

30-015-38595

COG OPERATING

Hay Hollow
Eddy County, NM
Honey Graham State #7H
VH - Job #32K0711715

Survey: Actual

SDI Standard Survey Report

This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notarized this date 22nd of September, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Honey Graham State #7H
Project:	Hay Hollow	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Honey Graham State #7H	North Reference:	Grid
Wellbore:	VH - Job #32K0711715	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0711715	Database:	EDM-Regulatory

Project	Hay Hollow		
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	Eddy County, NM		
Site Position:	Northing:	386,239 33 usft	Latitude: 32° 3' 42 020 N
From: Lat/Long	Easting:	572,312 98 usft	Longitude: 104° 5' 59 660 W
Position Uncertainty: 0 0 usft	Slot Radius: 13-3/16"	Grid Convergence:	0 12 °

Well	Honey Graham State #7H, Directional (DDC)		
Well Position	+N/-S 0 0 usft	Northing: 370,708 37 usft	Latitude: 32° 1' 8 400 N
	+E/-W 0 0 usft	Easting: 568,288 15 usft	Longitude: 104° 6' 46 800 W
Position Uncertainty	0 0 usft	Wellhead Elevation: usft	Ground Level: 0 0 usft

Wellbore	VH - Job #32K0711715				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/28/2011	7 80	59 90	48,445

Design	VH - Job #32K0711715			
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	180 07

Survey Program	Date 9/21/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	4,568 0	Actual (VH - Job #32K0711715)	Keeper	Keeper Gyro

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0	
100 0	0 97	249 32	100 0	-0 3	-0 8	249 32	0 8	
200 0	1 07	241 26	200 0	-1 0	-2 4	246 46	2 6	
300 0	1 00	278 52	300 0	-1 4	-4 1	251 50	4 3	
400 0	1 37	278 50	399 9	-1 1	-6 1	260 18	6 2	
500 0	1 67	281 77	499 9	-0 6	-8 7	266 16	8 8	
600 0	2 03	281 55	599 9	0 1	-11 9	270 31	11 9	
700 0	1 90	284 83	699 8	0 8	-15 2	273 17	15 3	
800 0	2 39	291 15	799 7	2 0	-18 8	276 14	18 9	
900 0	2 81	293 91	899 6	3 8	-23 0	279 31	23 3	
1,000 0	2 98	287 82	999 5	5 6	-27 7	281 35	28 2	
1,100 0	2 94	289 35	1,099 4	7 2	-32 6	282 46	33 4	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Honey Graham State #7H
Project:	Hay Hollow	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Honey Graham State #7H	North Reference:	Grid
Wellbore:	VH - Job #32K0711715	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0711715	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200 0	2 87	286 14	1,199 2	8 7	-37 4	283 16	38 4
1,300 0	2 30	277 75	1,299 1	9 7	-41 8	283 08	42 9
1,400 0	1 93	261 14	1,399 1	9.7	-45 5	282 08	46 5
1,500 0	1 51	265 22	1,499 0	9 4	-48 4	280 93	49 3
1,600 0	0 19	159 60	1,599 0	9 1	-49 7	280 37	50 5
1,700 0	0 53	98 49	1,699 0	8 9	-49 2	280 22	50 0
1,800 0	0 51	116 43	1,799 0	8 6	-48 3	280 09	49 1
1,900 0	1 91	94 39	1,899 0	8 3	-46 3	280 14	47 0
2,000.0	3 28	91 44	1,998 9	8 1	-41 7	280 95	42 5
2,100 0	3 11	88 38	2,098 7	8 1	-36 2	282 60	37 0
2,200 0	1 99	89 59	2,198 6	8 2	-31 7	284 45	32 7
2,300 0	1 21	75 86	2,298 6	8 4	-28 9	286 25	30 2
2,400 0	0 81	75 70	2,398 6	8 9	-27 2	288 04	28 6
2,500 0	0 89	70 11	2,498 6	9 3	-25 8	289 82	27 5
2,600 0	0 55	74 18	2,598 5	9 7	-24 6	291 50	26 5
2,700 0	0 83	67 57	2,698 5	10 1	-23 5	293 28	25 6
2,800 0	0 53	66 69	2,798 5	10 6	-22 4	295 26	24.8
2,900 0	0 71	61 77	2,898 5	11 0	-21 4	297 26	24 1
3,000 0	0 47	86 82	2,998 5	11 4	-20 5	299 02	23 4
3,100 0	0 25	87 93	3,098 5	11 4	-19 9	299 85	22 9
3,200 0	0 41	141 05	3,198 5	11 1	-19 4	299 82	22 4
3,300 0	0 27	167 81	3,298 5	10 6	-19 1	299 02	21 9
3,400 0	0 23	119 33	3,398 5	10 3	-18 9	298 54	21 5
3,500 0	0 24	181 72	3,498 5	10 0	-18 7	298 03	21 2
3,600 0	0 22	231 16	3,598 5	9 6	-18 9	297 05	21 2
3,700 0	0 42	210 85	3,698 5	9 2	-19 2	295 59	21 3
3,800 0	0 38	241 36	3,798 5	8 7	-19 7	293 91	21 6
3,900 0	0 68	212 40	3,898 5	8 1	-20.3	291 68	21 9
4,000 0	0 53	222 09	3,998 5	7 2	-21 0	289 05	22 2
4,100 0	0 95	218 67	4,098 5	6 2	-21 8	286 00	22 7
4,200 0	1 05	219 50	4,198 5	4 9	-22 9	282 07	23 4
4,300 0	1 09	222 28	4,298 5	3 5	-24 1	278 22	24 4
4,400 0	1 25	225 46	4,398 4	2 0	-25 5	274 51	25 6
4,500 0	1 65	218 63	4,498 4	0 1	-27 2	270 26	27 2
4,568 0	1 77	219 72	4,566 4	-1 4	-28 5	267 09	28 5



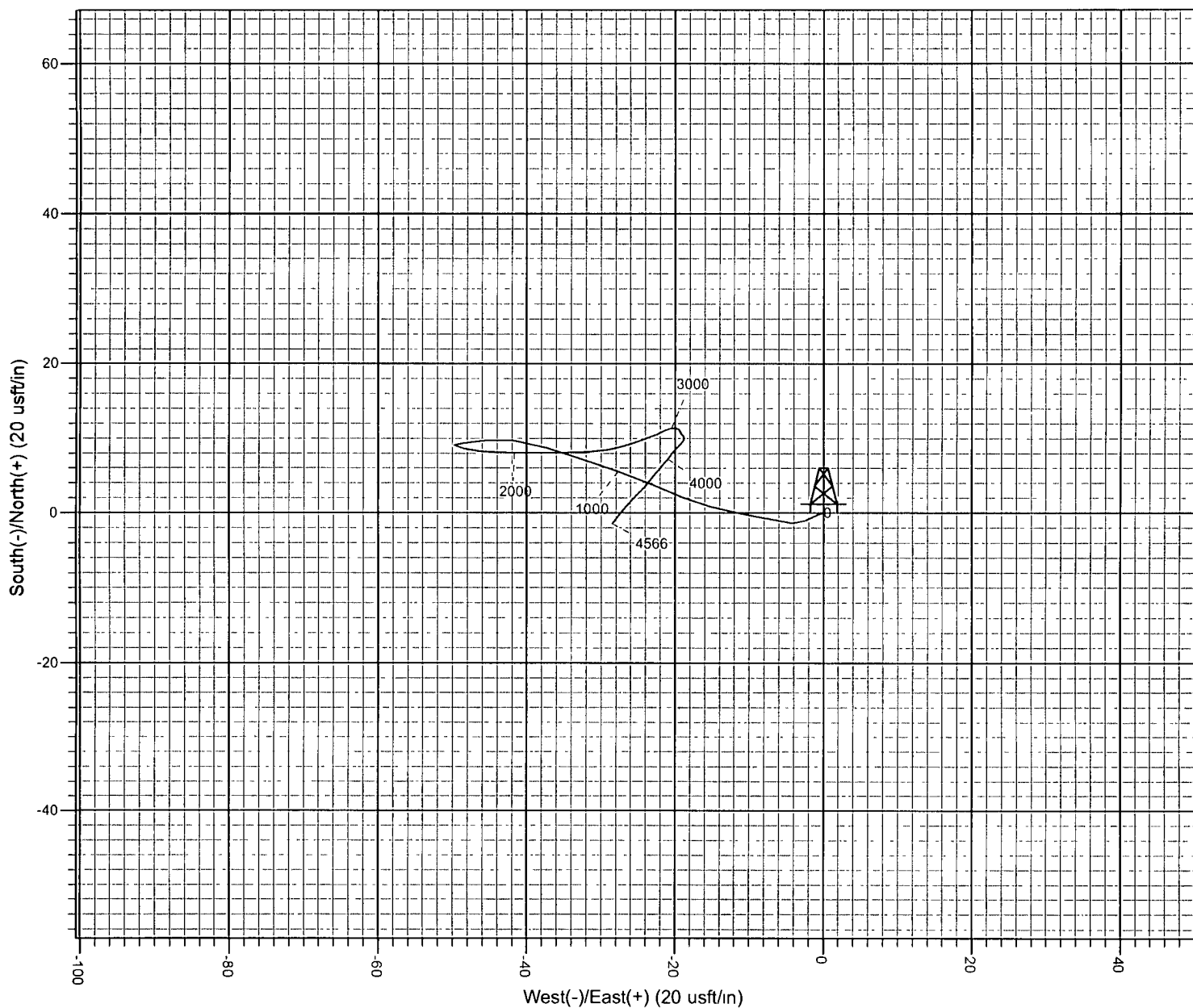
Project: Hay Hollow
Eddy County, NM
Well: Honey Graham State #7H
Wellbore: VH - Job #32K0711715
Design: VH - Job #32K0711715



Azimuths to Grid North
True North -0 12°
Magnetic North 7 69°
Magnetic Field
Strength 48445.1snT
Dip Angle 59.90°
Date 7/28/2011
Model IGRF2010

WELL DETAILS: Honey Graham State #7H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0 0	0 0	370708.37	568288.15	32° 1' 8.400 N	104° 6' 46.800 W	



PROJECT DETAILS: Hay Hollow
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 32° 3' 42.020 N
Longitude: 104° 5' 59.660 W
Positional Uncertainty: 0.0
Convergence: 0.12
Local North: Grid

COG Operating, LLC

Eddy County, NM

Sec 29, T26S, R28E

Honey Graham 29 State #7H

Wellbore #1

Design: Wellbore #1

DDC Survey Report

09 August, 2011



DDC
Survey Report



Company: COG Operating, LLC
Project: Eddy County, NM
Site: Sec 29, T26S, R28E
Well: Honey Graham 29 State #7H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Honey Graham 29 State #7H
TVD Reference: WELL @ 2995.8usft (Original Well Elev)
MD Reference: WELL @ 2995.8usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

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

Site	Sec 29, T26S, R28E				
Site Position:		Northing:	371,041.79 usft	Latitude:	32° 1' 11.562 N
From:	Map	Easting:	610,356.46 usft	Longitude:	104° 6' 38.287 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0 12 °

Well	Honey Graham 29 State #7H					
Well Position	+N/-S	0.0 usft	Northing:	370,719.12 usft	Latitude:	32° 1' 8.382 N
	+E/-W	0.0 usft	Easting:	609,695.56 usft	Longitude:	104° 6' 45.971 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	2,995.8 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/25/2011	7 80	59 90	48,424

Design	Wellbore #1				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0 0	0 0	0 0	180 07	

Survey Program		Date	8/9/2011	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	4,568.0	GYRO (Wellbore #1)	Good_gyro	Good Gyro
4,671.0	12,920.0	MWD (Wellbore #1)	MWD default	MWD - Standard

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 into Scientific Gyro									
4,568.0	1.77	219.72	4,566.4	-1.4	-28.5	1.5	0.18	0.18	1.60
4,671.0	1.90	209.10	4,669.3	-4.2	-30.3	4.2	0.35	0.13	-10.31
4,859.0	1.50	196.70	4,857.2	-9.2	-32.5	9.3	0.29	-0.21	-6.60
5,044.0	1.50	196.60	5,042.2	-13.9	-33.9	13.9	0.00	0.00	-0.05
5,230.0	1.60	178.60	5,228.1	-18.8	-34.6	18.9	0.27	0.05	-9.68
5,418.0	1.70	176.60	5,416.0	-24.2	-34.3	24.3	0.06	0.05	-1.06
5,605.0	2.00	175.40	5,602.9	-30.2	-33.9	30.3	0.16	0.16	-0.64
5,792.0	1.80	184.00	5,789.8	-36.4	-33.9	36.5	0.19	-0.11	4.60
5,979.0	1.90	180.00	5,976.7	-42.5	-34.1	42.5	0.09	0.05	-2.14

DDC
Survey Report



Company: COG Operating, LLC
Project: Eddy County, NM
Site: Sec 29, T26S, R28E
Well: Honey Graham 29.State #7H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Honey Graham 29 State #7H
TVD Reference: WELL @ 2995 8usft (Original Well Elev)
MD Reference: WELL @ 2995 8usft (Original Well Elev)
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)
6,061.0	1 80	180.80	6,058 7	-45 1	-34 1	45 1	0 13	-0 12	0 98
6,092.0	2 50	180.80	6,089 7	-46 3	-34 1	46.3	2 26	2 26	0 00
6,123 0	6 60	179 60	6,120 6	-48.7	-34 1	48 8	13 23	13 23	-3 87
6,154 0	11.80	177 90	6,151 2	-53 7	-34 0	53 7	16 80	16 77	-5 48
6,186 0	16 10	177 00	6,182 2	-61 4	-33.6	61 4	13 45	13 44	-2 81
6,217 0	19.50	177 60	6,211.7	-70.8	-33 2	70 9	10.98	10 97	1 94
6,248 0	22 30	179.10	6,240.7	-81 9	-32.9	81 9	9 20	9 03	4 84
6,280 0	25 00	180.70	6,270 0	-94.7	-32 8	94 8	8 67	8 44	5 00
6,312 0	27 10	180.60	6,298.7	-108 8	-33.0	108 8	6 56	6.56	-0 31
6,343 0	29 60	180 50	6,326 0	-123 5	-33 1	123 5	8 07	8 06	-0 32
6,374 0	32.60	180 50	6,352 5	-139 5	-33.3	139 6	9 68	9.68	0.00
6,406 0	35 90	179 80	6,379 0	-157.5	-33.3	157.6	10.39	10 31	-2 19
6,437 0	38 90	178 60	6,403.6	-176 3	-33 1	176 4	9 96	9 68	-3 87
6,468.0	42.20	177.10	6,427 2	-196 5	-32 3	196 5	11 10	10 65	-4 84
6,500 0	45 20	176.50	6,450 3	-218.5	-31.1	218.6	9.46	9 38	-1 88
6,531 0	48 10	177 70	6,471.6	-241 1	-29 9	241.1	9 77	9 35	3 87
6,562 0	50.60	178 60	6,491 8	-264 6	-29.2	264.6	8 36	8.06	2.90
6,594.0	54 20	179 40	6,511 3	-289 9	-28 7	289 9	11 42	11 25	2 50
6,625 0	57 80	180 00	6,528 6	-315.6	-28 6	315 6	11 72	11 61	1 94
6,656.0	61 30	180.40	6,544 3	-342 3	-28 7	342 4	11 34	11 29	1 29
6,687 0	64 50	180.00	6,558 5	-369 9	-28 8	370 0	10 39	10 32	-1.29
6,718.0	68 30	179 30	6,570 9	-398.3	-28 6	398 4	12 43	12 26	-2.26
6,750 0	71 30	179.00	6,581 9	-428 3	-28 2	428 4	9 42	9 38	-0 94
6,781 0	74 20	178 80	6,591.1	-457 9	-27.6	458 0	9 38	9 35	-0 65
6,812 0	76.80	179 10	6,598 9	-487 9	-27 0	488 0	8 44	8 39	0.97
6,843 0	79.70	179 40	6,605 2	-518.3	-26.7	518.3	9 40	9 35	0.97
6,874.0	82 80	179.50	6,609.9	-548 9	-26 4	549 0	10.01	10 00	0.32
6,905 0	85 80	179 30	6,613 0	-579 8	-26 0	579 8	9 70	9 68	-0.65
6,967 0	89 20	178 60	6,615.7	-641 7	-24 9	641.7	5 60	5 48	-1 13
7,029 0	90 30	178.40	6,615 9	-703 7	-23.3	703 7	1 80	1 77	-0 32
7,091.0	90 70	178 70	6,615 4	-765 6	-21 7	765 7	0 81	0 65	0 48
7,154 0	90.20	178 20	6,614.9	-828 6	-20 0	828 6	1.12	-0 79	-0 79
7,217 0	90 10	177 70	6,614 7	-891 6	-17 7	891 6	0 81	-0 16	-0 79
7,279 0	89.70	178 00	6,614 9	-953 5	-15.4	953.6	0 81	-0 65	0 48
7,310 0	90 00	178 40	6,614 9	-984 5	-14 4	984.5	1 61	0 97	1.29
7,342 0	90 70	179 40	6,614.7	-1,016 5	-13 8	1,016 5	3 81	2 19	3 13
7,372 0	89.90	179 80	6,614 6	-1,046.5	-13 6	1,046.5	2 98	-2 67	1 33
7,404 0	90.10	180 00	6,614 6	-1,078.5	-13.6	1,078 5	0 88	0 63	0 63
7,468 0	90 30	180 20	6,614 4	-1,142 5	-13 7	1,142 5	0 44	0 31	0 31
7,530.0	90 60	180 20	6,613.9	-1,204.5	-13.9	1,204.5	0.48	0.48	0.00
7,594 0	91 30	180 50	6,612 8	-1,268.5	-14 3	1,268 5	1 19	1 09	0 47
7,657.0	89 70	179 70	6,612 3	-1,331 5	-14 4	1,331.5	2 84	-2 54	-1 27
7,721.0	87.70	179 30	6,613 7	-1,395 5	-13.8	1,395 5	3.19	-3 13	-0.63

DDC Survey Report



Company: COG Operating, LLC
Project: Eddy County, NM
Site: Sec 29, T26S, R28E
Well: Honey Graham 29 State #7H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Honey Graham 29 State #7H
TVD Reference: WELL @ 2995.8usft (Original Well Elev)
MD Reference: WELL @ 2995.8usft (Original Well Elev)
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)
7,784.0	88.30	179.70	6,615.9	-1,458.4	-13.3	1,458.4	1.14	0.95	0.63
7,848.0	88.90	179.60	6,617.5	-1,522.4	-12.9	1,522.4	0.95	0.94	-0.16
7,911.0	89.40	179.70	6,618.4	-1,585.4	-12.5	1,585.4	0.81	0.79	0.16
7,975.0	89.80	179.40	6,618.9	-1,649.4	-12.0	1,649.4	0.78	0.63	-0.47
8,038.0	89.30	181.00	6,619.4	-1,712.4	-12.2	1,712.4	2.66	-0.79	2.54
8,102.0	89.20	181.30	6,620.2	-1,776.4	-13.5	1,776.4	0.49	-0.16	0.47
8,165.0	89.30	180.90	6,621.0	-1,839.4	-14.7	1,839.4	0.65	0.16	-0.63
8,229.0	89.30	179.80	6,621.8	-1,903.3	-15.1	1,903.4	1.72	0.00	-1.72
8,292.0	89.60	180.10	6,622.4	-1,966.3	-15.1	1,966.4	0.67	0.48	0.48
8,356.0	90.10	180.60	6,622.6	-2,030.3	-15.5	2,030.4	1.10	0.78	0.78
8,419.0	90.50	180.20	6,622.2	-2,093.3	-15.9	2,093.4	0.90	0.63	-0.63
8,482.0	91.20	180.00	6,621.3	-2,156.3	-16.0	2,156.3	1.16	1.11	-0.32
8,546.0	90.50	180.30	6,620.4	-2,220.3	-16.2	2,220.3	1.19	-1.09	0.47
8,609.0	91.30	180.30	6,619.4	-2,283.3	-16.5	2,283.3	1.27	1.27	0.00
8,673.0	90.20	180.80	6,618.5	-2,347.3	-17.1	2,347.3	1.89	-1.72	0.78
8,736.0	90.40	181.30	6,618.2	-2,410.3	-18.3	2,410.3	0.85	0.32	0.79
8,800.0	89.90	180.40	6,618.0	-2,474.3	-19.2	2,474.3	1.61	-0.78	-1.41
8,863.0	90.00	179.50	6,618.1	-2,537.3	-19.2	2,537.3	1.44	0.16	-1.43
8,927.0	90.80	179.30	6,617.6	-2,601.3	-18.5	2,601.3	1.29	1.25	-0.31
8,990.0	89.80	180.10	6,617.3	-2,664.3	-18.2	2,664.3	2.03	-1.59	1.27
9,054.0	89.40	179.90	6,617.8	-2,728.3	-18.2	2,728.3	0.70	-0.63	-0.31
9,117.0	89.50	179.90	6,618.4	-2,791.3	-18.1	2,791.3	0.16	0.16	0.00
9,181.0	90.40	180.20	6,618.4	-2,855.3	-18.1	2,855.3	1.48	1.41	0.47
9,244.0	89.80	181.10	6,618.3	-2,918.3	-18.8	2,918.3	1.72	-0.95	1.43
9,308.0	89.90	181.30	6,618.5	-2,982.3	-20.2	2,982.3	0.35	0.16	0.31
9,371.0	90.10	181.40	6,618.5	-3,045.2	-21.6	3,045.3	0.35	0.32	0.16
9,435.0	89.10	180.20	6,618.9	-3,109.2	-22.5	3,109.2	2.44	-1.56	-1.88
9,498.0	89.80	180.30	6,619.5	-3,172.2	-22.8	3,172.2	1.12	1.11	0.16
9,561.0	90.10	180.20	6,619.6	-3,235.2	-23.1	3,235.2	0.50	0.48	-0.16
9,625.0	89.20	180.70	6,620.0	-3,299.2	-23.6	3,299.2	1.61	-1.41	0.78
9,688.0	88.40	179.80	6,621.3	-3,362.2	-23.9	3,362.2	1.91	-1.27	-1.43
9,752.0	88.60	179.50	6,623.0	-3,426.2	-23.5	3,426.2	0.56	0.31	-0.47
9,815.0	89.70	178.60	6,623.9	-3,489.2	-22.4	3,489.2	2.26	1.75	-1.43
9,879.0	89.80	178.20	6,624.2	-3,553.1	-20.6	3,553.2	0.64	0.16	-0.63
9,943.0	89.40	178.20	6,624.6	-3,617.1	-18.6	3,617.1	0.63	-0.63	0.00
10,006.0	90.20	179.30	6,624.8	-3,680.1	-17.3	3,680.1	2.16	1.27	1.75
10,070.0	90.60	180.00	6,624.4	-3,744.1	-16.9	3,744.1	1.26	0.63	1.09
10,133.0	90.90	180.00	6,623.6	-3,807.1	-16.9	3,807.1	0.48	0.48	0.00
10,197.0	90.20	178.90	6,623.0	-3,871.1	-16.3	3,871.1	2.04	-1.09	-1.72
10,260.0	90.00	179.70	6,622.9	-3,934.1	-15.5	3,934.1	1.31	-0.32	1.27
10,324.0	90.10	179.70	6,622.8	-3,998.1	-15.2	3,998.1	0.16	0.16	0.00
10,387.0	89.90	179.70	6,622.8	-4,061.1	-14.8	4,061.1	0.32	-0.32	0.00
10,451.0	89.80	179.40	6,623.0	-4,125.1	-14.3	4,125.1	0.49	-0.16	-0.47

DDC Survey Report



Company: COG Operating, LLC
Project: Eddy County, NM
Site: Sec 29, T26S, R28E
Well: Honey Graham 29 State #7H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Honey Graham 29 State #7H
TVD Reference: WELL @ 2995 8usft (Original Well Elev)
MD Reference: WELL @ 2995 8usft (Original Well Elev)
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)
10,514.0	90.60	179.10	6,622.7	-4,188.1	-13.5	4,188.1	1.36	1.27	-0.48
10,578.0	90.90	180.40	6,621.9	-4,252.0	-13.2	4,252.1	2.08	0.47	2.03
10,642.0	90.90	181.50	6,620.9	-4,316.0	-14.3	4,316.0	1.72	0.00	1.72
10,705.0	90.20	180.80	6,620.3	-4,379.0	-15.5	4,379.0	1.57	-1.11	-1.11
10,768.0	89.60	180.00	6,620.4	-4,442.0	-16.0	4,442.0	1.59	-0.95	-1.27
10,832.0	90.00	179.60	6,620.6	-4,506.0	-15.8	4,506.0	0.88	0.63	-0.63
10,895.0	90.20	179.10	6,620.5	-4,569.0	-15.0	4,569.0	0.85	0.32	-0.79
10,959.0	90.10	180.40	6,620.4	-4,633.0	-14.8	4,633.0	2.04	-0.16	2.03
11,022.0	90.00	181.00	6,620.3	-4,696.0	-15.5	4,696.0	0.97	-0.16	0.95
11,086.0	90.10	180.30	6,620.2	-4,760.0	-16.3	4,760.0	1.10	0.16	-1.09
11,149.0	90.10	180.00	6,620.1	-4,823.0	-16.4	4,823.0	0.48	0.00	-0.48
11,244.0	89.90	179.60	6,620.1	-4,918.0	-16.1	4,918.0	0.47	-0.21	-0.42
11,308.0	88.80	178.60	6,620.9	-4,982.0	-15.1	4,982.0	2.32	-1.72	-1.56
11,403.0	89.40	179.90	6,622.3	-5,077.0	-13.8	5,077.0	1.51	0.63	1.37
11,498.0	89.20	180.40	6,623.5	-5,171.9	-14.1	5,172.0	0.57	-0.21	0.53
11,562.0	89.40	180.20	6,624.3	-5,235.9	-14.4	5,236.0	0.44	0.31	-0.31
11,657.0	89.10	179.90	6,625.5	-5,330.9	-14.5	5,330.9	0.45	-0.32	-0.32
11,721.0	89.70	179.80	6,626.2	-5,394.9	-14.3	5,394.9	0.95	0.94	-0.16
11,815.0	90.20	178.90	6,626.3	-5,488.9	-13.3	5,488.9	1.10	0.53	-0.96
11,910.0	91.20	179.40	6,625.1	-5,583.9	-11.9	5,583.9	1.18	1.05	0.53
12,004.0	92.00	179.90	6,622.5	-5,677.9	-11.3	5,677.9	1.00	0.85	0.53
12,100.0	91.00	180.20	6,620.0	-5,773.8	-11.4	5,773.8	1.09	-1.04	0.31
12,194.0	89.90	179.30	6,619.3	-5,867.8	-11.0	5,867.8	1.51	-1.17	-0.96
12,288.0	89.80	178.90	6,619.5	-5,961.8	-9.5	5,961.8	0.44	-0.11	-0.43
12,384.0	89.50	178.60	6,620.1	-6,057.8	-7.4	6,057.8	0.44	-0.31	-0.31
12,479.0	89.40	177.20	6,621.0	-6,152.7	-3.9	6,152.7	1.48	-0.11	-1.47
12,542.0	90.10	178.80	6,621.3	-6,215.7	-1.7	6,215.7	2.77	1.11	2.54
12,606.0	91.10	180.00	6,620.6	-6,279.7	-1.0	6,279.7	2.44	1.56	1.88
12,701.0	90.80	180.20	6,619.0	-6,374.6	-1.2	6,374.6	0.38	-0.32	0.21
12,764.0	90.90	181.00	6,618.1	-6,437.6	-1.9	6,437.6	1.28	0.16	1.27
12,828.0	91.30	181.90	6,616.9	-6,501.6	-3.5	6,501.6	1.54	0.63	1.41
12,869.0	91.30	183.00	6,615.9	-6,542.6	-5.2	6,542.6	2.68	0.00	2.68
TD									
12,920.0	91.30	183.00	6,614.8	-6,593.5	-7.9	6,593.5	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates	+N/-S (usft)	+E/-W (usft)	Comment
4,568.0	4,566.4	-1.4	-28.5		Tie into Scientific Gyro
12,920.0	6,614.8	-6,593.5	-7.9		TD

Company Name: COG Operating, LLC
Honey Graham 29 State #7H
Eddy County, NM
Rig: Original Well Elev
Created By: Shelly C. Peterkin
Date: 8/9/2011

Honey Graham 29 State #7H
Eddy County, NM
Q110513 & WT-11412

COG Operating, LLC



Azimuths to Grid North

Magnetic North: 7.69°

Magnetic Field

Strength 48423.7snT

Dip Angle: 59.90°

Date: 7/25/2011

Model: IGRF2010

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

WELL DETAILS: Honey Graham 29 State #7H

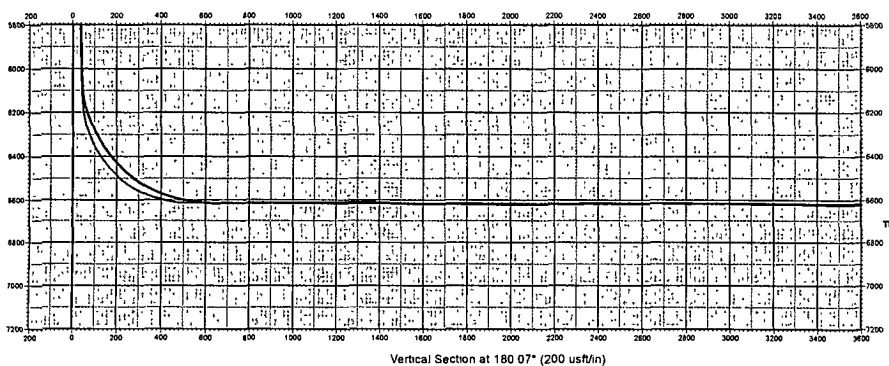
	Ground Level	2995.8			
+N/S	+E/W	North	East	Latitude	Longitude
0.0	0.0	370719.12	609699.56	32° 1' 5.332 N	104° 6' 45.971 W

DESIGN TARGET DETAILS

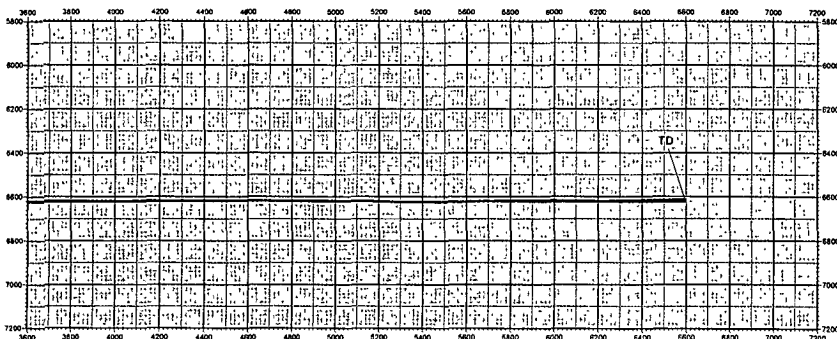
Name	TVD	+N/S	+E/W	North	East	Latitude	Longitude
PBH Honey Graham 29 State #7H	6625.0	-6593.0	-8.3	364121.11	609687.29	32° 0' 3.087 N	104° 6' 48.223 W

ANNOTATIONS

MD	Inc	Az	TVD	+N/S	+E/W	V.Sect	Departure	Annotation
4568.0	1.77	219.72	4568.4	-1.4	-28.6	1.6	99.8	Tie into Scientific Gyro
12920.0	91.30	103.00	6814.8	-6593.6	-7.9	6593.6	6694.2	TD



Vertical Section at 180.07° (200 usf/in)



Vertical Section at 180.07° (200 usf/in)

