

COG Operating, LLC

Eddy County, NM

Foran State #5

Foran State 5H

Wellbore #1

30-015-38440

Survey: MWD Survey #1

Standard Survey Report

19 July, 2011



Survey Report

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Site Foran State #5
Project:	Eddy County, NM	TVD Reference:	KB @ 3870 00ft (Silver oak Rig #1)
Site:	Foran State #5	MD Reference:	KB @ 3870 00ft (Silver oak Rig #1)
Well:	Foran State 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 1 Black Viper

Project	Eddy County, NM		
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	Foran State #5				
Site Position:		Northing:	668,090 00 ft	Latitude:	32° 50' 8 872 N
From:	Map	Easting:	642,819 60 ft	Longitude:	103° 52' 6 082 W
Position Uncertainty:	0 00 ft	Slot Radius:	13 200 in	Grid Convergence:	0 25 °

Well	Foran State 5H					
Well Position	+N/-S	0 00 ft	Northing:	668,090 00 ft	Latitude:	32° 50' 8 872 N
	+E/-W	0 00 ft	Easting:	642,819 60 ft	Longitude:	103° 52' 6 082 W
Position Uncertainty		0 00 ft	Wellhead Elevation:	3,870 00 ft	Ground Level:	3,858 00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	7/15/2011	7 76	60 70	48,941

Design	Wellbore #1				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	1,800 00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0 00	0 00	0 00	207 28	

Survey Program	Date	7/19/2011		
From	To	Survey (Wellbore)	Tool Name	Description
(ft)	(ft)			
100 00	1,800 00	Gyro Survey #1 (OH)	Gyro	
1,800 00	5,177 00	MWD Survey #1 (Wellbore #1)		

Survey	Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
	Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate
	(ft)			(ft)			(ft)	(°/100ft)	(°/100ft)	(°/100ft)
	1,800 00	1 17	44 16	1,799 88	0 78	5 76	-3 33	0 00	0 00	0 00
	HL North[FS#5] - HL East[FS#5]									
	1,890 00	1 40	147 90	1,889 86	0 51	6 99	-3 65	2 25	0 26	115 27
	First MWD Survey									
	1,984 00	3 10	179 40	1,983 79	-3 01	7 62	-0 82	2 17	1 81	33 51
	2,077 00	3 20	191 90	2,076 65	-8 06	7 11	3 91	0 74	0 11	13 44
	2,171 00	3 20	203 30	2,170 50	-13 04	5 53	9 05	0 68	0 00	12 13
	2,265 00	2 90	208 20	2,264 37	-17 54	3 37	14 05	0 42	-0 32	5 21
	2,358 00	2 80	218 50	2,357 26	-21 40	0 85	18 63	0 56	-0 11	11 08

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 1 Black Viper

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)
2,452 00	2 50	220 40	2,451 16	-24 75	-1 91	22 88	0 33	-0 32	2 02
2,546 00	2 80	221 20	2,545 05	-28 04	-4 75	27 10	0 32	0 32	0 85
2,640 00	2 60	218 40	2,638 95	-31 44	-7 59	31 42	0 25	-0 21	-2 98
2,734 00	2 50	220 20	2,732 86	-34 68	-10 24	35 51	0 14	-0 11	1 91
2,828 00	3 10	215 30	2,826 75	-38 32	-13 03	40 03	0 69	0 64	-5 21
2,922 00	3 20	214 20	2,920 60	-42 56	-15 97	45 15	0 12	0 11	-1 17
3,015 00	3 30	223 80	3,013 45	-46 64	-19 28	50 29	0 59	0 11	10 32
3,109 00	3 10	224 40	3,107 31	-50 41	-22 93	55 31	0 22	-0 21	0 64
3,203 00	3 30	221 50	3,201 16	-54 25	-26 50	60 37	0 27	0 21	-3 09
3,297 00	3 20	221 40	3,295 01	-58 25	-30 03	65 53	0 11	-0 11	-0 11
3,391 00	3 30	221 40	3,388 86	-62 24	-33 56	70 70	0 11	0 11	0 00
3,485 00	3 20	222 50	3,482 71	-66 21	-37 12	75 86	0 13	-0 11	1 17
3,579 00	3 20	222 60	3,576 56	-70 07	-40 67	80 92	0 01	0 00	0 11
3,673 00	3 00	221 90	3,670 42	-73 84	-44 09	85 83	0 22	-0 21	-0 74
3,767 00	3 10	222 00	3,764 29	-77 56	-47 43	90 67	0 11	0 11	0 11
3,861 00	3 00	220 50	3,858 16	-81 31	-50 73	95 52	0 14	-0 11	-1 60
3,954 00	3 00	219 00	3,951 03	-85 06	-53 84	100 27	0 08	0 00	-1 61
4,048 00	3 10	218 20	4,044 90	-88 97	-56 96	105 18	0 12	0 11	-0 85
4,143 00	3 20	216 80	4,139 75	-93 11	-60 14	110 31	0 13	0 11	-1 47
4,237 00	3 00	233 00	4,233 62	-96 69	-63 67	115 12	0 95	-0 21	17 23
4,331 00	3 10	235 60	4,327 48	-99 60	-67 73	119 57	0 18	0 11	2 77
4,425 00	3 20	231 70	4,421 34	-102 67	-71 89	124 20	0 25	0 11	-4 15
4,520 00	3 20	231 80	4,516 19	-105 95	-76 05	129 02	0 01	0 00	0 11
4,614 00	3 20	230 60	4,610 05	-109 24	-80 14	133 82	0 07	0 00	-1 28
4,708 00	2 50	228 50	4,703 93	-112 26	-83 71	138 14	0 75	-0 74	-2 23
4,801 00	1 80	218 80	4,796 86	-114 74	-86 14	141 46	0 85	-0 75	-10 43
4,896 00	1 00	215 30	4,891 84	-116 58	-87 55	143 74	0 85	-0 84	-3 68
4,989 00	0 40	298 80	4,984 83	-117 09	-88 31	144 54	1 11	-0 65	89 78
5,083 00	0 50	293 80	5,078 83	-116 77	-88 97	144 56	0 11	0 11	-5 32
5,177 00	0 60	291 40	5,172 82	-116 42	-89 80	144 63	0 11	0 11	-2 55

Last MWD Survey - PBHL#1[FS#5]

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,890 00	1,889 86	0 51	6 99	First MWD Survey
5,177 00	5,172 82	-116 42	-89 80	Last MWD Survey

Checked By _____ Approved By _____ Date _____