

COG Operating, LLC

Eddy County, NM

Sec 5 T26-S R29-E

Hambone Fee Com #2H

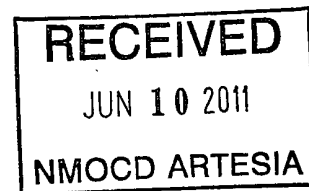
Wellbore #1

30-015-38318

Survey: Hambone Fee Com #2H

DDC Survey Report

17 January, 2011



DDC Survey Report



Company: COG Operating, LLC
Project: Eddy County, NM
Site: Sec 5 T26-S R29-E
Well: Hambone Fee Com #2H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Hambone Fee Com #2H
TVD Reference: WELL @ 0 0usft (Patriot #3)
MD Reference: WELL @ 0 0usft (Patriot #3)
North Reference: Gnd
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

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

Site Sec 5 T26-S R29-E

Site Position: **From:** Map **Northing:** 389,220.70 usft **Latitude:** 32° 4' 11.677 N
Position Uncertainty: 0.0 usft **Easting:** 599,085.80 usft **Longitude:** 104° 8' 48.840 W
Slot Radius: 13-3/16 " **Grid Convergence:** 0 10 °

Well Hambone Fee Com #2H
Well Position **+N/-S** 0.0 usft **Northing:** 389,220.70 usft **Latitude:** 32° 4' 11.677 N
+E/-W 0.0 usft **Easting:** 599,085.80 usft **Longitude:** 104° 8' 48.840 W
Position Uncertainty 0.0 usft **Wellhead Elevation:** usft **Ground Level:** 0 0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/30/2010	7.89	59.95	48,529

Design Wellbore #1

Audit Notes:

Version: 1 0 **Phase:** ACTUAL **Tie On Depth:** 0 0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 0	-0 0	0.0	89.83

Survey Program **Date** 1/17/2011

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	6,491 0	GYRO (Wellbore #1)		
6,562 0	11,594 0	Hambone Fee Com #2H (Wellbore #1)		

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)
Tie-in to Gyro									
6,491 0	2.05	218.98	6,488.4	-120.3	42.7	42.3	0.00	0.00	0.00
6,562 0	1.40	214.20	6,559.3	-122.0	41.4	41.0	0.94	-0.92	-6.73
6,593 0	2.10	120.30	6,590.3	-122.6	41.7	41.3	8.39	2.26	-302.90
6,625 0	5.10	100.80	6,622.3	-123.2	43.6	43.2	9.99	9.38	-60.94
6,657 0	8.20	91.50	6,654.0	-123.5	47.2	46.9	10.22	9.69	-29.06
6,689 0	11.40	86.10	6,685.6	-123.3	52.7	52.3	10.39	10.00	-16.88
6,721.0	14.60	83.60	6,716.7	-122.7	59.8	59.5	10.15	10.00	-7.81
6,753 0	18.00	83.10	6,747.5	-121.6	68.8	68.4	10.63	10.63	-1.56
6,784.0	21.50	83.70	6,776.6	-120.4	79.2	78.8	11.31	11.29	1.94

DDC

Survey Report



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Design: Wellbore #1

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MD Reference: WELL @ 0 0usft (Patriot #3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

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)
6,816 0	25 10	84 40	6,806 0	-119 1	91 8	91.4	11.28	11.25	2.19
6,848.0	28 90	83 90	6,834.5	-117 6	106 2	105.9	11.90	11 88	-1 56
6,880 0	32.10	83 10	6,862.1	-115 8	122.3	122 0	10.08	10 00	-2 50
6,912 0	34.90	82.70	6,888.8	-113 6	139 9	139 5	8.78	8.75	-1 25
6,943 0	37 60	82 80	6,913 8	-111 3	158.0	157 7	8.71	8 71	0 32
6,975 0	39.80	84 30	6,938 7	-109 0	177.9	177 6	7 47	6 88	4 69
7,007 0	42.60	85 20	6,962.8	-107.1	198.9	198.6	8 94	8 75	2.81
7,038.0	45 50	86.50	6,985 1	-105 6	220.4	220.1	9 80	9.35	4.19
7,070.0	48 40	86.80	7,006.9	-104 2	243.7	243.4	9 09	9.06	0.94
7,102.0	51 90	87 10	7,027 4	-102.9	268 3	268.0	10 96	10.94	0 94
7,134 0	55 40	87 80	7,046.4	-101 8	294 0	293 7	11.08	10.94	2 19
7,166 0	58 90	87 90	7,063 8	-100 7	320 9	320.6	10.94	10 94	0 31
7,197 0	62.30	87 90	7,079 0	-99 8	347 9	347 6	10.97	10.97	0 00
7,229 0	66.20	87 80	7,092 9	-98 7	376.7	376.4	12.19	12.19	-0 31
7,261 0	70.50	87 90	7,104.7	-97.6	406.4	406 1	13.44	13.44	0 31
7,293 0	74 90	88 40	7,114.2	-96 6	436.9	436.6	13 83	13 75	1 56
7,324 0	78 90	88.10	7,121 2	-95.7	467.1	466 8	12 94	12.90	-0.97
7,356 0	83 10	87 80	7,126 2	-94 5	498 7	498.4	13 16	13 13	-0.94
7,388.0	87 80	87 20	7,128.8	-93 1	530 5	530 2	14 81	14.69	-1 88
7,451.0	90 00	86 90	7,130 0	-89 9	593.4	593.1	3.52	3.49	-0.48
7,515.0	90 20	86.70	7,129 9	-86 3	657.3	657.1	0.44	0 31	-0 31
7,578 0	90.10	86 70	7,129 7	-82 7	720.2	720 0	0.16	-0.16	0 00
7,674 0	90.70	86 40	7,129 0	-76 9	816.0	815 8	0.70	0.63	-0.31
7,768 0	91.00	87 20	7,127 6	-71 7	909 9	909.7	0.91	0.32	0.85
7,864 0	89 30	87 20	7,127 4	-67 0	1,005 8	1,005.6	1 77	-1 77	0 00
7,958 0	89 90	87.40	7,128 0	-62 6	1,099 7	1,099.5	0 67	0 64	0 21
8,053 0	90.50	87.60	7,127 7	-58 4	1,194 6	1,194.4	0 67	0.63	0 21
8,149 0	89 50	87.70	7,127.7	-54 5	1,290 5	1,290.3	1 05	-1 04	0 10
8,244 0	90 30	87 80	7,127 9	-50.7	1,385.4	1,385 2	0.85	0 84	0 11
8,339 0	90 90	88 90	7,126.9	-48.0	1,480.4	1,480.2	1 32	0 63	1 16
8,435.0	88 70	88 10	7,127 2	-45.5	1,576.3	1,576.2	2 44	-2.29	-0 83
8,530 0	89.60	88.40	7,128 6	-42 6	1,671 3	1,671.1	1.00	0 95	0 32
8,625 0	88 40	88 00	7,130 3	-39.6	1,766.2	1,766.1	1 33	-1 26	-0.42
8,721 0	88.80	88.40	7,132.6	-36 6	1,862.1	1,862 0	0 59	0 42	0.42
8,816 0	88 80	88 30	7,134.6	-33 9	1,957 1	1,957.0	0 11	0 00	-0.11
8,911.0	88 70	88.10	7,136 7	-30 9	2,052 0	2,051 9	0 24	-0.11	-0.21
9,007 0	89.10	87 90	7,138 5	-27 5	2,147.9	2,147 8	0.47	0 42	-0.21
9,102.0	89 60	87.90	7,139.6	-24.0	2,242 8	2,242 8	0.53	0.53	0 00
9,197 0	88 40	87 80	7,141.3	-20.5	2,337.8	2,337 7	1.27	-1 26	-0 11
9,293 0	87 70	86 90	7,144 5	-16 0	2,433 6	2,433 5	1 19	-0 73	-0 94
9,388 0	88.40	87 80	7,147 8	-11.7	2,528.4	2,528 4	1.20	0 74	0.95
9,483 0	88 80	88.10	7,150 1	-8.3	2,623 4	2,623.3	0 53	0 42	0.32
9,578.0	89.50	88 50	7,151 5	-5 4	2,718 3	2,718 3	0 85	0 74	0.42

DDC

Survey Report



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Design: Wellbore #1

Local Co-ordinate Reference: Well Hambone Fee Com #2H
TVD Reference: WELL @ 0 0usft (Patriot #3)
MD Reference: WELL @ 0.0usft (Patriot #3)
North Reference: Grd
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

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)
9,674 0	89 90	89 40	7,152.0	-3 7	2,814 3	2,814.3	1 03	0 42	0 94
9,769 0	89 90	89 50	7,152 2	-2 8	2,909 3	2,909 3	0 11	0 00	0 11
9,833 0	88 70	88 70	7,152 9	-1 8	2,973 3	2,973 2	2 25	-1 88	-1.25
9,896 0	89 40	88 90	7,154 0	-0 4	3,036 2	3,036 2	1 16	1 11	0 32
9,959.0	90 40	89 90	7,154.1	0 2	3,099 2	3,099 2	2.24	1 59	1 59
10,023 0	90 70	90 10	7,153 5	0 2	3,163.2	3,163 2	0 56	0 47	0 31
10,086.0	91 30	90 20	7,152 4	0.0	3,226.2	3,226 2	0 97	0 95	0 16
10,150 0	91 10	89 90	7,151 0	0.0	3,290.2	3,290.2	0.56	-0 31	-0 47
10,245 0	89 70	89 00	7,150 4	0 9	3,385 2	3,385 2	1 75	-1 47	-0 95
10,340 0	90 30	89 00	7,150.4	2 6	3,480 2	3,480 2	0 63	0 63	0.00
10,436 0	89 30	88 90	7,150 7	4 3	3,576 2	3,576 2	1 05	-1 04	-0 10
10,531 0	89 70	88.60	7,151 5	6 4	3,671 1	3,671 1	0 53	0 42	-0 32
10,626 0	89 30	89 00	7,152.4	8 4	3,766 1	3,766 1	0 60	-0 42	0.42
10,722 0	90.10	88 60	7,152.9	10.4	3,862 1	3,862 1	0 93	0 83	-0 42
10,817 0	89 70	89 40	7,153 0	12 1	3,957 1	3,957 1	0 94	-0.42	0 84
10,912 0	89 60	90 60	7,153 6	12.1	4,052 1	4,052 1	1 27	-0 11	1 26
11,008 0	87 90	90 10	7,155 7	11 5	4,148.0	4,148.1	1 85	-1 77	-0 52
11,103.0	89 90	93 20	7,157 5	8 7	4,243 0	4,243 0	3 88	2 11	3 26
11,199 0	87 30	93.60	7,159 9	3.0	4,338 8	4,338 8	2 74	-2.71	0 42
11,294 0	87 60	95 90	7,164.1	-4 8	4,433 3	4,433 3	2 44	0 32	2 42
11,389 0	88 60	97.60	7,167 3	-16.0	4,527 6	4,527 6	2 08	1 05	1 79
11,538 0	86 70	98 80	7,173 4	-37 2	4,675 0	4,674 8	1 51	-1.28	0 81
Projection to Bit									
11,594.0	86 70	98.80	7,176 6	-45 8	4,730 2	4,730 1	0 00	0 00	0.00

Survey Annotations

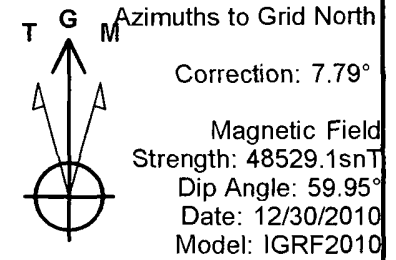
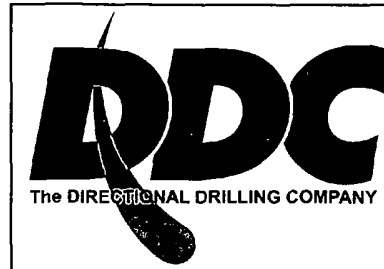
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,491 0	6,488 4	-120.3	42 7	Tie-in to Gyro
11,594 0	7,176 6	-45.8	4,730 2	Projection to Bit

Checked By: _____	Approved By: _____	Date: _____
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Hambone Fee Com #2H
Eddy County, NM
Q100877 & WT-11001

Company Name: COG Operating, LLC
Hambone Fee Com #2H
Eddy County, NM
Rig: Patriot #3
Created By: Shane Robbins
Date: 01/17/2011

COG Operating, LLC.



WELL DETAILS: Hambone Fee Com #2H					
+N-S	+E-W	Northing	Ground Level.	0 0	Longitude
0.0	0.0	389229.70	599015.80	Latitude 32° 4' 11.677 N	104° 8' 48.840 W

PROJECT DETAILS		Eddy County, NM
Geodetic System:	US State Plane 1983	
Datum:	North American Datum 1983	
Ellipsoid:	GRS 1980	
Zone:	New Mexico Eastern Zone	
System Datum:	Mean Sea Level	

ANNOTATIONS									
MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Departure	Annotation	
6491.0	2.05	218.98	6488.4	-120.3	42.7	4730.1	160.4	Tie-in to Gyro	
11594.0	86.70	98.80	7176.6	-45.8	4730.2		4855.8	Projection to Bit	

DESIGN TARGET DETAILS						
Name	TVD	+N-S	+E-W	Northing	Eastings	Latitude
PBHL Hambone Fee Com #2H	7150.0	14.2	4734.0	389234.90	603819.80	32° 4' 11.733 N
- plan hits target center						
						Longitude 104° 7' 53.820 W

