



COG Operating LLC

Eddy County, NM (NAN27 NME)

Burch Keely Unit #666

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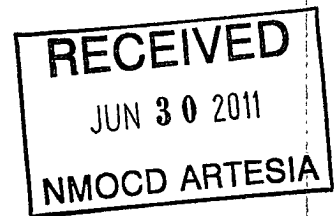
3D-015-38574

OH

Design: Actual

Standard Survey Report

22 May, 2011



Scientific Drilling
Directional Drilling Operations



Scientific Drilling

Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #666
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (13') @ 3585 00usft (Cavaloz #3)
Site:	Burch Keely Unit #666	MD Reference:	KB Elev (13') @ 3585 00usft (Cavaloz #3)
Well:	Burch Keely Unit #666	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Julio

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	Burch Keely Unit #666		
Site Position:		Northing:	657,245 50 usft
From:	Map	Easting:	590,597 60 usft
Position Uncertainty:	0 00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 48' 23 434 N
		Longitude:	104° 2' 18 486 W
		Grid Convergence:	0 16 °

Well	Burch Keely Unit #666		
Well Position	+N/-S	0 00 usft	Northing: 657,245 50 usft
	+E/-W	0 00 usft	Easting: 590,597 60 usft
Position Uncertainty	0 00 usft	Wellhead Elevation:	usft
		Latitude:	32° 48' 23 434 N
		Longitude:	104° 2' 18 486 W
		Ground Level:	3,572 00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	2011/05/17	7 86	60 65	48,922

Design	Actual				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0 00	0 00	0 00	330 14	

Survey Program	Date	2011/05/22			
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100 00	770 00	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1 0 2	
933 00	4,770 00	MWD Survey (OH)	MWD	MWD - Standard	

Survey	Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
	Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
	(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
	100 00	0 10	212 57	100 00	-0 07	-0 05	-0 04	0 10	0 10	0 00
	200 00	0 44	271 70	200 00	-0 14	-0 48	0 12	0 40	0 34	59 13
	300 00	0 18	344 66	300 00	0 03	-0 90	0 47	0 42	-0 26	72 96
	400 00	0 33	9 61	400 00	0 46	-0 90	0 85	0 18	0 15	24 95
	500 00	0 37	12 14	499 99	1 06	-0 78	1 31	0 04	0 04	2 53
	600 00	0 66	54 73	599 99	1 71	-0 24	1 60	0 46	0 29	42 59
	700 00	1 64	50 12	699 97	2 96	1 33	1 91	0 98	0 98	-4 61
	770 00	2 04	51 13	769 93	4 38	3 06	2 28	0 57	0 57	1 44
	797 00	1 96	50 00	796 92	4 98	3 79	2 43	0 32	-0 28	-4 20



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Julio

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)
Gyro Tie-in									
933 00	1 60	42 70	932 85	7 88	6 87	3 41	0 32	-0 27	-5 37
1,028 00	1 77	46 00	1,027 81	9 87	8 82	4 17	0 21	0 18	3 47
1,090 00	1 65	50 16	1,089 78	11 11	10 20	4 56	0 28	-0 19	6 71
1,153 00	1 95	27 21	1,152 75	12 64	11 38	5 30	1 23	0 48	-36 43
1,216 00	2 89	12 54	1,215 70	15 15	12 22	7 05	1 78	1 49	-23 29
1,280 00	3 45	4 60	1,279 60	18 64	12 72	9 83	1 11	0 88	-12 41
1,342 00	3 98	352 65	1,341 47	22 63	12 60	13 36	1 51	0 85	-19 27
1,405 00	4 48	337 16	1,404 30	27 07	11 36	17 82	1 97	0 79	-24 59
1,468 00	5 22	331 70	1,467 07	31 86	9 05	23 13	1 38	1 17	-8 67
1,531 00	6 10	326 60	1,529 77	37 18	5 85	29 33	1 61	1 40	-8 10
1,594 00	7 12	323 20	1,592 35	43 10	1 66	36 55	1 73	1 62	-5 40
1,657 00	6 95	321 84	1,654 87	49 22	-3 03	44 20	0 38	-0 27	-2 16
1,720 00	6 55	320 19	1,717 44	54 98	-7 68	51 51	0 71	-0 63	-2 62
1,783 00	6 58	322 25	1,780 02	60 60	-12 20	58 62	0 38	0 05	3 27
1,846 00	6 25	323 79	1,842 63	66 22	-16 43	65 61	0 59	-0 52	2 44
1,909 00	6 56	326 29	1,905 23	71 98	-20 45	72 61	0 66	0 49	3 97
1,973 00	7 32	328 17	1,968 77	78 48	-24 63	80 33	1 24	1 19	2 94
2,068 00	6 94	325 49	2,063 03	88 35	-31 08	92 10	0 53	-0 40	-2 82
2,162 00	6 56	325 31	2,156 38	97 45	-37 35	103 11	0 40	-0 40	-0 19
2,256 00	6 96	327 21	2,249 73	106 65	-43 49	114 15	0 49	0 43	2 02
2,351 00	6 81	328 59	2,344 04	116 30	-49 54	125 52	0 24	-0 16	1 45
2,477 00	6 56	327 98	2,469 18	128 78	-57 25	140 18	0 21	-0 20	-0 48
2,571 00	7 29	327 19	2,562 50	138 34	-63 33	151 51	0 78	0 78	-0 84
2,665 00	7 32	327 88	2,655 73	148 42	-69 75	163 45	0 10	0 03	0 73
2,761 00	7 41	320 64	2,750 94	158 39	-76 92	175 66	0 97	0 09	-7 54
2,856 00	7 53	320 82	2,845 14	167 95	-84 74	187 85	0 13	0 13	0 19
2,949 00	7 28	326 74	2,937 36	177 60	-91 82	199 74	0 86	-0 27	6 37
3,044 00	7 14	326 31	3,031 61	187 55	-98 40	211 64	0 16	-0 15	-0 45
3,138 00	6 61	325 90	3,124 94	196 89	-104 67	222 87	0 57	-0 56	-0 44
3,232 00	6 54	326 60	3,218 32	205 84	-110 65	233 60	0 11	-0 07	0 74
3,327 00	6 35	327 27	3,312 72	214 77	-116 47	244 25	0 22	-0 20	0 71
3,421 00	6 28	328 03	3,406 15	223 51	-122 00	254 58	0 12	-0 07	0 81
3,515 00	6 54	324 00	3,499 56	232 20	-127 87	265 04	0 55	0 28	-4 29
3,610 00	6 52	323 36	3,593 94	240 91	-134 27	275 78	0 08	-0 02	-0 67
3,704 00	5 99	320 47	3,687 38	248 97	-140 58	285 91	0 66	-0 56	-3 07
3,768 00	5 64	319 08	3,751 05	253 92	-144 76	292 29	0 59	-0 55	-2 17
3,830 00	4 99	320 76	3,812 79	258 31	-148 47	297 94	1 08	-1 05	2 71
3,892 00	3 73	321 10	3,874 61	261 97	-151 44	302 59	2 03	-2 03	0 55
3,955 00	2 46	324 01	3,937 51	264 66	-153 52	305 96	2 03	-2 02	4 62
4,017 00	1 36	339 45	3,999 48	266 43	-154 56	308 01	1 94	-1 77	24 90
4,081 00	0 44	6 97	4,063 47	267 38	-154 80	308 96	1 55	-1 44	43 00
4,143 00	0 12	95 89	4,125 47	267 61	-154 70	309 11	0 73	-0 52	143 42



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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)
4,238 00	0 45	359 14	4,220 47	267 97	-154 61	309 38	0 50	0 35	-101 84
4,332 00	0 30	61 77	4,314 47	268 46	-154 40	309 69	0 44	-0 16	66 63
4,426 00	0 71	142 43	4,408 46	268 11	-153 83	309 11	0 77	0 44	85 81
4,520 00	0 83	128 86	4,502 46	267 23	-152 94	307 90	0 23	0 13	-14 44
4,614 00	0 73	120 06	4,596 45	266 50	-151 89	306 74	0 17	-0 11	-9 36
4,678 00	0 76	129 08	4,660 44	266 03	-151 21	305 99	0 19	0 05	14 09
4,723 00	0 95	121 26	4,705 44	265 64	-150 66	305 39	0 49	0 42	-17 38
Last MWD Survey									
4,770 00	0 83	118 62	4,752 43	265 28	-150 03	304 76	0 27	-0 26	-5 62
Projection to Bit									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
797 00	796 92	4 98	3 79	Gyro Tie-in
4,723 00	4,705 44	265 64	-150 66	Last MWD Survey
4,770 00	4,752 43	265 28	-150 03	Projection to Bit

Checked By	_____	Approved By	_____	Date:	_____
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