

30-015-38971

COG Operating, LLC

Eddy County, NM

Raptor 12 State Com #1H

Raptor 12 State Com #1H

Lateral #1

Survey: MWD Survey #1

Standard Survey Report

31 August, 2011

Survey Report

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Site Raptor 12 State Com #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3551 50ft
Site:	Raptor 12 State Com #1H	MD Reference:	KB @ 3551 50ft
Well:	Raptor 12 State Com #1H	North Reference:	Gnd
Wellbore:	Lateral #1	Survey Calculation Method:	Minimum Curvature
Design:	Lateral #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	Raptor 12 State Com #1H		
Site Position:		Northing:	702,772 60 ft
From:	Map	Easting:	560,193 50 ft
Position Uncertainty:	0 00 ft	Slot Radius:	13 200 in
		Latitude:	32° 55' 54 623 N
		Longitude:	104° 8' 13 745 W
		Grid Convergence:	0 11 °

Well	Raptor 12 State Com #1H		
Well Position	+N/-S	0 00 ft	Northing: 702,772 60 ft
	+E/-W	0 00 ft	Easting: 560,193 50 ft
Position Uncertainty	0 00 ft	Wellhead Elevation:	3,551 50 ft
		Ground Level:	3,533 00 ft

Wellbore	Lateral #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010	8/7/2011	7 88
			Dip Angle (°)
			60 74
			Field Strength (nT)
			48,964

Design	Lateral #1		
Audit Notes:			
Version:	1 0	Phase:	ACTUAL
		Tie On Depth:	6,100 00
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)
	(ft)	(ft)	(ft)
	0 00	0 00	0 00
			Direction (°)
			50 27

Survey Program	Date 8/31/2011		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
100 00	6,100 00	Gyro Survey #1 (OH)	Gyro
6,142 00	11,110 00	MWD Survey #1 (Lateral #1)	MWD

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)
6,100 00	4 19	41 21	6,098 95	54 17	-24 30	15 93	0 00	0 00	0 00
6,142 00	6 20	55 30	6,140 77	56 62	-21 43	19 71	5 63	4 79	33 55
First MWD Survey									
6,173 00	10 10	65 20	6,171 46	58 71	-17 58	24 01	13 33	12 58	31 94
6,205 00	13 00	70 90	6,202 81	61 07	-11 63	30 09	9 73	9 06	17 81
6,236 00	16 90	74 40	6,232 75	63 42	-4 00	37 46	12 91	12 58	11 29
6,268 00	20 70	78 60	6,263 04	65 79	6 03	46 69	12 60	11 88	13 13
6,300 00	24 10	80 30	6,292 62	68 01	18 02	57 33	10 82	10 63	5 31
6,331 00	28 00	81 90	6,320 47	70 10	31 47	69 01	12 78	12 58	5 16
6,363 00	31 10	83 60	6,348 30	72 08	47 12	82 31	10 03	9 69	5 31
6,395 00	35 30	84 70	6,375 07	73 86	64 55	96 85	13 26	13 13	3 44

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

Survey

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6,426 00	39 00	86 90	6,399 78	75 21	83 22	112 07	12 68	11 94	7 10
6,458 00	42 30	89 40	6,424 06	75 87	104 04	128 51	11 50	10 31	7 81
6,489 00	45 50	90 50	6,446 39	75 88	125 54	145 05	10 61	10 32	3 55
6,521 00	49 00	89 90	6,468 11	75 81	149 03	163 07	11 02	10 94	-1 88
6,553 00	52 40	90 40	6,488 37	75 74	173 79	182 06	10 69	10 63	1 56
6,584 00	55 50	92 00	6,506 62	75 21	198 84	200 99	10 84	10 00	5 16
6,616 00	58 40	93 40	6,524 07	73 94	225 63	220 78	9 78	9 06	4 38
6,648 00	62 50	93 90	6,539 84	72 16	253 41	241 01	12 88	12 81	1 56
6,679 00	67 60	93 30	6,552 92	70 40	281 45	261 45	16 54	16 45	-1 94
6,711 00	72 00	93 10	6,563 96	68 73	311 43	283 43	13 76	13 75	-0 63
6,743 00	74 10	92 70	6,573 29	67 18	342 00	305 95	6 67	6 56	-1 25
6,774 00	76 10	93 00	6,581 26	65 69	371 91	328 01	6 52	6 45	0 97
6,806 00	77 20	92 20	6,588 65	64 28	403 02	351 03	4 21	3 44	-2 50
6,838 00	77 70	92 20	6,595 61	63 08	434 23	374 26	1 56	1 56	0 00
6,856 09	78 28	92 14	6,599 37	62 41	451 91	387 43	3 24	3 23	-0 32
LP2[R12SR@1H]									
6,866 66	78 62	92 11	6,601 48	62 02	462 26	395 15	3 24	3 23	-0 32
LP[R12SR@1H]									
6,869 00	78 70	92 10	6,601 94	61 94	464 55	396 86	3 24	3 23	-0 32
6,901 00	80 70	92 20	6,607 67	60 76	496 01	420 30	6 26	6 25	0 31
6,933 00	83 50	91 50	6,612 06	59 74	527 69	444 00	9 01	8 75	-2 19
6,964 00	85 70	91 20	6,614 98	59 01	558 54	467 27	7 16	7 10	-0 97
6,996 00	86 50	91 90	6,617 16	58 15	590 45	491 26	3 32	2 50	2 19
7,028 00	86 90	91 80	6,619 00	57 11	622 39	515 15	1 29	1 25	-0 31
7,059 00	89 00	91 90	6,620 11	56 11	653 35	538 33	6 78	6 77	0 32
7,091 00	89 30	92 50	6,620 58	54 89	685 32	562 13	2 10	0 94	1 88
7,122 00	89 50	92 60	6,620 91	53 51	716 29	585 06	0 72	0 65	0 32
7,186 00	88 60	91 20	6,621 97	51 38	780 24	632 89	2 60	-1 41	-2 19
7,281 00	88 60	94 20	6,624 29	46 91	875 10	702 98	3 16	0 00	3 16
7,376 00	88 40	96 00	6,626 78	38 47	969 68	770 33	1 91	-0 21	1 89
7,471 00	90 10	98 60	6,628 02	26 40	1,063 89	835 07	3 27	1 79	2 74
7,567 00	88 20	103 80	6,629 45	7 76	1,158 02	895 54	5 77	-1 98	5 42
7,661 00	82 30	104 80	6,637 23	-15 36	1,248 75	950 54	6 37	-6 28	1 06
7,756 00	80 60	102 10	6,651 35	-37 21	1,340 11	1,006 83	3 33	-1 79	-2 84
7,851 00	85 90	97 80	6,662 52	-53 48	1,432 98	1,067 85	7 16	5 58	-4 53
7,946 00	88 80	96 20	6,666 91	-65 05	1,527 16	1,132 89	3 49	3 05	-1 68
8,040 00	90 90	91 90	6,667 16	-71 68	1,620 89	1,200 73	5 09	2 23	-4 57
8,135 00	91 70	90 30	6,665 00	-73 51	1,715 85	1,272 59	1 88	0 84	-1 68
8,230 00	92 00	89 40	6,661 94	-73 26	1,810 80	1,345 77	1 00	0 32	-0 95
8,326 00	92 50	91 20	6,658 17	-73 76	1,906 72	1,419 22	1 94	0 52	1 88
8,421 00	92 50	90 40	6,654 02	-75 09	2,001 62	1,491 35	0 84	0 00	-0 84
8,516 00	91 30	87 60	6,650.87	-73 43	2,096 54	1,565 41	3 21	-1 26	-2 95
8,611 00	92 70	88 40	6,647 56	-70 11	2,191 42	1,640 50	1 70	1 47	0 84
8,706 00	93 80	88 20	6,642 17	-67 30	2,286 22	1,715 21	1 18	1 16	-0 21

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8,801 00	93 90	88 00	6,635 79	-64 16	2,380 96	1,790 07	0 23	0 11	-0 21
8,896 00	94 30	88 00	6,629 00	-60 85	2,475 66	1,865 01	0 42	0 42	0 00
8,990 00	93 30	88 10	6,622 77	-57 66	2,569 40	1,939 14	1 07	-1 06	0 11
9,085 00	92 40	87 30	6,618 05	-53 85	2,664 20	2,014 49	1 27	-0 95	-0 84
9,180 00	91 70	87 70	6,614 65	-49 71	2,759 05	2,090 08	0 85	-0 74	0 42
9,276 00	89 80	89 30	6,613 39	-47 20	2,855 00	2,165 47	2 59	-1 98	1 67
9,370 00	87 80	88 10	6,615 36	-45 07	2,948 95	2,239 09	2 48	-2 13	-1 28
-9,466 00	87 30	89 80	6,619 46	-43 31	3,044 84	2,313 96	1 84	-0 52	1 77
9,561 00	87 60	90 30	6,623 69	-43 39	3,139 75	2,386 89	0 61	0 32	0 53
9,656 00	86 90	90 40	6,628 25	-43 97	3,234 63	2,459 50	0 74	-0 74	0 11
9,750 00	87 20	90 00	6,633 09	-44 30	3,328 51	2,531 48	0 53	0 32	-0 43
9,846 00	88 10	89 00	6,637 02	-43 46	3,424 42	2,605 78	1 40	0 94	-1 04
9,941 00	88 70	88 50	6,639 68	-41 39	3,519 36	2,680 12	0 82	0 63	-0 53
10,035 00	88 40	90 20	6,642 05	-40 32	3,613 32	2,753 06	1 84	-0 32	1 81
10,130 00	88 40	89 40	6,644 71	-39 99	3,708 28	2,826 30	0 84	0 00	-0 84
10,225 00	88 80	89 40	6,647 03	-39 00	3,803 25	2,899 97	0 42	0 42	0 00
10,320 00	88 70	89 80	6,649 10	-38 34	3,898 22	2,973 43	0 43	-0 11	0 42
10,416 00	91 10	88 60	6,649 27	-36 99	3,994 21	3,048 11	2 80	2 50	-1 25
10,511 00	91 30	91 40	6,647 28	-36 99	4,089 18	3,121 14	2 95	0 21	2 95
10,606 00	90 00	92 90	6,646 20	-40 56	4,184 10	3,191 87	2 09	-1 37	1 58
10,702 00	87 30	94 30	6,648 46	-46 58	4,279 87	3,261 67	3 17	-2 81	1 46
10,796 00	86 50	94 40	6,653 55	-53 70	4,373 46	3,329 09	0 86	-0 85	0 11
10,859 00	87 70	94 50	6,656 73	-58 58	4,436 19	3,374 22	1 91	1 90	0 16
10,954 00	88 40	94 60	6,659 97	-66 12	4,530 84	3,442 19	0 74	0 74	0 11
11,058 00	89 80	92 70	6,661 60	-72 74	4,634 60	3,517 76	2 27	1 35	-1 83
11,110 00	89 80	92 70	6,661 78	-75 19	4,686 55	3,556 14	0 00	0 00	0 00

Proj. to Bit - PBHL#1[R12SC#1H] - PBHL#2[R12SC#1H]

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		
		+N/-S (ft)	+E/-W (ft)	Comment
6,142 00	6,140 77	56 62	-21 43	First MWD Survey
11,110 00	6,661 78	-75 19	4,686 55	Proj. to Bit

Checked By: _____ Approved By: _____ Date: _____