



COG Operating LLC

Eddy County, NM (NAN27 NME)

Patton 5 Fee #2H

Patton 5 Fee #2H

OH

Plan: Plan #1 8-3/4" Hole

SHL = 1040' FNL & 330' FWL

BHL = 1040' FNL & 330' FEL

Standard Planning Report

22 December, 2011



Scientific Drilling
Directional Drilling Operations



SDI
Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Site Patton 5 Fee #2H
Company:	COG Operating LLC	TVD Reference:	GL Elev @ 3379 00usft
Project:	Eddy County, NM (NAN27 NME)	MD Reference:	GL Elev @ 3379.00usft
Site:	Patton 5 Fee #2H	North Reference:	Grid
Well:	Patton 5 Fee #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 8-3/4" Hole		

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	Patton 5 Fee #2H		
Site Position:	Northing:	616,162 40 usft	Latitude: 32° 41' 38 057 N
From: Map	Easting:	476,030 10 usft	Longitude: 104° 24' 40 498 W
Position Uncertainty:	0 00 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0 04 °

Well	Patton 5 Fee #2H		
Well Position	+N/-S	0 00 usft	Northing: 616,162 40 usft
	+E/-W	0 00 usft	Easting: 476,030.10 usft
Position Uncertainty	0 00 usft	Wellhead Elevation:	Ground Level: 3,379 00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	2011/12/22	7 94
			Dip Angle (°)
			60 46
			Field Strength (nT)
			48,753

Design	Plan #1 8-3/4" Hole		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0 00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0 00	0 00	0 00
			Direction (°)
			89 64

Plan Sections:										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0 00	0 00	0 00	0 00	0 00	0 00	0.00	0.00	0.00	0 00	
2,272 54	0 00	0 00	2,272 54	0 00	0 00	0.00	0.00	0 00	0 00	
3,022 54	90 00	89 64	2,750 00	2 98	477 46	12 00	12 00	0 00	89 64	
7,163 76	90 00	89 64	2,750 00	28 80	4,618 60	0 00	0 00	0 00	0 00	PBHL-Patton 5 Fee #:



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Site:	Patton 5 Fee #2H	North Reference:	Grnd
Well:	Patton 5 Fee #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 8-3/4" Hole		

Planned 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)
0.00	0 00	0 00	0.00	0.00	0 00	0.00	0 00	0 00	0 00
2,272.54	0 00	0 00	2,272.54	0.00	0 00	0 00	0 00	0 00	0 00
KOP Start Build 12.00/100°									
2,300.00	3 30	89.64	2,299.98	0 00	0 79	0 79	12.00	12.00	0.00
2,400.00	15 30	89.64	2,398.49	0 11	16.91	16.91	12.00	12.00	0.00
2,500.00	27 30	89.64	2,491.49	0.33	53.16	53.17	12.00	12.00	0.00
2,600.00	39 30	89.64	2,574.93	0.67	107.96	107.96	12.00	12.00	0.00
2,700.00	51 30	89.64	2,645.14	1.12	178.90	178.91	12.00	12.00	0.00
2,800.00	63 30	89.64	2,699.07	1.64	262.89	262.90	12.00	12.00	0.00
2,900.00	75 30	89.64	2,734.36	2.22	356.26	356.27	12.00	12.00	0.00
3,000.00	87 30	89.64	2,749.47	2.84	454.93	454.94	12.00	12.00	0.00
3,022.54	90 00	89.64	2,750.00	2.98	477.46	477.47	12.00	12.00	0.00
Land EOC hold 90.00°									
3,100.00	90 00	89.64	2,750.00	3.46	554.92	554.93	0.00	0.00	0.00
3,200.00	90 00	89.64	2,750.00	4.08	654.92	654.93	0.00	0.00	0.00
3,300.00	90 00	89.64	2,750.00	4.71	754.91	754.93	0.00	0.00	0.00
3,400.00	90 00	89.64	2,750.00	5.33	854.91	854.93	0.00	0.00	0.00
3,500.00	90 00	89.64	2,750.00	5.95	954.91	954.93	0.00	0.00	0.00
3,600.00	90 00	89.64	2,750.00	6.58	1,054.91	1,054.93	0.00	0.00	0.00
3,700.00	90 00	89.64	2,750.00	7.20	1,154.91	1,154.93	0.00	0.00	0.00
3,800.00	90 00	89.64	2,750.00	7.83	1,254.91	1,254.93	0.00	0.00	0.00
3,900.00	90 00	89.64	2,750.00	8.45	1,354.90	1,354.93	0.00	0.00	0.00
4,000.00	90 00	89.64	2,750.00	9.07	1,454.90	1,454.93	0.00	0.00	0.00
4,100.00	90 00	89.64	2,750.00	9.70	1,554.90	1,554.93	0.00	0.00	0.00
4,200.00	90 00	89.64	2,750.00	10.32	1,654.90	1,654.93	0.00	0.00	0.00
4,300.00	90 00	89.64	2,750.00	10.94	1,754.90	1,754.93	0.00	0.00	0.00
4,400.00	90 00	89.64	2,750.00	11.57	1,854.89	1,854.93	0.00	0.00	0.00
4,500.00	90 00	89.64	2,750.00	12.19	1,954.89	1,954.93	0.00	0.00	0.00
4,600.00	90 00	89.64	2,750.00	12.81	2,054.89	2,054.93	0.00	0.00	0.00
4,700.00	90 00	89.64	2,750.00	13.44	2,154.89	2,154.93	0.00	0.00	0.00
4,800.00	90 00	89.64	2,750.00	14.06	2,254.89	2,254.93	0.00	0.00	0.00
4,900.00	90 00	89.64	2,750.00	14.68	2,354.88	2,354.93	0.00	0.00	0.00
5,000.00	90 00	89.64	2,750.00	15.31	2,454.88	2,454.93	0.00	0.00	0.00
5,100.00	90 00	89.64	2,750.00	15.93	2,554.88	2,554.93	0.00	0.00	0.00
5,200.00	90 00	89.64	2,750.00	16.55	2,654.88	2,654.93	0.00	0.00	0.00
5,300.00	90 00	89.64	2,750.00	17.18	2,754.88	2,754.93	0.00	0.00	0.00
5,400.00	90 00	89.64	2,750.00	17.80	2,854.87	2,854.93	0.00	0.00	0.00
5,500.00	90 00	89.64	2,750.00	18.43	2,954.87	2,954.93	0.00	0.00	0.00
5,600.00	90 00	89.64	2,750.00	19.05	3,054.87	3,054.93	0.00	0.00	0.00
5,700.00	90 00	89.64	2,750.00	19.67	3,154.87	3,154.93	0.00	0.00	0.00
5,800.00	90 00	89.64	2,750.00	20.30	3,254.87	3,254.93	0.00	0.00	0.00
5,900.00	90 00	89.64	2,750.00	20.92	3,354.86	3,354.93	0.00	0.00	0.00
6,000.00	90 00	89.64	2,750.00	21.54	3,454.86	3,454.93	0.00	0.00	0.00
6,100.00	90 00	89.64	2,750.00	22.17	3,554.86	3,554.93	0.00	0.00	0.00
6,200.00	90 00	89.64	2,750.00	22.79	3,654.86	3,654.93	0.00	0.00	0.00
6,300.00	90 00	89.64	2,750.00	23.41	3,754.86	3,754.93	0.00	0.00	0.00
6,400.00	90 00	89.64	2,750.00	24.04	3,854.85	3,854.93	0.00	0.00	0.00
6,500.00	90 00	89.64	2,750.00	24.66	3,954.85	3,954.93	0.00	0.00	0.00
6,600.00	90 00	89.64	2,750.00	25.28	4,054.85	4,054.93	0.00	0.00	0.00
6,700.00	90 00	89.64	2,750.00	25.91	4,154.85	4,154.93	0.00	0.00	0.00
6,800.00	90 00	89.64	2,750.00	26.53	4,254.85	4,254.93	0.00	0.00	0.00
6,900.00	90 00	89.64	2,750.00	27.16	4,354.85	4,354.93	0.00	0.00	0.00
7,000.00	90 00	89.64	2,750.00	27.78	4,454.84	4,454.93	0.00	0.00	0.00
7,100.00	90 00	89.64	2,750.00	28.40	4,554.84	4,554.93	0.00	0.00	0.00



SDI
Planning Report

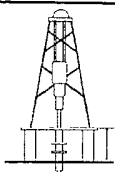


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Company:	COG Operating LLC	TVD Reference:	GL Elev @ 3379 00usft
Project:	Eddy County, NM (NAN27 NME)	MD Reference:	GL Elev @ 3379 00usft
Site:	Patton 5 Fee #2H	North Reference:	Grid
Well:	Patton 5 Fee #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 8-3/4" Hole		

Planned 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)
7,163.76	90.00	89.64	2,750.00	28.80	4,618.60	4,618.69	0.00	0.00	0.00
PBHL-Patton 5 Fee #2H									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL-Patton 5 Fee #2H	0.00	0.00	2,750.00	28.80	4,618.60	616,191.20	480,648.70	32° 41' 38.373 N	104° 23' 46.451 W
- plan hits target center									
- Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,272.54	2,272.54	0.00	0.00	KOP Start Build 12 00/100'
3,022.54	2,750.00	2.98	477.46	Land EOC hold 90 00°



GL Elev @ 3379.00usft

Ground Elev 3379.00



Patton 5 Fee #2H
Eddy County, NM (NAN27 NME)
Northing: (Y) 616162.40
Easting: (X) 476030.10
Plan #1 8-3/4" Hole



To convert a Magnetic Direction to a Grid Direction Add 7.98
To convert a True Direction to a Grid Direction Add 0.04

Azimuths to Grid North
True North 0.04°
Magnetic North 7.98°
Magnetic Field
Strength 48753.0usT
Dip Angle 60.46°
Date 2011/12/22
Model IGRF2010



Scientific Drilling
Directional Drilling Operations

WELL DETAILS Patton 5 Fee #2H

	+N/-S	+E/-W	Northing	Ground Level	Easting	Latitude	Longitude	Slot
	0.00	0.00	616162.40	3379.00	476030.10	32° 41' 38.057 N	104° 24' 40.498 W	

SECTION DETAILS

Sec	MD	Inc	Act	TVD	+N/-S	+E/-W	Dleg	TFace	VFace	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2272.54	0.00	0.00	2272.54	0.00	0.00	0.00	0.00	0.00	
3	3022.54	90.00	89.64	2750.00	2.98	477.48	12.00	89.64	477.48	
4	7163.76	90.00	89.64	2750.00	28.80	4618.60	0.00	0.00	4618.60	PBHL-Patton 5 Fee #2H

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL-Patton 5 Fee #2H	2750.00	28.80	4618.60	616161.20	480648.70	32° 41' 38.373 N	104° 23' 49.451 W	Point
- plan hits target center								

PROJECT DETAILS Eddy County NM (NAN27 NME)

Geoidic System US State Plane 1927 (Exact solution)
Datum NAD 1927 (NADCON CONUS)
Ellipsoid Clarke 1866
Zone Name New Mexico East 3001
System Datum Mean Sea Level

Map System US State Plane 1927 (Exact solution)
Datum NAD 1927 (NADCON CONUS)
Ellipsoid Clarke 1866
Zone Name New Mexico East 3001

Local Origin Site Patton 5 Fee #2H Grid North

Latitude 32° 41' 38.057 N
Longitude 104° 24' 40.498 W

Grid East 476030.10

Grid North 616162.40

Scale Factor 1.000

Geomagnetic Model IGRF2010

Semiole Date 22-Dec-11

Magnetic Declination 7.94

Dip Angle from Horizontal 60.46°

Magnetic Field Strength 48753

To convert a Magnetic Direction to a Grid Direction Add 7.98
To convert a Magnetic Direction to a True Direction Add 7.94 East
To convert a True Direction to a Grid Direction Add 0.04

SITE DETAILS Patton 5 Fee #2H

Site Centre Northing 616162.40

Easting 476030.10

Positional Uncertainty 0.00

Convergence -0.04

Local North Grid

FORMATION TOP DETAILS

No formation data is available

CASING DETAILS

No casing data is available

LEGEND

Plan #1 8-3/4" Hole

