

Gettysburg State Com #15H
Lea County, NM
Q171*** & WT-171***
Design #1



Company Name: COG Operating, LLC
Gettysburg State Com #15H
Lea County, NM
Rig: Noram 21
Created By: Shelly Petarkin
Date: 14/29, November 28 2017

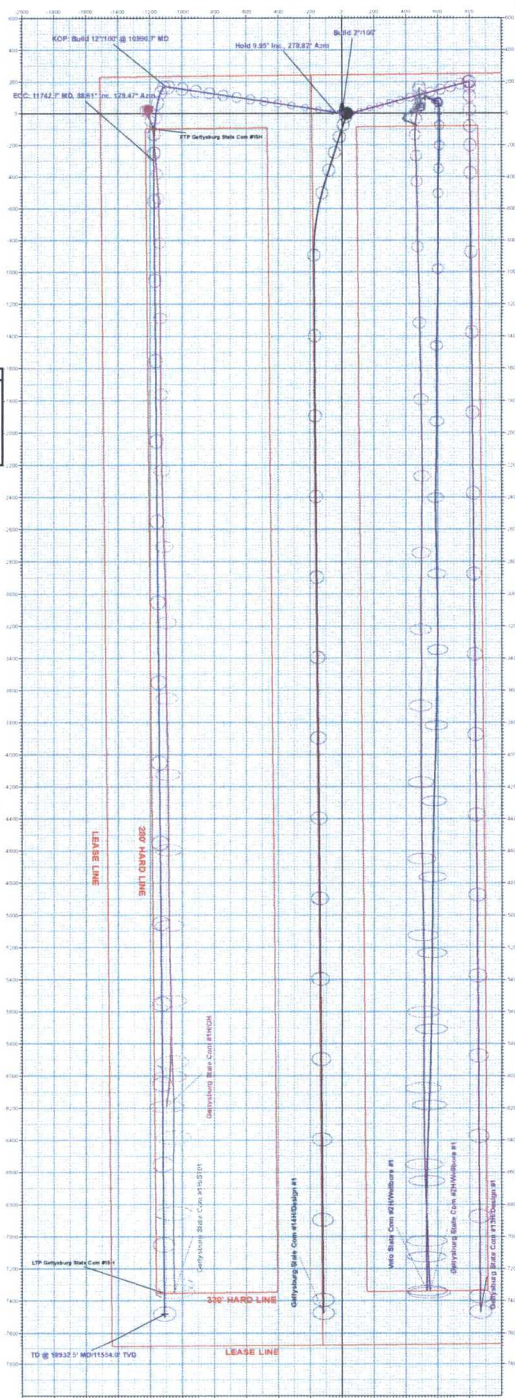
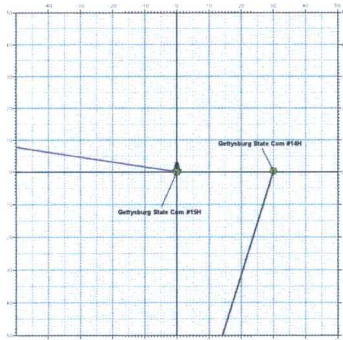
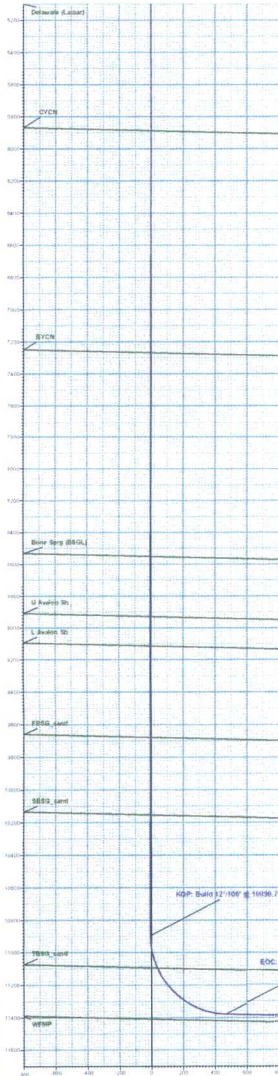
WELL DETAILS: Gettysburg State Com #15H						
N/S	E/W	North	East	Latitude	Longitude	Spot
0.0	0.0	477842.30	764187.30	3425.0	103° 18' 38.898 N	103° 28' 41.578 W

DESIGN TARGET DETAILS						
Name	TVD	N/S	E/W	North	East	Latitude
FTP Gettysburg State Com #15H	0.0	-86.5	-1173.2	477842.30	763886.11	32° 29' 53.28 W
LTP Gettysburg State Com #15H	0.0	-7352.3	-1111.3	476889.38	763875.88	32° 17' 27.27 W
Plan, Gettysburg State Com #15H	11554.8	-7683.3	-1111.1	476558.88	763875.28	32° 17' 25.827 W

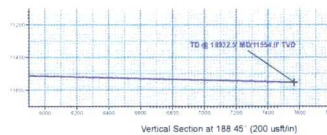
ANNOTATIONS									
MD	Inc	Azi	TVD	N/S	E/W	Vsect	Departure	Annotation	
4300.0	0.00	0.00	4300.0	0.0	0.0	0.0	0.0	Build 2°100'	
4787.4	9.95	278.82	4784.9	8.6	-42.6	-0.3	43.1	Hold 9.95° Inc, 278.82° Azm	
10890.7	9.95	278.82	10895.1	170.6	-1099.9	-7.2	1113.1	KOP Build 12°1100' @ 10890.7 MD	
11742.7	88.61	179.47	11379.0	-295.3	-1177.3	465.8	1989.8	EOC: 11742.7 MD, 88.61° Inc, 179.47° Azm	
18822.5	88.61	179.47	11554.8	-7683.3	-1111.1	7565.3	8767.4	TD @ 18822.5 MD/11554.8' TVD	

PROJECT DETAILS: Lea County, NM
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

T G M Azimuths to Grid North
Magnetic North: 6.41°
Magnetic Field
Strength: 47953.7snT
Dip Angle: 60.15°
Date: 11/27/2015
Model: IGRF2015



HOBBS OCD
NOV 3 0 2017
RECEIVED



Vertical Section at 188 45' (200 uat/in)



COG Operating, LLC

Lea County, NM

Sec 16, T23S, R34E

Gettysburg State Com #15H

Wellbore #1

Plan: Design #1

QES Well Planning Report

28 November, 2017

HOBBS OCD

NOV 30 2017

RECEIVED



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #15H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3454.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3454.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Lea 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	Sec 16, T23S, R34E		
Site Position:		Northing:	478,042.00 usft
From:	Map	Easting:	765,915.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 18' 40.748 N
		Longitude:	103° 28' 21.433 W
		Grid Convergence:	0.46 °

Well	Gettysburg State Com #15H		
Well Position	+N/-S	-99.7 usft	Northing:
	+E/-W	-1,728.1 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	
		Latitude:	32° 18' 39.898 N
		Longitude:	103° 28' 41.576 W
		Ground Level:	3,425.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	11/27/2017	6.87
			Dip Angle (°)
			60.15
			Field Strength (nT)
			47,953.70584752

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction (°)
			188.45

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,797.4	9.95	278.82	4,794.9	6.6	-42.6	2.00	2.00	0.00	278.82	
10,990.7	9.95	278.82	10,895.1	170.6	-1,099.9	0.00	0.00	0.00	0.00	
11,742.7	88.61	179.47	11,379.0	-295.9	-1,177.3	12.00	10.46	-13.21	-99.45	
18,932.5	88.61	179.47	11,554.0	-7,483.3	-1,111.1	0.00	0.00	0.00	0.00	PBHL Gettysburg Sta

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Project:	Lea County, NM	MD Reference:	KB @ 3454.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
Rustler									
1,229.0	0.00	0.00	1,229.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
TOS									
1,554.0	0.00	0.00	1,554.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
Build 2°/100'									
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	2.00	278.82	4,400.0	0.3	-1.7	0.0	2.00	2.00	0.00
4,500.0	4.00	278.82	4,499.8	1.1	-6.9	0.0	2.00	2.00	0.00
4,600.0	6.00	278.82	4,599.5	2.4	-15.5	-0.1	2.00	2.00	0.00
4,700.0	8.00	278.82	4,698.7	4.3	-27.6	-0.2	2.00	2.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #15H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3454.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3454.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
BOS (Castile)									
4,720.5	8.41	278.82	4,719.0	4.7	-30.4	-0.2	2.00	2.00	0.00
Hold 9.95° Inc., 278.82° Azm									
4,797.4	9.95	278.82	4,794.9	6.6	-42.6	-0.3	2.00	2.00	0.00
4,800.0	9.95	278.82	4,797.5	6.7	-43.0	-0.3	0.00	0.00	0.00
4,900.0	9.95	278.82	4,896.0	9.3	-60.1	-0.4	0.00	0.00	0.00
Delaware (Lamar)									
4,994.4	9.95	278.82	4,989.0	11.8	-76.2	-0.5	0.00	0.00	0.00
5,000.0	9.95	278.82	4,994.5	12.0	-77.2	-0.5	0.00	0.00	0.00
5,100.0	9.95	278.82	5,093.0	14.6	-94.2	-0.6	0.00	0.00	0.00
5,200.0	9.95	278.82	5,191.5	17.3	-111.3	-0.7	0.00	0.00	0.00
5,300.0	9.95	278.82	5,289.9	19.9	-128.4	-0.8	0.00	0.00	0.00
5,400.0	9.95	278.82	5,388.4	22.6	-145.4	-1.0	0.00	0.00	0.00
5,500.0	9.95	278.82	5,486.9	25.2	-162.5	-1.1	0.00	0.00	0.00
5,600.0	9.95	278.82	5,585.4	27.9	-179.6	-1.2	0.00	0.00	0.00
5,700.0	9.95	278.82	5,683.9	30.5	-196.7	-1.3	0.00	0.00	0.00
5,800.0	9.95	278.82	5,782.4	33.2	-213.7	-1.4	0.00	0.00	0.00
5,900.0	9.95	278.82	5,880.9	35.8	-230.8	-1.5	0.00	0.00	0.00
CYCN									
5,908.2	9.95	278.82	5,889.0	36.0	-232.2	-1.5	0.00	0.00	0.00
6,000.0	9.95	278.82	5,979.4	38.5	-247.9	-1.6	0.00	0.00	0.00
6,100.0	9.95	278.82	6,077.9	41.1	-264.9	-1.7	0.00	0.00	0.00
6,200.0	9.95	278.82	6,176.4	43.7	-282.0	-1.9	0.00	0.00	0.00
6,300.0	9.95	278.82	6,274.9	46.4	-299.1	-2.0	0.00	0.00	0.00
6,400.0	9.95	278.82	6,373.4	49.0	-316.2	-2.1	0.00	0.00	0.00
6,500.0	9.95	278.82	6,471.9	51.7	-333.2	-2.2	0.00	0.00	0.00
6,600.0	9.95	278.82	6,570.4	54.3	-350.3	-2.3	0.00	0.00	0.00
6,700.0	9.95	278.82	6,668.9	57.0	-367.4	-2.4	0.00	0.00	0.00
6,800.0	9.95	278.82	6,767.4	59.6	-384.5	-2.5	0.00	0.00	0.00
6,900.0	9.95	278.82	6,865.9	62.3	-401.5	-2.6	0.00	0.00	0.00
7,000.0	9.95	278.82	6,964.4	64.9	-418.6	-2.8	0.00	0.00	0.00
7,100.0	9.95	278.82	7,062.9	67.6	-435.7	-2.9	0.00	0.00	0.00
7,200.0	9.95	278.82	7,161.4	70.2	-452.7	-3.0	0.00	0.00	0.00
7,300.0	9.95	278.82	7,259.9	72.9	-469.8	-3.1	0.00	0.00	0.00
BYCN									
7,309.2	9.95	278.82	7,268.9	73.1	-471.4	-3.1	0.00	0.00	0.00
7,400.0	9.95	278.82	7,358.4	75.5	-486.9	-3.2	0.00	0.00	0.00
7,500.0	9.95	278.82	7,456.9	78.2	-504.0	-3.3	0.00	0.00	0.00
7,600.0	9.95	278.82	7,555.4	80.8	-521.0	-3.4	0.00	0.00	0.00
7,700.0	9.95	278.82	7,653.9	83.5	-538.1	-3.5	0.00	0.00	0.00
7,800.0	9.95	278.82	7,752.4	86.1	-555.2	-3.6	0.00	0.00	0.00
7,900.0	9.95	278.82	7,850.9	88.8	-572.2	-3.8	0.00	0.00	0.00
8,000.0	9.95	278.82	7,949.3	91.4	-589.3	-3.9	0.00	0.00	0.00
8,100.0	9.95	278.82	8,047.8	94.1	-606.4	-4.0	0.00	0.00	0.00
8,200.0	9.95	278.82	8,146.3	96.7	-623.5	-4.1	0.00	0.00	0.00
8,300.0	9.95	278.82	8,244.8	99.4	-640.5	-4.2	0.00	0.00	0.00
8,400.0	9.95	278.82	8,343.3	102.0	-657.6	-4.3	0.00	0.00	0.00
8,500.0	9.95	278.82	8,441.8	104.7	-674.7	-4.4	0.00	0.00	0.00
8,600.0	9.95	278.82	8,540.3	107.3	-691.8	-4.5	0.00	0.00	0.00
Bone Sprg (BSGL)									
8,611.7	9.95	278.82	8,551.9	107.6	-693.8	-4.6	0.00	0.00	0.00
8,700.0	9.95	278.82	8,638.8	110.0	-708.8	-4.7	0.00	0.00	0.00
8,800.0	9.95	278.82	8,737.3	112.6	-725.9	-4.8	0.00	0.00	0.00

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Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
8,900.0	9.95	278.82	8,835.8	115.2	-743.0	-4.9	0.00	0.00	0.00
U Avalon Sh									
8,994.5	9.95	278.82	8,928.9	117.8	-759.1	-5.0	0.00	0.00	0.00
9,000.0	9.95	278.82	8,934.3	117.9	-760.0	-5.0	0.00	0.00	0.00
9,100.0	9.95	278.82	9,032.8	120.5	-777.1	-5.1	0.00	0.00	0.00
L Avalon Sh									
9,182.3	9.95	278.82	9,113.9	122.7	-791.2	-5.2	0.00	0.00	0.00
9,200.0	9.95	278.82	9,131.3	123.2	-794.2	-5.2	0.00	0.00	0.00
9,300.0	9.95	278.82	9,229.8	125.8	-811.3	-5.3	0.00	0.00	0.00
9,400.0	9.95	278.82	9,328.3	128.5	-828.3	-5.4	0.00	0.00	0.00
9,500.0	9.95	278.82	9,426.8	131.1	-845.4	-5.6	0.00	0.00	0.00
9,600.0	9.95	278.82	9,525.3	133.8	-862.5	-5.7	0.00	0.00	0.00
9,700.0	9.95	278.82	9,623.8	136.4	-879.6	-5.8	0.00	0.00	0.00
FBSG_sand									
9,755.9	9.95	278.82	9,678.9	137.9	-889.1	-5.8	0.00	0.00	0.00
9,800.0	9.95	278.82	9,722.3	139.1	-896.6	-5.9	0.00	0.00	0.00
9,900.0	9.95	278.82	9,820.8	141.7	-913.7	-6.0	0.00	0.00	0.00
10,000.0	9.95	278.82	9,919.3	144.4	-930.8	-6.1	0.00	0.00	0.00
10,100.0	9.95	278.82	10,017.8	147.0	-947.8	-6.2	0.00	0.00	0.00
10,200.0	9.95	278.82	10,116.3	149.7	-964.9	-6.3	0.00	0.00	0.00
SBSG_sand									
10,238.2	9.95	278.82	10,153.8	150.7	-971.4	-6.4	0.00	0.00	0.00
10,300.0	9.95	278.82	10,214.8	152.3	-982.0	-6.5	0.00	0.00	0.00
10,400.0	9.95	278.82	10,313.3	155.0	-999.1	-6.6	0.00	0.00	0.00
10,500.0	9.95	278.82	10,411.8	157.6	-1,016.1	-6.7	0.00	0.00	0.00
10,600.0	9.95	278.82	10,510.3	160.3	-1,033.2	-6.8	0.00	0.00	0.00
10,700.0	9.95	278.82	10,608.7	162.9	-1,050.3	-6.9	0.00	0.00	0.00
10,800.0	9.95	278.82	10,707.2	165.6	-1,067.3	-7.0	0.00	0.00	0.00
10,900.0	9.95	278.82	10,805.7	168.2	-1,084.4	-7.1	0.00	0.00	0.00
KOP: Build 12°/100' @ 10990.7' MD									
10,990.7	9.95	278.82	10,895.1	170.6	-1,099.9	-7.2	0.00	0.00	0.00
11,000.0	9.83	272.36	10,904.2	170.8	-1,101.5	-7.1	12.00	-1.31	-69.50
11,025.0	10.11	255.05	10,928.9	170.3	-1,105.7	-6.0	12.00	1.15	-69.25
11,050.0	11.22	239.92	10,953.4	168.5	-1,110.0	-3.7	12.00	4.42	-60.53
11,075.0	12.93	228.10	10,977.9	165.4	-1,114.2	0.0	12.00	6.85	-47.28
11,100.0	15.05	219.27	11,002.1	161.0	-1,118.3	4.9	12.00	8.46	-35.32
11,125.0	17.42	212.68	11,026.2	155.4	-1,122.4	11.1	12.00	9.49	-26.36
11,150.0	19.96	207.67	11,049.8	148.4	-1,126.4	18.6	12.00	10.15	-20.03
11,175.0	22.60	203.77	11,073.1	140.3	-1,130.3	27.3	12.00	10.59	-15.59
TBSG_sand									
11,198.8	25.20	200.80	11,094.9	131.3	-1,133.9	36.6	12.00	10.88	-12.50
11,200.0	25.33	200.67	11,096.0	130.9	-1,134.1	37.1	12.00	11.00	-11.23
11,225.0	28.10	198.13	11,118.3	120.3	-1,137.8	48.2	12.00	11.10	-10.15
11,250.0	30.92	196.02	11,140.1	108.5	-1,141.4	60.3	12.00	11.26	-8.45
11,275.0	33.76	194.23	11,161.2	95.6	-1,144.9	73.6	12.00	11.37	-7.16
11,300.0	36.63	192.68	11,181.6	81.6	-1,148.3	88.0	12.00	11.46	-6.17
11,325.0	39.51	191.34	11,201.3	66.5	-1,151.5	103.3	12.00	11.53	-5.39
11,350.0	42.41	190.15	11,220.2	50.4	-1,154.5	119.7	12.00	11.59	-4.76
11,375.0	45.31	189.08	11,238.2	33.3	-1,157.4	137.0	12.00	11.63	-4.26
11,400.0	48.23	188.12	11,255.3	15.3	-1,160.1	155.2	12.00	11.67	-3.86
11,425.0	51.15	187.24	11,271.5	-3.6	-1,162.7	174.3	12.00	11.70	-3.52
11,450.0	54.08	186.43	11,286.7	-23.3	-1,165.0	194.2	12.00	11.72	-3.24
11,475.0	57.02	185.67	11,300.8	-43.8	-1,167.2	214.8	12.00	11.74	-3.01

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #15H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3454.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3454.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
11,500.0	59.96	184.97	11,313.9	-65.0	-1,169.2	236.0	12.00	11.76	-2.82
11,525.0	62.90	184.31	11,325.8	-86.9	-1,171.0	257.9	12.00	11.77	-2.65
11,550.0	65.85	183.68	11,336.6	-109.4	-1,172.5	280.4	12.00	11.78	-2.52
11,575.0	68.80	183.08	11,346.3	-132.4	-1,173.9	303.4	12.00	11.79	-2.40
11,600.0	71.75	182.50	11,354.7	-155.9	-1,175.0	326.8	12.00	11.80	-2.31
11,625.0	74.70	181.94	11,361.9	-179.8	-1,175.9	350.6	12.00	11.81	-2.23
11,650.0	77.65	181.40	11,367.9	-204.1	-1,176.7	374.7	12.00	11.81	-2.17
11,675.0	80.61	180.87	11,372.6	-228.6	-1,177.1	399.0	12.00	11.82	-2.12
11,700.0	83.56	180.35	11,376.1	-253.4	-1,177.4	423.6	12.00	11.82	-2.09
11,725.0	86.52	179.83	11,378.2	-278.3	-1,177.4	448.2	12.00	11.82	-2.06
EOC: 11742.7' MD, 88.61° Inc, 179.47° Azm									
11,742.7	88.61	179.47	11,379.0	-295.9	-1,177.3	465.6	12.00	11.82	-2.05
11,800.0	88.61	179.47	11,380.4	-353.3	-1,176.8	522.3	0.00	0.00	0.00
11,900.0	88.61	179.47	11,382.8	-453.2	-1,175.9	621.0	0.00	0.00	0.00
12,000.0	88.61	179.47	11,385.2	-553.2	-1,175.0	719.8	0.00	0.00	0.00
12,100.0	88.61	179.47	11,387.7	-653.2	-1,174.0	818.5	0.00	0.00	0.00
12,200.0	88.61	179.47	11,390.1	-753.1	-1,173.1	917.3	0.00	0.00	0.00
12,300.0	88.61	179.47	11,392.5	-853.1	-1,172.2	1,016.0	0.00	0.00	0.00
12,400.0	88.61	179.47	11,395.0	-953.1	-1,171.3	1,114.7	0.00	0.00	0.00
12,500.0	88.61	179.47	11,397.4	-1,053.0	-1,170.4	1,213.5	0.00	0.00	0.00
12,600.0	88.61	179.47	11,399.8	-1,153.0	-1,169.4	1,312.2	0.00	0.00	0.00
12,700.0	88.61	179.47	11,402.3	-1,253.0	-1,168.5	1,411.0	0.00	0.00	0.00
12,800.0	88.61	179.47	11,404.7	-1,352.9	-1,167.6	1,509.7	0.00	0.00	0.00
12,900.0	88.61	179.47	11,407.1	-1,452.9	-1,166.7	1,608.5	0.00	0.00	0.00
13,000.0	88.61	179.47	11,409.6	-1,552.9	-1,165.8	1,707.2	0.00	0.00	0.00
13,100.0	88.61	179.47	11,412.0	-1,652.8	-1,164.8	1,806.0	0.00	0.00	0.00
13,200.0	88.61	179.47	11,414.4	-1,752.8	-1,163.9	1,904.7	0.00	0.00	0.00
13,300.0	88.61	179.47	11,416.9	-1,852.8	-1,163.0	2,003.5	0.00	0.00	0.00
13,400.0	88.61	179.47	11,419.3	-1,952.7	-1,162.1	2,102.2	0.00	0.00	0.00
13,500.0	88.61	179.47	11,421.7	-2,052.7	-1,161.1	2,201.0	0.00	0.00	0.00
13,600.0	88.61	179.47	11,424.2	-2,152.6	-1,160.2	2,299.7	0.00	0.00	0.00
13,700.0	88.61	179.47	11,426.6	-2,252.6	-1,159.3	2,398.5	0.00	0.00	0.00
13,800.0	88.61	179.47	11,429.1	-2,352.6	-1,158.4	2,497.2	0.00	0.00	0.00
13,900.0	88.61	179.47	11,431.5	-2,452.5	-1,157.5	2,595.9	0.00	0.00	0.00
14,000.0	88.61	179.47	11,433.9	-2,552.5	-1,156.5	2,694.7	0.00	0.00	0.00
14,100.0	88.61	179.47	11,436.4	-2,652.5	-1,155.6	2,793.4	0.00	0.00	0.00
14,200.0	88.61	179.47	11,438.8	-2,752.4	-1,154.7	2,892.2	0.00	0.00	0.00
14,300.0	88.61	179.47	11,441.2	-2,852.4	-1,153.8	2,990.9	0.00	0.00	0.00
14,400.0	88.61	179.47	11,443.7	-2,952.4	-1,152.9	3,089.7	0.00	0.00	0.00
14,500.0	88.61	179.47	11,446.1	-3,052.3	-1,151.9	3,188.4	0.00	0.00	0.00
14,600.0	88.61	179.47	11,448.5	-3,152.3	-1,151.0	3,287.2	0.00	0.00	0.00
14,700.0	88.61	179.47	11,451.0	-3,252.3	-1,150.1	3,385.9	0.00	0.00	0.00
14,800.0	88.61	179.47	11,453.4	-3,352.2	-1,149.2	3,484.7	0.00	0.00	0.00
14,900.0	88.61	179.47	11,455.8	-3,452.2	-1,148.2	3,583.4	0.00	0.00	0.00
15,000.0	88.61	179.47	11,458.3	-3,552.2	-1,147.3	3,682.2	0.00	0.00	0.00
15,100.0	88.61	179.47	11,460.7	-3,652.1	-1,146.4	3,780.9	0.00	0.00	0.00
15,200.0	88.61	179.47	11,463.1	-3,752.1	-1,145.5	3,879.7	0.00	0.00	0.00
15,300.0	88.61	179.47	11,465.6	-3,852.1	-1,144.6	3,978.4	0.00	0.00	0.00
15,400.0	88.61	179.47	11,468.0	-3,952.0	-1,143.6	4,077.1	0.00	0.00	0.00
15,500.0	88.61	179.47	11,470.4	-4,052.0	-1,142.7	4,175.9	0.00	0.00	0.00
15,600.0	88.61	179.47	11,472.9	-4,152.0	-1,141.8	4,274.6	0.00	0.00	0.00
15,700.0	88.61	179.47	11,475.3	-4,251.9	-1,140.9	4,373.4	0.00	0.00	0.00
15,800.0	88.61	179.47	11,477.7	-4,351.9	-1,140.0	4,472.1	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #15H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3454.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3454.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
15,900.0	88.61	179.47	11,480.2	-4,451.9	-1,139.0	4,570.9	0.00	0.00	0.00
16,000.0	88.61	179.47	11,482.6	-4,551.8	-1,138.1	4,669.6	0.00	0.00	0.00
16,100.0	88.61	179.47	11,485.0	-4,651.8	-1,137.2	4,768.4	0.00	0.00	0.00
16,200.0	88.61	179.47	11,487.5	-4,751.8	-1,136.3	4,867.1	0.00	0.00	0.00
16,300.0	88.61	179.47	11,489.9	-4,851.7	-1,135.4	4,965.9	0.00	0.00	0.00
16,400.0	88.61	179.47	11,492.3	-4,951.7	-1,134.4	5,064.6	0.00	0.00	0.00
16,500.0	88.61	179.47	11,494.8	-5,051.7	-1,133.5	5,163.4	0.00	0.00	0.00
16,600.0	88.61	179.47	11,497.2	-5,151.6	-1,132.6	5,262.1	0.00	0.00	0.00
16,700.0	88.61	179.47	11,499.7	-5,251.6	-1,131.7	5,360.9	0.00	0.00	0.00
16,800.0	88.61	179.47	11,502.1	-5,351.6	-1,130.7	5,459.6	0.00	0.00	0.00
16,900.0	88.61	179.47	11,504.5	-5,451.5	-1,129.8	5,558.4	0.00	0.00	0.00
17,000.0	88.61	179.47	11,507.0	-5,551.5	-1,128.9	5,657.1	0.00	0.00	0.00
17,100.0	88.61	179.47	11,509.4	-5,651.5	-1,128.0	5,755.8	0.00	0.00	0.00
17,200.0	88.61	179.47	11,511.8	-5,751.4	-1,127.1	5,854.6	0.00	0.00	0.00
17,300.0	88.61	179.47	11,514.3	-5,851.4	-1,126.1	5,953.3	0.00	0.00	0.00
17,400.0	88.61	179.47	11,516.7	-5,951.4	-1,125.2	6,052.1	0.00	0.00	0.00
17,500.0	88.61	179.47	11,519.1	-6,051.3	-1,124.3	6,150.8	0.00	0.00	0.00
17,600.0	88.61	179.47	11,521.6	-6,151.3	-1,123.4	6,249.6	0.00	0.00	0.00
17,700.0	88.61	179.47	11,524.0	-6,251.3	-1,122.5	6,348.3	0.00	0.00	0.00
17,800.0	88.61	179.47	11,526.4	-6,351.2	-1,121.5	6,447.1	0.00	0.00	0.00
17,900.0	88.61	179.47	11,528.9	-6,451.2	-1,120.6	6,545.8	0.00	0.00	0.00
18,000.0	88.61	179.47	11,531.3	-6,551.2	-1,119.7	6,644.6	0.00	0.00	0.00
18,100.0	88.61	179.47	11,533.7	-6,651.1	-1,118.8	6,743.3	0.00	0.00	0.00
18,200.0	88.61	179.47	11,536.2	-6,751.1	-1,117.8	6,842.1	0.00	0.00	0.00
18,300.0	88.61	179.47	11,538.6	-6,851.1	-1,116.9	6,940.8	0.00	0.00	0.00
18,400.0	88.61	179.47	11,541.0	-6,951.0	-1,116.0	7,039.6	0.00	0.00	0.00
18,500.0	88.61	179.47	11,543.5	-7,051.0	-1,115.1	7,138.3	0.00	0.00	0.00
18,600.0	88.61	179.47	11,545.9	-7,151.0	-1,114.2	7,237.0	0.00	0.00	0.00
18,700.0	88.61	179.47	11,548.3	-7,250.9	-1,113.2	7,335.8	0.00	0.00	0.00
18,800.0	88.61	179.47	11,550.8	-7,350.9	-1,112.3	7,434.5	0.00	0.00	0.00
18,900.0	88.61	179.47	11,553.2	-7,450.9	-1,111.4	7,533.3	0.00	0.00	0.00
TD @ 18932.5' MD/11554.0' TVD									
18,932.5	88.61	179.47	11,554.0	-7,483.3	-1,111.1	7,565.3	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LTP Gettysburg State Co - hit/miss target - Shape - Point	0.00	0.00	0.0	-7,352.9	-1,112.3	470,589.36	763,075.00	32° 17' 27.227 N	103° 28' 55.217 W
- plan misses target center by 7436.6usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)									
FTP Gettysburg State Co - hit/miss target - Shape - Point	0.00	0.00	0.0	-96.5	-1,179.2	477,845.79	763,008.12	32° 18' 39.036 N	103° 28' 55.324 W
- plan misses target center by 1183.1usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)									
PBHL Gettysburg State Co - hit/miss target - Shape - Point	0.00	0.00	11,554.0	-7,483.3	-1,111.1	470,459.00	763,076.20	32° 17' 25.937 N	103° 28' 55.215 W
- plan hits target center									

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #15H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3454.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3454.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,229.0	1,229.0	Rustler		1.39	188.45	
1,554.0	1,554.0	TOS		1.39	188.45	
4,720.5	4,719.0	BOS (Castile)		1.39	188.45	
4,994.4	4,989.0	Delaware (Lamar)		1.39	188.45	
5,908.2	5,889.0	CYCN		1.39	188.45	
7,309.2	7,268.9	BYCN		1.39	188.45	
8,611.7	8,551.9	Bone Sprg (BSGL)		1.39	188.45	
8,994.5	8,928.9	U Avalon Sh		1.39	188.45	
9,182.3	9,113.9	L Avalon Sh		1.39	188.45	
9,755.9	9,678.9	FBSG_sand		1.39	188.45	
10,238.2	10,153.8	SBSG_sand		1.39	188.45	
11,198.8	11,094.9	TBSG_sand		1.39	188.45	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
4,300.0	4,300.0	0.0	0.0	Build 2°/100'	
4,797.4	4,794.9	6.6	-42.6	Hold 9.95° Inc., 278.82° Azm	
10,990.7	10,895.1	170.6	-1,099.9	KOP: Build 12°/100' @ 10990.7' MD	
11,742.7	11,379.0	-295.9	-1,177.3	EOC: 11742.7' MD, 88.61° Inc, 179.47° Azm	
18,932.5	11,554.0	-7,483.3	-1,111.1	TD @ 18932.5' MD/11554.0' TVD	