

COG OPERATING LLC

Eddy County, NM (NAN27 NME)

Hatfield State #9H

Hatfield State #9H

OH

SDI Standard Survey Report

21 September, 2010

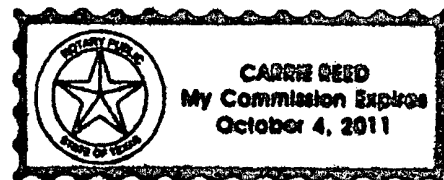
This survey is correct to the best of my knowledge and is supported by actual field data.

Robert

Notorized this date 13th of October, 2010.

Carrin Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Hatfield State #9H
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (12') @ 3656.6usft (Silver Oak #1)
Site:	Hatfield State #9H	MD Reference:	KB Elev (12') @ 3656.6usft (Silver Oak #1)
Well:	Hatfield State #9H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

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		

Well	Hatfield State #9H				
Well Position	+N/-S	0.0 usft	Northing:	672,314.70 usft	Latitude: 32° 50' 53.044 N
	+E/-W	0.0 usft	Easting:	570,424.10 usft	Longitude: 104° 6' 14.470 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level: 3,644.6 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2010	9/1/2010	8.04	60.70	49,046

Design	Actual				
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	89.90	

Survey Program	Date 9/3/2010				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	3,386.0	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1.0.2	
3,488.0	5,817.0	MWD Survey (OH)	MWD	MWD - Standard	

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	0.21	192.73	100.0	-0.2	0.0	192.73	0.2	
200.0	0.16	146.77	200.0	-0.5	0.0	180.51	0.5	
300.0	0.11	105.59	300.0	-0.6	0.2	165.05	0.6	
400.0	0.13	65.56	400.0	-0.6	0.4	148.82	0.7	
500.0	0.77	83.67	500.0	-0.5	1.1	112.76	1.2	
600.0	1.08	89.43	600.0	-0.4	2.7	98.12	2.8	
700.0	1.13	74.70	700.0	-0.1	4.6	91.50	4.8	
800.0	1.05	75.59	799.9	0.4	6.5	86.76	6.5	
900.0	0.94	82.06	899.9	0.7	8.2	85.05	8.2	
1,000.0	0.68	89.43	999.9	0.8	9.6	85.07	9.6	
1,100.0	0.66	83.67	1,099.9	0.9	10.7	85.23	10.8	
1,200.0	0.61	78.53	1,199.9	1.1	11.8	84.86	11.9	
1,300.0	0.51	66.49	1,299.9	1.3	12.8	83.97	12.8	
1,400.0	0.52	59.26	1,399.9	1.8	13.6	82.61	13.7	
1,500.0	0.56	46.30	1,499.9	2.3	14.3	80.76	14.5	

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Site:	Hatfield State #9H	MD Reference:	KB Elev (12') @ 3656.6usft (Silver Oak #1)
Well:	Hatfield State #9H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,600.0	0.44	44.05	1,599.9	2.9	14.9	78.85	15.2
1,700.0	0.34	39.70	1,699.9	3.4	15.4	77.38	15.8
1,800.0	0.03	62.00	1,799.9	3.7	15.6	76.70	16.0
1,900.0	0.26	43.15	1,899.9	3.9	15.8	76.24	16.2
2,000.0	0.23	34.63	1,999.9	4.2	16.0	75.35	16.6
2,100.0	0.17	32.25	2,099.9	4.5	16.2	74.56	16.8
2,200.0	0.14	16.58	2,199.9	4.7	16.4	73.87	17.0
2,300.0	0.14	353.81	2,299.9	5.0	16.4	73.13	17.1
2,400.0	0.14	337.67	2,399.9	5.2	16.3	72.32	17.1
2,500.0	0.09	328.65	2,499.9	5.4	16.2	71.66	17.1
2,600.0	0.04	308.86	2,599.9	5.5	16.2	71.30	17.1
2,700.0	0.14	19.99	2,699.9	5.6	16.2	70.88	17.1
2,800.0	0.12	20.91	2,799.9	5.8	16.3	70.30	17.3
2,900.0	0.17	0.01	2,899.9	6.1	16.3	69.58	17.4
3,000.0	0.24	337.53	2,999.9	6.4	16.2	68.43	17.4
3,100.0	0.15	299.52	3,099.9	6.7	16.0	67.41	17.4
3,200.0	0.18	6.45	3,199.9	6.9	15.9	66.61	17.3
3,300.0	0.24	37.54	3,299.9	7.2	16.1	65.84	17.6
3,386.0	0.45	50.98	3,385.9	7.6	16.4	65.29	18.1

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Site:	Hatfield State #9H	MD Reference:	KB Elev (12') @ 3656.6usft (Silver Oak #1)
Well:	Hatfield State #9H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

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		

Well	Hatfield State #9H				
Well Position	+N/-S	0.0 usft	Northing:	672,314.70 usft	Latitude: 32° 50' 53.044 N
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Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2010	9/1/2010	8.04	60.70	49,046

Design	Actual			
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	89.90

Survey Program	Date	9/21/2010		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	3,386.0	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1.0.2
3,488.0	5,817.0	MWD Survey (OH)	MWD	MWD - Standard

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
3,386.0	0.45	50.98	3,385.9	7.6	16.4	65.29	18.1
3,488.0	0.41	29.89	3,487.9	8.1	16.9	64.35	18.8
3,583.0	0.86	50.08	3,582.9	8.9	17.6	63.28	19.8
3,615.0	2.03	65.68	3,614.9	9.3	18.3	63.19	20.6
3,646.0	4.00	75.64	3,645.8	9.8	19.9	63.86	22.2
3,679.0	6.57	79.85	3,678.7	10.4	22.9	65.58	25.1
3,710.0	10.37	84.74	3,709.3	11.0	27.4	68.21	29.5
3,742.0	15.17	91.46	3,740.5	11.1	34.5	72.13	36.2
3,774.0	20.24	95.31	3,771.0	10.5	44.2	76.64	45.4
3,805.0	25.98	96.35	3,799.5	9.2	56.3	80.67	57.0
3,836.0	31.33	94.50	3,826.7	7.9	71.1	83.69	71.5
3,868.0	35.39	92.98	3,853.4	6.7	88.6	85.66	88.9
3,899.0	39.05	91.81	3,878.1	5.9	107.3	86.83	107.5
3,931.0	43.14	91.29	3,902.2	5.4	128.4	87.60	128.5
3,993.0	51.08	91.81	3,944.4	4.1	173.7	88.63	173.8
4,025.0	56.32	91.16	3,963.3	3.5	199.5	89.00	199.5

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Well:	Hatfield State #9H	North Reference:	Grid
Wellbore:	.OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
4,057.0	61.04	89.18	3,979.9	3.4	226.8	89.14	226.9
4,089.0	64.25	90.15	3,994.7	3.6	255.2	89.20	255.3
4,120.0	65.60	89.58	4,007.8	3.6	283.3	89.26	283.3
4,152.0	68.05	89.19	4,020.4	4.0	312.7	89.28	312.8
4,183.0	70.76	88.47	4,031.3	4.6	341.7	89.24	341.8
4,215.0	73.17	87.56	4,041.2	5.6	372.2	89.14	372.2
4,247.0	75.95	87.40	4,049.7	7.0	403.0	89.01	403.0
4,279.0	78.81	87.38	4,056.7	8.4	434.2	88.89	434.2
4,311.0	82.19	87.53	4,062.0	9.8	465.7	88.80	465.8
4,342.0	84.72	87.93	4,065.5	11.0	496.5	88.73	496.6
4,374.0	85.63	89.63	4,068.2	11.7	528.3	88.73	528.5
4,405.0	86.34	90.67	4,070.4	11.6	559.3	88.81	559.4
4,437.0	86.44	90.36	4,072.4	11.3	591.2	88.90	591.3
4,469.0	88.15	90.68	4,073.9	11.0	623.2	88.99	623.2
4,501.0	88.02	90.53	4,075.0	10.7	655.1	89.07	655.2
4,533.0	87.88	90.49	4,076.1	10.4	687.1	89.13	687.2
4,564.0	88.02	90.14	4,077.2	10.2	718.1	89.18	718.2
4,596.0	87.85	89.89	4,078.4	10.2	750.1	89.22	750.1
4,628.0	87.98	89.92	4,079.5	10.3	782.0	89.25	782.1
4,659.0	89.60	90.07	4,080.2	10.3	813.0	89.28	813.1
4,691.0	90.37	90.39	4,080.2	10.2	845.0	89.31	845.1
4,723.0	91.04	91.33	4,079.8	9.7	877.0	89.37	877.1
4,755.0	91.38	91.58	4,079.1	8.9	909.0	89.44	909.1
4,786.0	91.61	91.51	4,078.3	8.0	940.0	89.51	940.0
4,818.0	91.65	91.89	4,077.4	7.1	972.0	89.58	972.0
4,850.0	91.01	91.31	4,076.7	6.2	1,003.9	89.65	1,004.0
4,882.0	90.84	91.26	4,076.2	5.5	1,035.9	89.70	1,035.9
4,914.0	90.64	90.54	4,075.7	5.0	1,067.9	89.73	1,067.9
4,945.0	90.24	90.49	4,075.5	4.7	1,098.9	89.76	1,098.9
4,977.0	89.46	91.15	4,075.6	4.2	1,130.9	89.79	1,130.9
5,009.0	88.89	90.50	4,076.0	3.8	1,162.9	89.81	1,162.9
5,040.0	88.56	90.21	4,076.7	3.6	1,193.9	89.83	1,193.9
5,072.0	88.52	89.28	4,077.6	3.7	1,225.9	89.83	1,225.9
5,104.0	88.59	89.48	4,078.4	4.1	1,257.9	89.82	1,257.9
5,136.0	88.22	89.09	4,079.3	4.5	1,289.9	89.80	1,289.9
5,167.0	88.89	88.89	4,080.0	5.0	1,320.9	89.78	1,320.9
5,199.0	88.56	88.75	4,080.7	5.7	1,352.8	89.76	1,352.8
5,231.0	88.22	88.31	4,081.6	6.5	1,384.8	89.73	1,384.8
5,262.0	88.05	88.62	4,082.7	7.3	1,415.8	89.70	1,415.8
5,294.0	88.12	88.55	4,083.7	8.1	1,447.8	89.68	1,447.8
5,326.0	88.08	88.73	4,084.8	8.9	1,479.7	89.66	1,479.6
5,357.0	88.32	88.42	4,085.8	9.6	1,510.7	89.63	1,510.7
5,389.0	88.15	89.93	4,086.7	10.1	1,542.7	89.63	1,542.7
5,421.0	88.35	90.39	4,087.7	10.0	1,574.7	89.64	1,574.7

Scientific Drilling International, Inc.

SDI Standard Survey Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Hatfield State #9H
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (12') @ 3656.6usft (Silver Oak #1)
Site:	Hatfield State #9H	MD Reference:	KB Elev (12') @ 3656.6usft (Silver Oak #1)
Well:	Hatfield State #9H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,453.0	88.05	91.21	4,088.7	9.6	1,606.7	89.66	1,606.7
5,484.0	89.09	91.30	4,089.5	8.9	1,637.6	89.69	1,637.7
5,516.0	89.26	91.34	4,090.0	8.1	1,669.6	89.72	1,669.6
5,548.0	89.53	89.72	4,090.3	7.8	1,701.6	89.74	1,701.6
5,580.0	89.19	89.32	4,090.7	8.1	1,733.6	89.73	1,733.6
5,612.0	88.69	88.94	4,091.2	8.6	1,765.6	89.72	1,765.6
5,643.0	88.49	88.58	4,092.0	9.3	1,796.6	89.70	1,796.6
5,675.0	87.82	89.29	4,093.0	9.9	1,828.6	89.69	1,828.6
5,707.0	87.82	89.06	4,094.3	10.3	1,860.5	89.68	1,860.6
5,738.0	87.81	89.60	4,095.4	10.7	1,891.5	89.68	1,891.5
5,757.0	88.46	89.70	4,096.1	10.8	1,910.5	89.68	1,910.5

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,386.0	3,385.9	7.6	16.4	Gyro Tie-in
5,757.0	4,096.1	10.8	1,910.5	Last MWD Survey
5,817.0	4,097.7	11.0	1,970.5	Projection to Bit



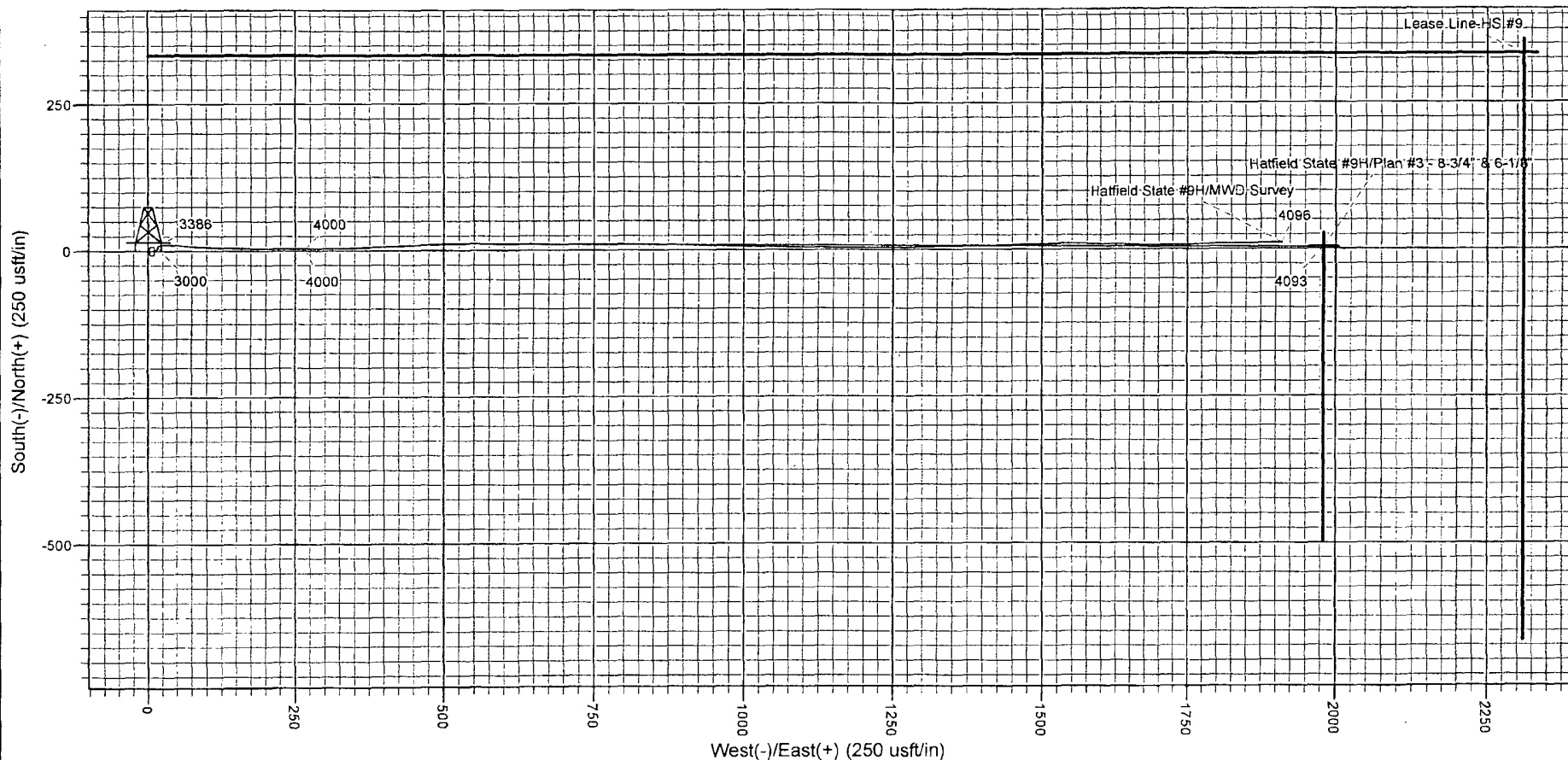
Project: Eddy County, NM (NAN27 NME)
 Hatfield State #9H
 Well: Hatfield State #9H
 Wellbore: OH
 Design: Plan #3 - 8-3/4" & 6-1/8"



Azimuths to Grid North
 True North: -0.12°
 Magnetic North: 7.91°
 Magnetic Field
 Strength: 49045.6snT
 Dip Angle: 60.70°
 Date: 9/1/2010
 Model: BGGM2010

WELL DETAILS: Hatfield State #9H
 KB Elev (12') @ 3656.6usft (Silver Oak #1)
 Ground Level: 3644.6

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	672314.70	570424.10	32° 50' 53.044 N	104° 6' 14.470 W	



PROJECT DETAILS: Eddy County, NM (NAN27 NME)
 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: Hatfield State #9H
 Site Centre Latitude: 32° 50' 53.044 N
 Longitude: 104° 6' 14.470 W
 Positional Uncertainty: 0.0
 Convergence: 0.12
 Local North: Grid