50	88.30	6547.94	
11/6/2011		8117	89.20	87.60	6549.03	
11/6/2011		8211	86.90	87.10	6557.23	
11/6/2011		8306	88.40	85.70	6556.12	
11/6/2011		8402	88.00	87.20	6559.14	
11/6/2011		8498	88.80	88.80	6561.82	
11/7/2011		8594	88.10	89.70	6564.92	
11/7/2011		8690	84.70	89.70	6520.44	
11/7/2011		8786	84.80	89.70	6579.23	
11/7/2011		8881	86.50	90.20	6586.93	
11/7/2011		8978	87.90	91.80	0.00	
11/7/2011		9072	90.10	90.60	6591.74	
11/7/2011		9168	92.30	90.40	6588.73	
11/8/2011		9264	91.30	90.60	6586.71	
11/8/2011		9360	91.30	90.80	6583.53	
11/8/2011		9456	90.90	90.90	6581.69	
11/8/2011		9551	89.50	91.30	6581.11	
11/8/2011		9646	91.80	92.30	6579.78	
11/8/2011		9741	91.00	92.30	6577.46	
11/8/2011		9836	90.40	92.30	6576.30	
11/8/2011		9931	91.20	92.20	6574.98	
11/8/2011		10027	89.80	91.80	6574.14	

COG Operating LLC

Eddy County, NM (NAD 83)

Reindeer 21 Federal #4H

Reindeer 21 Federal #4H

Wellbore #1

Survey: MWD Surveys

Standard Survey Report

29 November, 2011

Crescent Directional Drilling

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Reindeer 21 Federal #4H
Project:	Eddy County, NM (NAD 83)	TVD Reference:	WELL @ 3614 00ft (Silver Oak #12)
Site:	Reindeer 21 Federal #4H	MD Reference:	WELL @ 3614 00ft (Silver Oak #12)
Well:	Reindeer 21 Federal #4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass R5000 DB Server

Project	Eddy County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site:		Reindeer 21 Federal #4H			
Site Position:		Northing:	693,313 97 ft	Latitude:	32° 54' 21 05 N
From:	Map	Easting:	585,933 43 ft	Longitude:	104° 11' 16 90 W
Position Uncertainty:	0 00 ft	Slot Radius:	13 200 in	Grid Convergence:	0 08 °

Well:	Reindeer 21 Federal #4H					
Well Position	+N/-S	0 00 ft	Northing:	693,313 97 ft	Latitude:	32° 54' 21.05 N
	+E/-W	0 00 ft	Easting:	585,933 43 ft	Longitude:	104° 11' 16 90 W
Position Uncertainty		0 00 ft	Wellhead Elevation:	ft	Ground Level:	3,596 00 ft

Wellbore		Wellbore #1			
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF200510	10/14/2011	7.87	60 73	48,961

Design:	Wellbore #1				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0 00	0 00	0 00	89 57	

Survey Program		Date 11/29/2011		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100 00	6,000 00	Gyro Surveys (Wellbore #1)	Good__mag	Good Magnetic
6,000 00	10,141 00	MWD Surveys (Wellbore #1)	Good__mag	Good Magnetic

Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(°/100ft)	(°/100ft)	(°/100ft)
6,000 00	0.69	101 68	5,999 86	-0 67	-1 76	-1 77	0 00	0 00	0 00
6,047 00	0 70	104 60	6,046 86	-0 80	-1 21	-1 21	0 08	0 02	6 21
6,079 00	1 60	94 60	6,078 85	-0 88	-0 57	-0 58	2 87	2 81	-31 25
6,111 00	5 00	106 90	6,110 80	-1 32	1 21	1 20	10 79	10 63	38.44
6,143 00	10 50	109 00	6,142 49	-2.68	5 30	5 28	17 21	17 19	6 56
6,174 00	16 60	108 00	6,172 61	-4 97	12 19	12 15	19.69	19.68	-3 23
6,206 00	21 70	106 40	6,202 83	-8 05	22 22	22 16	16 02	15 94	-5 00
6,238 00	25 50	103 20	6,232 15	-11 30	34 61	34 52	12 53	11 88	-10 00
6,270 00	28 30	99 90	6,260.69	-14 17	48 79	48 68	9 91	8 75	-10 31
6,302 00	31 60	98 30	6,288 41	-16 69	64 56	64 43	10 61	10 31	-5 00

Crescent Directional Drilling

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Reindeer 21-Federal #4H
Project:	Eddy County, NM (NAD 83)	TVD Reference:	WELL @ 3614.00ft (Silver Oak #12)
Site:	Reindeer 21 Federal #4H	MD Reference:	WELL @ 3614.00ft (Silver Oak #12)
Well:	Reindeer 21 Federal #4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass R5000 DB Server

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)
6,334.00	35.10	97.40	6,315.14	-19.09	81.99	81.84	11.05	10.94	-2.81
6,366.00	39.30	97.60	6,340.62	-21.61	101.16	101.00	13.13	13.13	0.63
6,398.00	42.70	97.80	6,364.77	-24.43	121.96	121.78	10.63	10.63	0.63
6,430.00	44.50	96.70	6,387.94	-27.21	143.85	143.65	6.10	5.63	-3.44
6,461.00	48.30	93.00	6,409.32	-29.08	166.21	165.99	15.00	12.26	-11.94
6,493.00	53.60	91.50	6,429.47	-30.04	191.04	190.81	16.96	16.56	-4.69
6,525.00	57.80	91.30	6,447.50	-30.69	217.46	217.22	13.14	13.13	-0.63
6,557.00	61.10	90.90	6,463.77	-31.22	245.01	244.77	10.37	10.31	-1.25
6,589.00	64.10	90.80	6,478.49	-31.64	273.41	273.17	9.38	9.38	-0.31
6,621.00	67.00	89.70	6,491.73	-31.76	302.54	302.29	9.59	9.06	-3.44
6,653.00	69.90	89.50	6,503.49	-31.55	332.30	332.05	9.08	9.06	-0.63
6,684.00	73.00	88.60	6,513.35	-31.06	361.68	361.43	10.37	10.00	-2.90
6,717.00	75.50	87.80	6,522.31	-30.06	393.42	393.18	7.93	7.58	-2.42
6,748.00	77.70	87.90	6,529.49	-28.93	423.55	423.32	7.10	7.10	0.32
6,780.00	80.40	88.50	6,535.57	-27.95	454.95	454.73	8.64	8.44	1.88
6,811.00	82.70	89.70	6,540.12	-27.47	485.61	485.39	8.35	7.42	3.87
6,843.00	85.60	89.20	6,543.38	-27.16	517.44	517.22	9.19	9.06	-1.56
6,875.00	86.10	89.70	6,545.70	-26.85	549.35	549.13	2.21	1.56	1.56
6,970.00	88.20	90.10	6,550.42	-26.69	644.23	644.01	2.25	2.21	0.42
7,065.00	88.40	90.20	6,553.24	-26.94	739.19	738.96	0.24	0.21	0.11
7,161.00	90.60	88.10	6,554.08	-25.51	835.16	834.95	3.17	2.29	-2.19
7,257.00	92.10	88.30	6,551.82	-22.50	931.08	930.89	1.58	1.56	0.21
7,352.00	91.30	88.60	6,549.00	-19.93	1,026.01	1,025.83	0.90	-0.84	0.32
7,448.00	89.50	87.80	6,548.33	-16.92	1,121.95	1,121.79	2.05	-1.88	-0.83
7,544.00	89.40	87.20	6,549.25	-12.73	1,217.86	1,217.73	0.63	-0.10	-0.63
7,639.00	89.50	87.20	6,550.16	-8.09	1,312.74	1,312.64	0.11	0.11	0.00
7,734.00	91.40	87.60	6,549.42	-3.78	1,407.63	1,407.56	2.04	2.00	0.42
7,830.00	89.80	86.90	6,548.41	0.83	1,503.51	1,503.48	1.82	-1.67	-0.73
7,926.00	90.60	87.40	6,548.08	5.60	1,599.39	1,599.39	0.98	0.83	0.52
8,021.00	89.50	88.30	6,547.99	9.16	1,694.32	1,694.34	1.50	-1.16	0.95
8,117.00	89.20	87.60	6,549.08	12.60	1,790.26	1,790.30	0.79	-0.31	-0.73
8,211.00	86.90	87.10	6,552.28	16.94	1,884.09	1,884.17	2.50	-2.45	-0.53
8,306.00	88.40	85.70	6,556.18	22.90	1,978.82	1,978.94	2.16	1.58	-1.47
8,402.00	88.00	87.20	6,559.19	28.84	2,074.59	2,074.74	1.62	-0.42	1.56
8,498.00	88.80	88.80	6,561.87	32.19	2,170.49	2,170.67	1.86	0.83	1.67
8,594.00	88.10	89.70	6,564.47	33.45	2,266.44	2,266.63	1.19	-0.73	0.94
8,690.00	84.70	89.70	6,570.50	33.95	2,362.24	2,362.43	3.54	-3.54	0.00
8,786.00	84.80	89.70	6,579.28	34.45	2,457.83	2,458.02	0.10	0.10	0.00
8,881.00	86.50	90.20	6,586.49	34.53	2,552.56	2,552.74	1.86	1.79	0.53
8,976.00	87.90	90.80	6,591.13	33.70	2,647.44	2,647.61	1.60	1.47	0.63
9,072.00	91.30	90.60	6,591.80	32.53	2,743.41	2,743.58	3.55	3.54	-0.21
9,168.00	92.30	90.40	6,588.78	31.69	2,839.36	2,839.52	1.06	1.04	-0.21
9,264.00	91.30	90.60	6,585.77	30.86	2,935.31	2,935.46	1.06	-1.04	0.21

Crescent Directional Drilling

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Reindeer 21 Federal #4H
Project:	Eddy County, NM (NAD 83)	TVD Reference:	WELL @ 3614 00ft (Silver Oak #12)
Site:	Reindeer 21 Federal #4H	MD Reference:	WELL @ 3614 00ft (Silver Oak #12)
Well:	Reindeer 21 Federal #4H	North Reference:	Gnd
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass R5000 DB Server

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)
9,360.00	91.30	90.80	6,583.59	29.68	3,031.28	3,031.41	0.21	0.00	0.21
9,456.00	90.90	90.90	6,581.74	28.26	3,127.25	3,127.37	0.43	-0.42	0.10
9,646.00	91.80	92.30	6,577.27	22.96	3,317.11	3,317.19	0.88	0.47	0.74
9,741.00	91.00	92.30	6,574.95	19.15	3,412.01	3,412.06	0.84	-0.84	0.00
9,836.00	90.40	92.30	6,573.79	15.33	3,506.92	3,506.94	0.63	-0.63	0.00
9,931.00	91.20	92.20	6,572.46	11.60	3,601.84	3,601.83	0.85	0.84	-0.11
10,027.00	89.80	91.80	6,571.62	8.25	3,697.78	3,697.73	1.52	-1.46	-0.42
10,076.00	91.70	92.30	6,570.98	6.50	3,746.74	3,746.68	4.01	3.88	1.02
Last Survey @ 10076.00 MD, 6570.98 TVD, 91.70 INC, 92.30 AZ									
10,141.00	91.70	92.30	6,569.05	3.89	3,811.66	3,811.58	0.00	0.00	0.00
Straight line Projection to TD @ 10141.00' MD, 6569.05' TVD									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
10,076.00	6,570.98	6.50	3,746.74	Last Survey @ 10076.00 MD, 6570.98 TVD, 91.70 INC, 92.30 AZ
10,141.00	6,569.05	3.89	3,811.66	Straight line Projection to TD @ 10141.00' MD, 6569.05' TVD

Checked By: _____ Approved By: _____ Date: _____



COG Operating LLC
Reindeer 21 Federal #4H
Eddy County, NM (NAD 83)
Plan #6



Surface Location		Ground Elev: 3596.00 WELL @ 3614.00ft (Silver Oak #12)			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	693313.98	585933.42	32° 54' 21.05 N	104° 11' 16.90 W

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	7257.00	92.10	88.30	6551.82	-22.50	931.08	0.00	0.00	930.89	Start Drop & Turn @ 4.00°/100'
2	7318.21	89.75	88.99	6550.83	-21.05	992.27	4.00	163.60	992.08	EOD & T - Hold @ 89.75° INC, 88.99° AZ
3	10119.11	89.75	88.99	6563.00	28.25	3792.71	0.00	0.00	3792.81	TD @ 10119.11' MD, 6563.00' TVD

TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL (Reindeer 21 Federal #4H Plan 6)	6563.00	28.25	3792.71	693342.23	589726.13	32° 54' 21.28 N	104° 10' 32.41 W



Azimuths to Grd North
 True North -0.08°
 Magnetic North 7.79°

Magnetic Field
 Strength - 48960.7nT
 Dip Angle 60.73°
 Date 10/14/2011
 Model IGRF200510

