



PO Box 1370
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(575) 748-1288

30-015-39588



July 9, 2012

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

RE: Moncrief State #4
1815' FSL & 830' FWL
Sec. 23, T17S, R28E
Eddy County, New Mexico

Dear Sir,

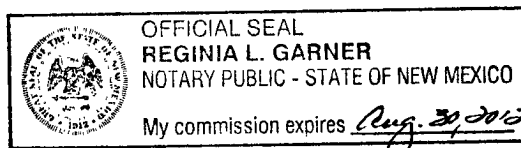
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 9th day of July, 2012.



Moncrief State #4

Date	Depth	Dev/Inc	Dir/AZ	TVD
7/1/2012	113	1.0		
7/2/2012	221	0.7		
7/3/2012	499	0.4		
7/3/2012	833	0.7		
7/4/2012	906	1.1	210.3	
7/4/2012	997	1.4	179.4	
7/4/2012	1092	2.3	160.6	
7/4/2012	1187	2.6	145.1	
7/4/2012	1280	2.9	152.2	
7/4/2012	1375	4.0	147.6	
7/5/2012	1565	5.4	145.7	
7/5/2012	1659	5.5	147.6	
7/5/2012	1752	4.1	146.4	
7/5/2012	1846	4.5	136.7	
7/5/2012	1940	5.2	132.7	
7/5/2012	2034	5.1	128.8	
7/5/2012	2127	5.0	129.0	
7/5/2012	2315	4.8	126.8	
7/5/2012	2407	4.8	128.8	
7/5/2012	2501	4.7	130.9	
7/5/2012	2594	4.3	127.7	
7/5/2012	2689	4.3	126.8	
7/5/2012	2782	4.7	129.5	
7/5/2012	2877	4.7	141.8	
7/6/2012	3066	4.0	134.2	
7/6/2012	3169	3.1	141.4	
7/6/2012	3254	1.9	147.8	
7/6/2012	3347	1.9	148.8	
7/6/2012	3441	0.8	138.3	
7/6/2012	3535	0.7	140.2	
7/6/2012	3630	0.3	149.2	
7/6/2012	3721	0.2	160.8	
7/6/2012	3817	0.4	153.7	
7/6/2012	3912	0.4	147.1	
7/6/2012	4002	0.4	139.0	
7/6/2012	4097	0.8	149.5	
7/6/2012	4191	0.4	145.1	
7/6/2012	4285	0.7	181.2	
7/6/2012	4379	0.8	169.4	
7/6/2012	4474	0.6	200.7	
7/7/2012	4510	0.7	217.3	
7/7/2012	4775	0.6	200.5	
7/7/2012	4695	0.7	179.4	
7/7/2012	4757	0.7	183.5	
7/7/2012	4851	0.5	279.9	
7/7/2012	5037	0.4	251.5	
7/7/2012	5133	0.6	243.2	
7/7/2012	5223	0.5	239.2	



COG Operating, LLC

Eddy County, NM (NAD27)

MONCRIEF STATE #4

MONCRIEF STATE #4

ORIGINAL HOLE

Design: ORIGINAL HOLE

Standard Survey Report

25 October, 2012





Childress Directional Drilling Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well MONCRIEF STATE #4
Project:	Eddy County, NM (NAD27)	TVD Reference:	RKB @ 3624 00usft (Original Well Elev)
Site:	MONCRIEF STATE #4	MD Reference:	RKB @ 3624.00usft (Original Well Elev)
Well:	MONCRIEF STATE #4	North Reference:	Grid
Wellbore:	ORIGINAL HOLE	Survey Calculation Method:	Minimum Curvature
Design:	ORIGINAL HOLE	Database:	EDM 5000 1 Single User Db

Project:	Eddy County, NM (NAD27)		
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:	MONCRIEF STATE #4			
Site Position:		Northing:	661,301 60 usft	Latitude: 32° 49' 4 348 N
From:	Map	Easting:	555,741 00 usft	Longitude: 104° 9' 6 810 W
Position Uncertainty:	0 00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0 10 °

Well:	MONCRIEF STATE #4			
Well Position	+N/-S	0 00 usft	Northing:	661,301 60 usft
	+E/-W	0 00 usft	Easting:	555,741 00 usft
Position Uncertainty	0 00 usft	Wellhead Elevation:	usft	Ground Level: 3,612 00 usft

Wellbore:	ORIGINAL HOLE			
Magnetics	Model Name	Sample Date	Declination	Dip Angle
	IGRF2010	2012/06/25	7 77	60 61
				Field Strength (nT) 48,805

Design:	ORIGINAL HOLE			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth: 0 00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 00	0 00	0 00	144 01

Survey Program	Date 2012/10/25			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 00	816 00	Gyro Surveys (ORIGINAL HOLE)	NS-GYRO-MS	North sensing gyrocompassing m/s
906 00	5,278 00	CHILDRESS MWD SURVEYS (ORIGINAL	MWD	MWD - CHILDRESS MWD

Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
	100 00	0 72	277 77	100 00	0 08	-0 62	-0 43	0 72	0 72	0 00
	200 00	0 86	283 75	199 99	0 35	-1 97	-1 44	0 16	0 14	5 98
	300 00	0 83	292 63	299 98	0 81	-3 37	-2 63	0 13	-0 03	8 88
	400 00	0 92	285 83	399 97	1 30	-4 81	-3 88	0 14	0 09	-6 80
	500 00	0 75	278 39	499 95	1 62	-6 23	-4 97	0 20	-0 17	-7 44
	600 00	0 44	284 02	599 95	1 81	-7 25	-5 72	0 32	-0 31	5 63
	700 00	0 42	286 45	699 95	2 00	-7 98	-6 31	0 03	-0 02	2 43
	800 00	0 39	282 40	799 94	2 18	-8 66	-6 85	0 04	-0 03	-4 05
	816 00	0 57	281 21	815 94	2 21	-8 79	-6 95	1 13	1 13	-7 44



Childress Directional Drilling
Survey Report



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Wellbore:	ORIGINAL HOLE	Survey Calculation Method:	Minimum Curvature
Design:	ORIGINAL HOLE	Database:	EDM 5000 1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
906 00	1 10	210 30	905 94	1 55	-9 67	-6 93	1 18	0 59	-78 79
997 00	1 40	179 40	996 91	-0 32	-10 10	-5 68	0 80	0 33	-33.96
1,092 00	2 30	160 60	1,091 87	-3 28	-9 45	-2 90	1 13	0 95	-19 79
1,187 00	2 60	145 10	1,186 78	-6.84	-7 58	1 08	0 76	0 32	-16 32
1,280 00	2 90	152 20	1,279 67	-10 65	-5 28	5.52	0 49	0 32	7 63
1,375 00	4 00	147 60	1,374 50	-15 58	-2 38	11 20	1 19	1 16	-4 84
1,468 00	4 50	152 00	1,467 24	-21 54	1 07	18 05	0 64	0 54	4 73
1,565 00	5 40	145 70	1,563 88	-28 67	5.43	26 38	1 08	0 93	-6 49
1,659 00	5 50	147 60	1,657 46	-36.12	10 33	35.30	0 22	0 11	2 02
1,752 00	4 10	146 40	1,750 13	-42 66	14 56	43 07	1 51	-1 51	-1 29
1,846 00	4 50	136 70	1,843 86	-48 14	18 95	50 09	0 88	0 43	-10 32
1,940 00	5 20	132 70	1,937 53	-53 71	24 61	57 92	0 83	0 74	-4 26
2,033 00	5 10	128 80	2,030 15	-59 16	30 93	66 04	0 39	-0 11	-4 19
2,127 00	5 00	129 00	2,123 79	-64 36	37 37	74 03	0 11	-0 11	0 21
2,221 00	5 00	126 00	2,217 43	-69 34	43 86	81 88	0 28	0 00	-3 19
2,313 00	4 80	126 80	2,309 09	-74 00	50.19	89 37	0 23	-0 22	0 87
2,407.00	4.80	128 80	2,402 76	-78 82	56 40	96 92	0 18	0 00	2 13
2,502 00	4 70	130 90	2,497 44	-83 86	62 44	104 55	0 21	-0 11	2 21
2,594 00	4 30	127 70	2,589 15	-88 44	68 02	111 53	0 51	-0 43	-3.48
2,689 00	4 30	126 80	2,683 89	-92 75	73 69	118 35	0 07	0 00	-0 95
2,784 00	4 70	129 50	2,778.59	-97 36	79 55	125 52	0 48	0 42	2 84
2,878 00	4 70	141 80	2,872 28	-102 84	84 90	133 10	1.07	0 00	13 09
2,972 00	4 30	143 50	2,965 99	-108 70	89 38	140 47	0 45	-0 43	1 81
3,066 00	4 00	134 20	3,059 74	-113.81	93 82	147 22	0 78	-0 32	-9 89
3,160 00	3 10	141 40	3,153 56	-118 09	97 76	152 99	1 07	-0 96	7 66
3,254 00	1 90	147 80	3,247 47	-121 39	100 18	157 09	1 31	-1 28	6 81
3,347 00	1 90	148 80	3,340 42	-124 02	101 80	160 16	0 04	0 00	1 08
3,441 00	0 80	138 30	3,434 39	-125 84	103.04	162 37	1 19	-1 17	-11 17
3,535 00	0 70	140 20	3,528 39	-126 77	103 84	163 60	0 11	-0 11	2 02
3,630 00	0 30	149 20	3,623 38	-127 43	104 34	164 42	0 43	-0 42	9 47
3,723 00	0 20	160 80	3,716 38	-127 79	104.52	164 82	0 12	-0 11	12 47
3,817 00	0 40	153 70	3,810 38	-128 24	104.72	165 30	0 22	0 21	-7 55
3,912 00	0 40	147 10	3,905 38	-128 82	105 05	165 96	0 05	0 00	-6 95
4,005 00	0 40	139 00	3,998 38	-129 33	105 44	166 61	0 06	0 00	-8 71
4,099 00	0 80	149 50	4,092 37	-130.15	105.99	167 59	0 44	0 43	11 17
4,193 00	0 40	145 10	4,186 36	-130 98	106 51	168 57	0 43	-0 43	-4 68
4,287 00	0 70	181 20	4,280 36	-131 82	106 68	169 35	0 47	0 32	38 40
4,381 00	0 80	169 40	4,374 35	-133 04	106 79	170 40	0 20	0 11	-12 55
4,475 00	0 60	200 50	4,468 35	-134 15	106 74	171 27	0 45	-0 21	33 09
4,570 00	0 70	217 30	4,563 34	-135 08	106 21	171 71	0 23	0 11	17 68
4,663 00	0 70	179 40	4,656 33	-136 10	105 87	172 34	0 49	0 00	-40.75
4,757 00	0 70	183 50	4,750 33	-137 24	105 85	173 25	0 05	0 00	4 36
4,851.00	0.50	229.90	4,844.32	-138 08	105 50	173 72	0 54	-0 21	49 36



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4,945 00	0 70	221 40	4,938 32	-138 78	104 80	173 87	0 23	0 21	-9 04
5,039 00	0 40	251 50	5,032 31	-139 31	104 11	173 90	0 43	-0 32	32 02
5,132 00	0 60	243 20	5,125 31	-139 63	103 37	173 73	0 23	0 22	-8 92
5,223 00	0 50	239 20	5,216 30	-140 05	102 60	173 61	0 12	-0 11	-4 40
Survey @ 5223' MD 0.50° INC 239.20° AZM									
5,278 00	0 50	239 20	5,271 30	-140 30	102 19	173 57	0 00	0 00	0 00
PTB at TD @ 5278' MD 0.50° INC 239.20° AZM									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,223 00	5,216 30	-140 05	102 60	Survey @ 5223' MD 0 50° INC 239.20° AZM
5,278 00	5,271 30	-140 30	102 19	PTB at TD @ 5278' MD 0 50° INC 239 20° AZM

Checked By: _____ Approved By: _____ Date: _____