

Gettysburg State Com #11H
Lea County, NM
Q171*** & WT-171***
Design #1



Company Name: COG Operating, LLC
Gettysburg State Com #11H
Lea County, NM
Rig: Noram 21
Created By: Shelly Peterkin
Date: 8:59, October 24 2017

WELL DETAILS: Gettysburg State Com #11H

#H-S	#E-W	North	Ground Level	3412.0	Latitude	Longitude	Spot
9.0	8.0	478088.45	Easting	765555.45	32° 16' 45.261 N	103° 28' 13.513 W	

DESIGN TARGET DETAILS

Name	TVD	#H-S	#E-W	North	Easting	Latitude	Longitude
PTT Gettysburg State Com #11H	0.0	-123.7	791.3	477864.75	767396.41	32° 16' 28.982 N	103° 28' 5.354 W
LTP Gettysburg State Com #11H	0.0	-7368.8	794.8	476822.78	767385.18	32° 17' 27.218 N	103° 28' 5.387 W
T1 Gettysburg State Com #11H	11390.0	-3638.4	721.5	476668.38	767315.81	32° 16' 16.105 N	103° 28' 5.318 W
T2 Gettysburg State Com #11H	11485.0	-4855.1	743.5	473988.28	767338.81	32° 17' 51.325 N	103° 28' 5.318 W
P806 Gettysburg State Com #11H	11481.0	-7515.7	766.5	473462.75	767261.48	32° 17' 28.921 N	103° 28' 5.388 W

ANNOTATIONS

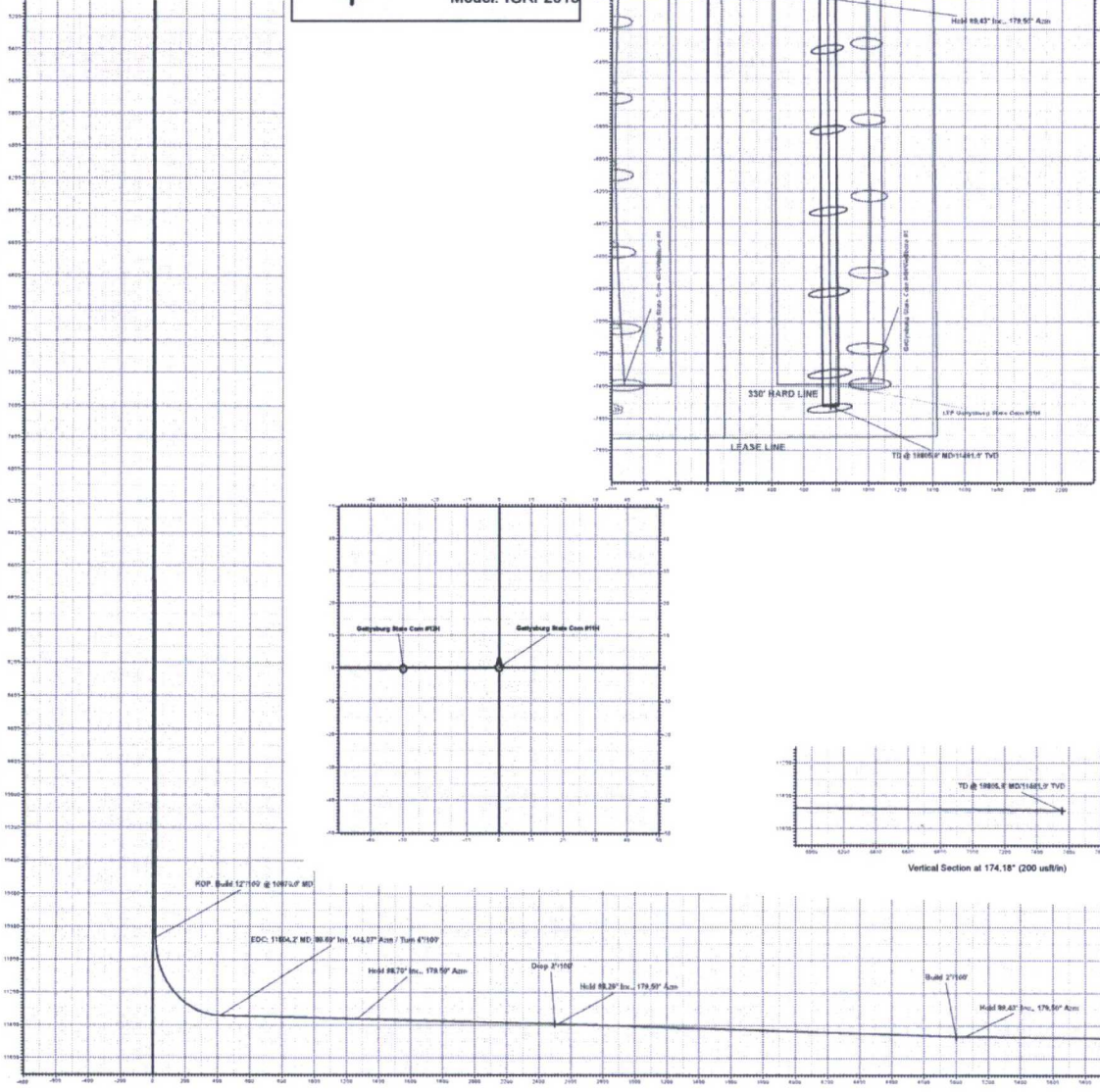
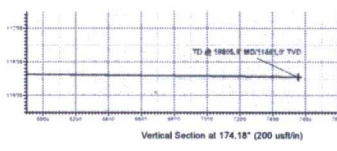
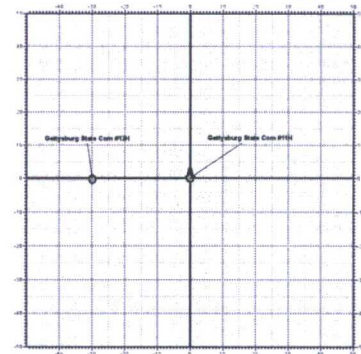
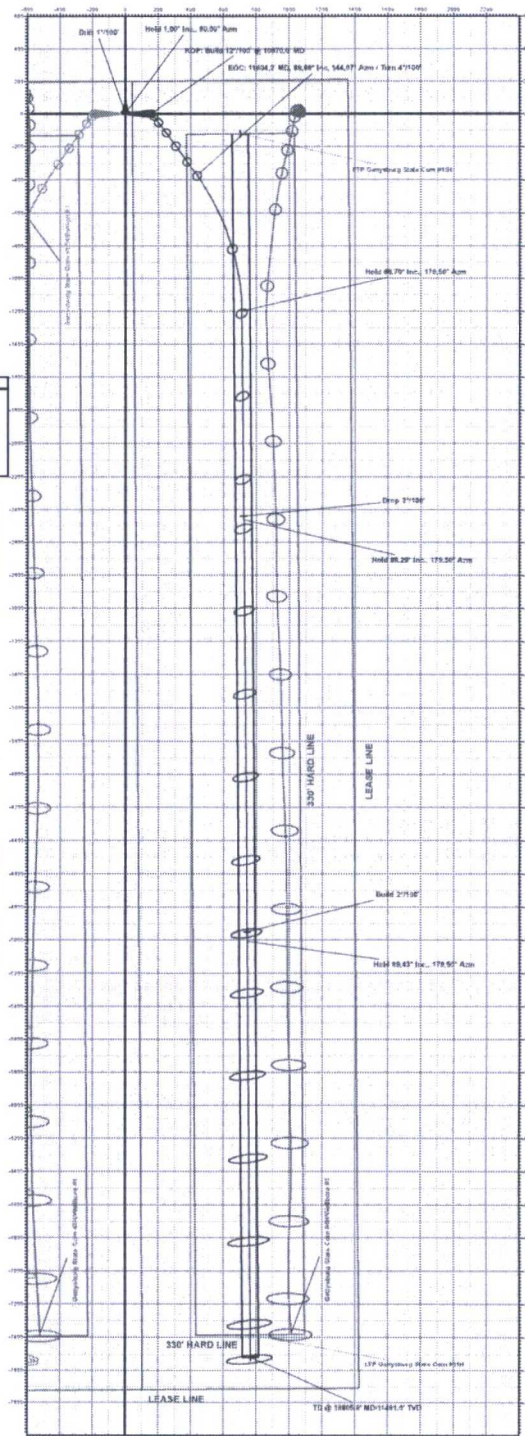
MD	Inc	Act	TVD	#H-S	#E-W	V-East	Departure	Annotation
1789.0	0.00	0.00	1789.0	0.0	0.0	0.0	0.0	0.0
1899.0	1.00	99.00	1899.0	0.0	0.0	0.0	0.0	0.0
1987.0	1.00	98.00	1987.0	0.0	153.3	153.3	153.3	0.0
11664.2	88.70	144.07	11341.0	-374.0	438.3	416.3	626.8	EOC: 11664.2 MD, 88.89° Inc, 144.07° Azm / Turn 4°100'
12469.0	88.70	179.50	11341.0	-4391.5	718.7	1287.4	1511.3	Hold 88.70° Inc., 179.50° Azm
13738.0	88.70	179.50	11399.0	-2438.4	721.5	3500.0	2749.2	Drop 2°100'
13748.0	88.29	179.50	11399.0	-2408.9	721.7	3528.3	2769.4	Hold 88.29° Inc., 179.50° Azm
16213.0	88.29	179.50	11465.0	-4595.1	743.5	5089.0	5260.8	Build 2°100'
16297.0	89.43	179.50	11466.1	-4597.3	744.8	5057.0	5317.2	Hold 89.43° Inc., 179.50° Azm
18965.0	89.43	179.50	11481.0	-7515.7	766.5	7554.6	7925.7	TD @ 18965.0 MD/11481.0 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



G M Azimuths to Grid North
Magnetic North: 6.41°
Magnetic Field Strength: 47964.6snT
Dip Angle: 60.15°
Date: 10/23/2017
Model: IGRF2015



Gettysburg State Com #12H
Lea County, NM
Q171*** & WT-171***
Design #1



Company Name: COG Operating, LLC
Gettysburg State Com #12H
Lea County, NM
Rig: Noram 21
Created By: Shelby Peterkin
Date: 9:06, October 24 2017

WELL DETAILS: Gettysburg State Com #12H

North	East	North	East	Latitude	Longitude	Spot
47899.10	79655.50	32° 18' 45.300 N	103° 28' 13.861 W			

DESIGN POINTS DETAILS

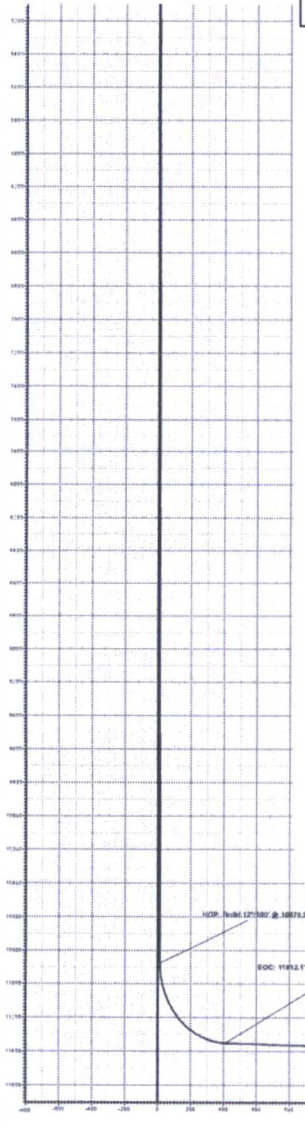
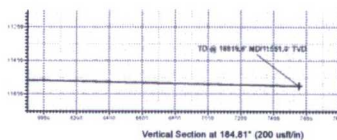
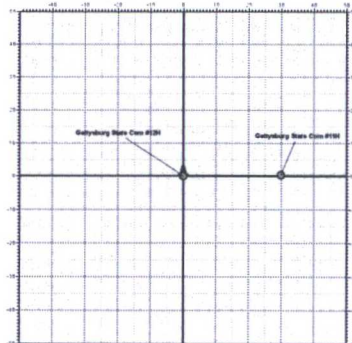
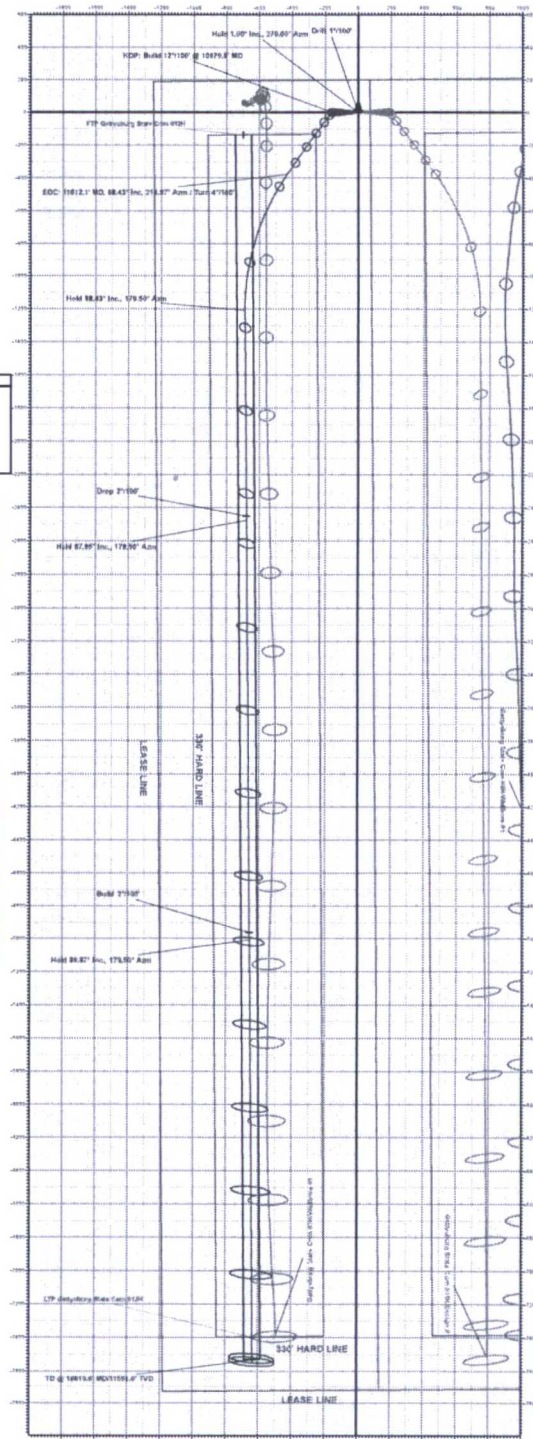
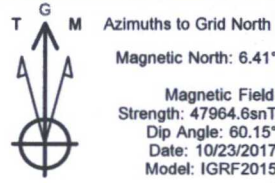
Name	TVD	North	East	Latitude	Longitude
FTD Gettysburg State Com #12H	0.0	-136.7	-498.7	47791.43	79655.50
LTP Gettysburg State Com #12H	0.0	-7387.9	-435.2	47899.10	79655.50
T1 Gettysburg State Com #12H	11615.0	-3851.7	-478.5	47899.10	79655.50
T2 Gettysburg State Com #12H	11588.0	-4882.4	-458.5	47899.10	79655.50
PBH Gettysburg State Com #12H	11591.0	-7327.8	-434.6	47899.10	79655.50

ANNOTATIONS

MD	Inc	Asl	TVD	North	East	Vsect	Departure	Annotation
1750.0	0.00	0.00	1750.0	0.0	0.0	0.0	0.0	Drift 17100'
1800.0	1.00	279.00	1800.0	0.0	-0.9	0.1	0.9	Hold 1.00' Inc., 279.00' Azm
18079.0	1.00	279.00	18079.0	0.0	-159.3	15.4	159.3	KOP: Build 121100' @ 10179.0' MD
11612.1	88.43	214.97	11591.0	-376.8	-435.8	411.6	626.0	EOC: 11612.1' MD, 88.43' Inc., 214.97' Azm / Turn 47100'
12489.7	88.43	179.50	11576.0	-4309.7	-489.3	1243.3	1510.2	Hold 88.43' Inc., 179.50' Azm
13141.3	88.43	179.50	11610.0	-4041.7	-478.5	1560.0	2792.3	Drop 27100'
13765.0	87.84	179.50	11610.0	-2476.1	-478.2	2526.3	2776.6	Hold 87.85' Inc., 179.50' Azm
16253.0	87.84	179.50	11590.0	-4862.4	-458.5	5006.0	5263.0	Build 27100'
16299.0	88.87	179.50	11591.0	-6888.8	-458.5	5046.0	5309.3	Hold 88.87' Inc., 179.50' Azm
18819.0	88.87	179.50	11551.0	-7327.8	-434.6	7564.6	7829.5	TD @ 18819.0' MD/11551.0' 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



Vertical Section at 164.61° (200 ual/in)

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #12H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3441.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3441.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #12H	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 #12H					
Well Position	+N/-S	-33.9 usft	Northing:	478,008.10 usft	Latitude:	32° 18' 40.360 N
	+E/-W	650.1 usft	Easting:	766,565.50 usft	Longitude:	103° 28' 13.861 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	3,412.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/23/2017	6.87	60.15	47,964.57018412

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	184.81

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	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,800.0	1.00	270.00	1,800.0	0.0	-0.9	1.00	1.00	0.00	270.00	
10,879.9	1.00	270.00	10,878.5	0.0	-159.3	0.00	0.00	0.00	0.00	
11,612.1	88.43	214.97	11,351.0	-376.8	-430.9	12.00	11.94	-7.52	-55.05	
12,498.7	88.43	179.50	11,376.0	-1,209.7	-689.3	4.00	0.00	-4.00	-90.50	
13,741.2	88.43	179.50	11,410.0	-2,451.7	-678.5	0.00	0.00	0.00	0.00	T1 Gettysburg State C
13,765.6	87.94	179.50	11,410.8	-2,476.1	-678.2	2.00	-2.00	0.00	-179.98	
16,253.6	87.94	179.50	11,500.0	-4,962.4	-656.5	0.00	0.00	0.00	0.00	T2 Gettysburg State C
16,299.8	88.87	179.50	11,501.3	-5,008.6	-656.1	2.00	2.00	0.00	0.00	
18,819.6	88.87	179.50	11,551.0	-7,527.8	-634.0	0.00	0.00	0.00	0.00	PBHL Gettysburg Sta

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gettysburg State Com #12H
Company:	COG Operating, LLC	TVD Reference:	KB @ 3441.0usft (Noram 21)
Project:	Lea County, NM	MD Reference:	KB @ 3441.0usft (Noram 21)
Site:	Sec 16, T23S, R34E	North Reference:	Grid
Well:	Gettysburg State Com #12H	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
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
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
Drift 1°/100'									
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
Hold 1.00° Inc., 270.00° Azm									
1,800.0	1.00	270.00	1,800.0	0.0	-0.9	0.1	1.00	1.00	0.00
1,900.0	1.00	270.00	1,900.0	0.0	-2.6	0.2	0.00	0.00	0.00
2,000.0	1.00	270.00	2,000.0	0.0	-4.4	0.4	0.00	0.00	0.00
2,100.0	1.00	270.00	2,099.9	0.0	-6.1	0.5	0.00	0.00	0.00
2,200.0	1.00	270.00	2,199.9	0.0	-7.9	0.7	0.00	0.00	0.00
2,300.0	1.00	270.00	2,299.9	0.0	-9.6	0.8	0.00	0.00	0.00
2,400.0	1.00	270.00	2,399.9	0.0	-11.3	1.0	0.00	0.00	0.00
2,500.0	1.00	270.00	2,499.9	0.0	-13.1	1.1	0.00	0.00	0.00
2,600.0	1.00	270.00	2,599.9	0.0	-14.8	1.2	0.00	0.00	0.00
2,700.0	1.00	270.00	2,699.9	0.0	-16.6	1.4	0.00	0.00	0.00
2,800.0	1.00	270.00	2,799.8	0.0	-18.3	1.5	0.00	0.00	0.00
2,900.0	1.00	270.00	2,899.8	0.0	-20.1	1.7	0.00	0.00	0.00
3,000.0	1.00	270.00	2,999.8	0.0	-21.8	1.8	0.00	0.00	0.00
3,100.0	1.00	270.00	3,099.8	0.0	-23.6	2.0	0.00	0.00	0.00
3,200.0	1.00	270.00	3,199.8	0.0	-25.3	2.1	0.00	0.00	0.00
3,300.0	1.00	270.00	3,299.8	0.0	-27.1	2.3	0.00	0.00	0.00
3,400.0	1.00	270.00	3,399.8	0.0	-28.8	2.4	0.00	0.00	0.00
3,500.0	1.00	270.00	3,499.7	0.0	-30.5	2.6	0.00	0.00	0.00
3,600.0	1.00	270.00	3,599.7	0.0	-32.3	2.7	0.00	0.00	0.00
3,700.0	1.00	270.00	3,699.7	0.0	-34.0	2.9	0.00	0.00	0.00
3,800.0	1.00	270.00	3,799.7	0.0	-35.8	3.0	0.00	0.00	0.00
3,900.0	1.00	270.00	3,899.7	0.0	-37.5	3.1	0.00	0.00	0.00
4,000.0	1.00	270.00	3,999.7	0.0	-39.3	3.3	0.00	0.00	0.00
4,100.0	1.00	270.00	4,099.6	0.0	-41.0	3.4	0.00	0.00	0.00
4,200.0	1.00	270.00	4,199.6	0.0	-42.8	3.6	0.00	0.00	0.00
4,300.0	1.00	270.00	4,299.6	0.0	-44.5	3.7	0.00	0.00	0.00
4,400.0	1.00	270.00	4,399.6	0.0	-46.2	3.9	0.00	0.00	0.00
4,500.0	1.00	270.00	4,499.6	0.0	-48.0	4.0	0.00	0.00	0.00
4,600.0	1.00	270.00	4,599.6	0.0	-49.7	4.2	0.00	0.00	0.00
4,700.0	1.00	270.00	4,699.6	0.0	-51.5	4.3	0.00	0.00	0.00
4,800.0	1.00	270.00	4,799.5	0.0	-53.2	4.5	0.00	0.00	0.00
4,900.0	1.00	270.00	4,899.5	0.0	-55.0	4.6	0.00	0.00	0.00
5,000.0	1.00	270.00	4,999.5	0.0	-56.7	4.8	0.00	0.00	0.00
5,100.0	1.00	270.00	5,099.5	0.0	-58.5	4.9	0.00	0.00	0.00

Database: EDM 5000.1 Single User Db
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 16, T23S, R34E
Well: Gettysburg State Com #12H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference: Well Gettysburg State Com #12H
TVD Reference: KB @ 3441.0usft (Noram 21)
MD Reference: KB @ 3441.0usft (Noram 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
5,200.0	1.00	270.00	5,199.5	0.0	-60.2	5.1	0.00	0.00	0.00
5,300.0	1.00	270.00	5,299.5	0.0	-62.0	5.2	0.00	0.00	0.00
5,400.0	1.00	270.00	5,399.4	0.0	-63.7	5.3	0.00	0.00	0.00
5,500.0	1.00	270.00	5,499.4	0.0	-65.4	5.5	0.00	0.00	0.00
5,600.0	1.00	270.00	5,599.4	0.0	-67.2	5.6	0.00	0.00	0.00
5,700.0	1.00	270.00	5,699.4	0.0	-68.9	5.8	0.00	0.00	0.00
5,800.0	1.00	270.00	5,799.4	0.0	-70.7	5.9	0.00	0.00	0.00
5,900.0	1.00	270.00	5,899.4	0.0	-72.4	6.1	0.00	0.00	0.00
6,000.0	1.00	270.00	5,999.4	0.0	-74.2	6.2	0.00	0.00	0.00
6,100.0	1.00	270.00	6,099.3	0.0	-75.9	6.4	0.00	0.00	0.00
6,200.0	1.00	270.00	6,199.3	0.0	-77.7	6.5	0.00	0.00	0.00
6,300.0	1.00	270.00	6,299.3	0.0	-79.4	6.7	0.00	0.00	0.00
6,400.0	1.00	270.00	6,399.3	0.0	-81.2	6.8	0.00	0.00	0.00
6,500.0	1.00	270.00	6,499.3	0.0	-82.9	7.0	0.00	0.00	0.00
6,600.0	1.00	270.00	6,599.3	0.0	-84.6	7.1	0.00	0.00	0.00
6,700.0	1.00	270.00	6,699.2	0.0	-86.4	7.3	0.00	0.00	0.00
6,800.0	1.00	270.00	6,799.2	0.0	-88.1	7.4	0.00	0.00	0.00
6,900.0	1.00	270.00	6,899.2	0.0	-89.9	7.5	0.00	0.00	0.00
7,000.0	1.00	270.00	6,999.2	0.0	-91.6	7.7	0.00	0.00	0.00
7,100.0	1.00	270.00	7,099.2	0.0	-93.4	7.8	0.00	0.00	0.00
7,200.0	1.00	270.00	7,199.2	0.0	-95.1	8.0	0.00	0.00	0.00
7,300.0	1.00	270.00	7,299.2	0.0	-96.9	8.1	0.00	0.00	0.00
7,400.0	1.00	270.00	7,399.1	0.0	-98.6	8.3	0.00	0.00	0.00
7,500.0	1.00	270.00	7,499.1	0.0	-100.4	8.4	0.00	0.00	0.00
7,600.0	1.00	270.00	7,599.1	0.0	-102.1	8.6	0.00	0.00	0.00
7,700.0	1.00	270.00	7,699.1	0.0	-103.8	8.7	0.00	0.00	0.00
7,800.0	1.00	270.00	7,799.1	0.0	-105.6	8.9	0.00	0.00	0.00
7,900.0	1.00	270.00	7,899.1	0.0	-107.3	9.0	0.00	0.00	0.00
8,000.0	1.00	270.00	7,999.1	0.0	-109.1	9.2	0.00	0.00	0.00
8,100.0	1.00	270.00	8,099.0	0.0	-110.8	9.3	0.00	0.00	0.00
8,200.0	1.00	270.00	8,199.0	0.0	-112.6	9.4	0.00	0.00	0.00
8,300.0	1.00	270.00	8,299.0	0.0	-114.3	9.6	0.00	0.00	0.00
8,400.0	1.00	270.00	8,399.0	0.0	-116.1	9.7	0.00	0.00	0.00
8,500.0	1.00	270.00	8,499.0	0.0	-117.8	9.9	0.00	0.00	0.00
8,600.0	1.00	270.00	8,599.0	0.0	-119.5	10.0	0.00	0.00	0.00
8,700.0	1.00	270.00	8,698.9	0.0	-121.3	10.2	0.00	0.00	0.00
8,800.0	1.00	270.00	8,798.9	0.0	-123.0	10.3	0.00	0.00	0.00
8,900.0	1.00	270.00	8,898.9	0.0	-124.8	10.5	0.00	0.00	0.00
9,000.0	1.00	270.00	8,998.9	0.0	-126.5	10.6	0.00	0.00	0.00
9,100.0	1.00	270.00	9,098.9	0.0	-128.3	10.8	0.00	0.00	0.00
9,200.0	1.00	270.00	9,198.9	0.0	-130.0	10.9	0.00	0.00	0.00
9,300.0	1.00	270.00	9,298.9	0.0	-131.8	11.1	0.00	0.00	0.00
9,400.0	1.00	270.00	9,398.8	0.0	-133.5	11.2	0.00	0.00	0.00
9,500.0	1.00	270.00	9,498.8	0.0	-135.3	11.4	0.00	0.00	0.00
9,600.0	1.00	270.00	9,598.8	0.0	-137.0	11.5	0.00	0.00	0.00
9,700.0	1.00	270.00	9,698.8	0.0	-138.7	11.6	0.00	0.00	0.00
9,800.0	1.00	270.00	9,798.8	0.0	-140.5	11.8	0.00	0.00	0.00
9,900.0	1.00	270.00	9,898.8	0.0	-142.2	11.9	0.00	0.00	0.00
10,000.0	1.00	270.00	9,998.7	0.0	-144.0	12.1	0.00	0.00	0.00
10,100.0	1.00	270.00	10,098.7	0.0	-145.7	12.2	0.00	0.00	0.00
10,200.0	1.00	270.00	10,198.7	0.0	-147.5	12.4	0.00	0.00	0.00
10,300.0	1.00	270.00	10,298.7	0.0	-149.2	12.5	0.00	0.00	0.00
10,400.0	1.00	270.00	10,398.7	0.0	-151.0	12.7	0.00	0.00	0.00
10,500.0	1.00	270.00	10,498.7	0.0	-152.7	12.8	0.00	0.00	0.00

Database: EDM 5000.1 Single User Db
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 16, T23S, R34E
Well: Gettysburg State Com #12H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well Gettysburg State Com #12H
KB @ 3441.0usft (Noram 21)
KB @ 3441.0usft (Noram 21)
Grid
Minimum Curvature

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)	
10,600.0	1.00	270.00	10,598.7	0.0	-154.5	13.0	0.00	0.00	0.00	
10,700.0	1.00	270.00	10,698.6	0.0	-156.2	13.1	0.00	0.00	0.00	
10,800.0	1.00	270.00	10,798.6	0.0	-157.9	13.3	0.00	0.00	0.00	
KOP: Build 12°/100' @ 10879.9' MD										
10,879.9	1.00	270.00	10,878.5	0.0	-159.3	13.4	0.00	0.00	0.00	
10,900.0	3.09	230.31	10,898.6	-0.3	-159.9	13.8	12.00	10.42	-197.74	
10,925.0	6.04	222.73	10,923.5	-1.7	-161.3	15.3	12.00	11.78	-30.33	
10,950.0	9.02	220.12	10,948.3	-4.2	-163.5	17.9	12.00	11.93	-10.41	
10,975.0	12.01	218.81	10,972.9	-7.7	-166.4	21.7	12.00	11.96	-5.26	
11,000.0	15.00	218.01	10,997.2	-12.3	-170.0	26.5	12.00	11.98	-3.19	
11,025.0	18.00	217.48	11,021.1	-17.9	-174.4	32.5	12.00	11.98	-2.14	
11,050.0	21.00	217.09	11,044.7	-24.6	-179.4	39.5	12.00	11.99	-1.55	
11,075.0	23.99	216.79	11,067.8	-32.2	-185.2	47.6	12.00	11.99	-1.18	
11,100.0	26.99	216.56	11,090.4	-40.8	-191.6	56.8	12.00	11.99	-0.93	
11,125.0	29.99	216.37	11,112.3	-50.4	-198.7	66.9	12.00	11.99	-0.76	
11,150.0	32.99	216.21	11,133.7	-61.0	-206.4	78.1	12.00	12.00	-0.63	
11,175.0	35.99	216.08	11,154.3	-72.4	-214.7	90.2	12.00	12.00	-0.54	
11,200.0	38.99	215.96	11,174.1	-84.7	-223.7	103.2	12.00	12.00	-0.46	
11,225.0	41.99	215.86	11,193.1	-97.8	-233.2	117.1	12.00	12.00	-0.41	
11,250.0	44.99	215.77	11,211.2	-111.8	-243.3	131.8	12.00	12.00	-0.36	
11,275.0	47.99	215.69	11,228.5	-126.5	-253.9	147.4	12.00	12.00	-0.33	
11,300.0	50.99	215.62	11,244.7	-141.9	-264.9	163.7	12.00	12.00	-0.30	
11,325.0	53.99	215.55	11,259.9	-158.1	-276.5	180.7	12.00	12.00	-0.27	
11,350.0	56.99	215.48	11,274.1	-174.8	-288.4	198.4	12.00	12.00	-0.25	
11,375.0	59.98	215.43	11,287.1	-192.2	-300.8	216.8	12.00	12.00	-0.24	
11,400.0	62.98	215.37	11,299.1	-210.1	-313.5	235.7	12.00	12.00	-0.22	
11,425.0	65.98	215.32	11,309.8	-228.5	-326.6	255.1	12.00	12.00	-0.21	
11,450.0	68.98	215.27	11,319.4	-247.4	-339.9	275.0	12.00	12.00	-0.20	
11,475.0	71.98	215.22	11,327.8	-266.6	-353.5	295.3	12.00	12.00	-0.19	
11,500.0	74.98	215.17	11,334.9	-286.2	-367.3	316.0	12.00	12.00	-0.19	
11,525.0	77.98	215.13	11,340.7	-306.1	-381.3	337.0	12.00	12.00	-0.18	
11,550.0	80.98	215.08	11,345.3	-326.2	-395.5	358.2	12.00	12.00	-0.18	
11,575.0	83.98	215.04	11,348.6	-346.4	-409.7	379.6	12.00	12.00	-0.17	
11,600.0	86.98	214.99	11,350.5	-366.9	-424.0	401.1	12.00	12.00	-0.17	
EOC: 11612.1' MD, 88.43° Inc, 214.97° Azm / Turn 4°/100'										
11,612.1	88.43	214.97	11,351.0	-376.8	-430.9	411.6	12.00	12.00	-0.17	
11,700.0	88.41	211.46	11,353.4	-450.3	-479.0	488.9	4.00	-0.03	-4.00	
11,800.0	88.38	207.46	11,356.2	-537.3	-528.2	579.7	4.00	-0.02	-4.00	
11,900.0	88.37	203.45	11,359.1	-627.5	-571.1	673.2	4.00	-0.02	-4.00	
12,000.0	88.36	199.45	11,361.9	-720.5	-607.7	769.0	4.00	-0.01	-4.00	
12,100.0	88.36	195.45	11,364.8	-815.9	-637.7	866.5	4.00	0.00	-4.00	
12,200.0	88.36	191.45	11,367.7	-913.1	-660.9	965.3	4.00	0.01	-4.00	
12,300.0	88.38	187.45	11,370.5	-1,011.7	-677.3	1,064.9	4.00	0.02	-4.00	
12,400.0	88.40	183.45	11,373.3	-1,111.1	-686.8	1,164.9	4.00	0.02	-4.00	
Hold 88.43° Inc., 179.50° Azm										
12,498.7	88.43	179.50	11,376.0	-1,209.7	-689.3	1,263.3	4.00	0.03	-4.00	
12,500.0	88.43	179.50	11,376.1	-1,211.0	-689.3	1,264.6	0.00	0.00	0.00	
12,600.0	88.43	179.50	11,378.8	-1,311.0	-688.4	1,364.2	0.00	0.00	0.00	
12,700.0	88.43	179.50	11,381.5	-1,411.0	-687.6	1,463.7	0.00	0.00	0.00	
12,800.0	88.43	179.50	11,384.3	-1,510.9	-686.7	1,563.2	0.00	0.00	0.00	
12,900.0	88.43	179.50	11,387.0	-1,610.9	-685.8	1,662.8	0.00	0.00	0.00	
13,000.0	88.43	179.50	11,389.7	-1,710.8	-684.9	1,762.3	0.00	0.00	0.00	
13,100.0	88.43	179.50	11,392.5	-1,810.8	-684.1	1,861.8	0.00	0.00	0.00	

Database: EDM 5000.1 Single User Db
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 16, T23S, R34E
Well: Gettysburg State Com #12H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference: Well Gettysburg State Com #12H
TVD Reference: KB @ 3441.0usft (Noram 21)
MD Reference: KB @ 3441.0usft (Noram 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
13,200.0	88.43	179.50	11,395.2	-1,910.8	-683.2	1,961.4	0.00	0.00	0.00
13,300.0	88.43	179.50	11,397.9	-2,010.7	-682.3	2,060.9	0.00	0.00	0.00
13,400.0	88.43	179.50	11,400.7	-2,110.7	-681.4	2,160.4	0.00	0.00	0.00
13,500.0	88.43	179.50	11,403.4	-2,210.6	-680.6	2,260.0	0.00	0.00	0.00
13,600.0	88.43	179.50	11,406.1	-2,310.6	-679.7	2,359.5	0.00	0.00	0.00
13,700.0	88.43	179.50	11,408.9	-2,410.6	-678.8	2,459.0	0.00	0.00	0.00
Drop 2°/100'									
13,741.2	88.43	179.50	11,410.0	-2,451.7	-678.5	2,500.0	0.00	0.00	0.00
Hold 87.95° Inc., 179.50° Azm									
13,765.6	87.94	179.50	11,410.8	-2,476.1	-678.2	2,524.3	2.00	-2.00	0.00
13,800.0	87.94	179.50	11,412.0	-2,510.5	-677.9	2,558.5	0.00	0.00	0.00
13,900.0	87.94	179.50	11,415.6	-2,610.4	-677.1	2,658.0	0.00	0.00	0.00
14,000.0	87.94	179.50	11,419.2	-2,710.4	-676.2	2,757.6	0.00	0.00	0.00
14,100.0	87.94	179.50	11,422.8	-2,810.3	-675.3	2,857.1	0.00	0.00	0.00
14,200.0	87.94	179.50	11,426.4	-2,910.2	-674.4	2,956.6	0.00	0.00	0.00
14,300.0	87.94	179.50	11,429.9	-3,010.2	-673.6	3,056.1	0.00	0.00	0.00
14,400.0	87.94	179.50	11,433.5	-3,110.1	-672.7	3,155.6	0.00	0.00	0.00
14,500.0	87.94	179.50	11,437.1	-3,210.0	-671.8	3,255.1	0.00	0.00	0.00
14,600.0	87.94	179.50	11,440.7	-3,310.0	-670.9	3,354.6	0.00	0.00	0.00
14,700.0	87.94	179.50	11,444.3	-3,409.9	-670.1	3,454.1	0.00	0.00	0.00
14,800.0	87.94	179.50	11,447.9	-3,509.8	-669.2	3,553.6	0.00	0.00	0.00
14,900.0	87.94	179.50	11,451.5	-3,609.8	-668.3	3,653.1	0.00	0.00	0.00
15,000.0	87.94	179.50	11,455.0	-3,709.7	-667.4	3,752.6	0.00	0.00	0.00
15,100.0	87.94	179.50	11,458.6	-3,809.6	-666.6	3,852.1	0.00	0.00	0.00
15,200.0	87.94	179.50	11,462.2	-3,909.5	-665.7	3,951.6	0.00	0.00	0.00
15,300.0	87.94	179.50	11,465.8	-4,009.5	-664.8	4,051.1	0.00	0.00	0.00
15,400.0	87.94	179.50	11,469.4	-4,109.4	-663.9	4,150.6	0.00	0.00	0.00
15,500.0	87.94	179.50	11,473.0	-4,209.3	-663.1	4,250.1	0.00	0.00	0.00
15,600.0	87.94	179.50	11,476.6	-4,309.3	-662.2	4,349.6	0.00	0.00	0.00
15,700.0	87.94	179.50	11,480.1	-4,409.2	-661.3	4,449.2	0.00	0.00	0.00
15,800.0	87.94	179.50	11,483.7	-4,509.1	-660.4	4,548.7	0.00	0.00	0.00
15,900.0	87.94	179.50	11,487.3	-4,609.1	-659.6	4,648.2	0.00	0.00	0.00
16,000.0	87.94	179.50	11,490.9	-4,709.0	-658.7	4,747.7	0.00	0.00	0.00
16,100.0	87.94	179.50	11,494.5	-4,808.9	-657.8	4,847.2	0.00	0.00	0.00
16,200.0	87.94	179.50	11,498.1	-4,908.9	-656.9	4,946.7	0.00	0.00	0.00
Build 2°/100'									
16,253.6	87.94	179.50	11,500.0	-4,962.4	-656.5	5,000.0	0.00	0.00	0.00
Hold 88.87° Inc., 179.50° Azm									
16,299.8	88.87	179.50	11,501.3	-5,008.6	-656.1	5,046.0	2.00	2.00	0.00
16,400.0	88.87	179.50	11,503.3	-5,108.8	-655.2	5,145.7	0.00	0.00	0.00
16,500.0	88.87	179.50	11,505.2	-5,208.8	-654.3	5,245.3	0.00	0.00	0.00
16,600.0	88.87	179.50	11,507.2	-5,308.7	-653.4	5,344.8	0.00	0.00	0.00
16,700.0	88.87	179.50	11,509.2	-5,408.7	-652.6	5,444.4	0.00	0.00	0.00
16,800.0	88.87	179.50	11,511.2	-5,508.7	-651.7	5,544.0	0.00	0.00	0.00
16,900.0	88.87	179.50	11,513.1	-5,608.7	-650.8	5,643.5	0.00	0.00	0.00
17,000.0	88.87	179.50	11,515.1	-5,708.6	-649.9	5,743.1	0.00	0.00	0.00
17,100.0	88.87	179.50	11,517.1	-5,808.6	-649.1	5,842.6	0.00	0.00	0.00
17,200.0	88.87	179.50	11,519.0	-5,908.6	-648.2	5,942.2	0.00	0.00	0.00
17,300.0	88.87	179.50	11,521.0	-6,008.6	-647.3	6,041.7	0.00	0.00	0.00
17,400.0	88.87	179.50	11,523.0	-6,108.6	-646.4	6,141.3	0.00	0.00	0.00
17,500.0	88.87	179.50	11,525.0	-6,208.5	-645.6	6,240.8	0.00	0.00	0.00
17,600.0	88.87	179.50	11,526.9	-6,308.5	-644.7	6,340.4	0.00	0.00	0.00
17,700.0	88.87	179.50	11,528.9	-6,408.5	-643.8	6,439.9	0.00	0.00	0.00

Database: EDM 5000.1 Single User Db
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 16, T23S, R34E
Well: Gettysburg State Com #12H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well Gettysburg State Com #12H
 KB @ 3441.0usft (Noram 21)
 KB @ 3441.0usft (Noram 21)
 Grid
 Minimum Curvature

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)	
17,800.0	88.87	179.50	11,530.9	-6,508.5	-642.9	6,539.5	0.00	0.00	0.00	
17,900.0	88.87	179.50	11,532.9	-6,608.4	-642.1	6,639.0	0.00	0.00	0.00	
18,000.0	88.87	179.50	11,534.8	-6,708.4	-641.2	6,738.6	0.00	0.00	0.00	
18,100.0	88.87	179.50	11,536.8	-6,808.4	-640.3	6,838.1	0.00	0.00	0.00	
18,200.0	88.87	179.50	11,538.8	-6,908.4	-639.4	6,937.7	0.00	0.00	0.00	
18,300.0	88.87	179.50	11,540.7	-7,008.3	-638.5	7,037.2	0.00	0.00	0.00	
18,400.0	88.87	179.50	11,542.7	-7,108.3	-637.7	7,136.8	0.00	0.00	0.00	
18,500.0	88.87	179.50	11,544.7	-7,208.3	-636.8	7,236.3	0.00	0.00	0.00	
18,600.0	88.87	179.50	11,546.7	-7,308.3	-635.9	7,335.9	0.00	0.00	0.00	
18,700.0	88.87	179.50	11,548.6	-7,408.2	-635.0	7,435.4	0.00	0.00	0.00	
18,800.0	88.87	179.50	11,550.6	-7,508.2	-634.2	7,535.0	0.00	0.00	0.00	
TD @ 18819.6' MD/11551.0' TVD										
18,819.6	88.87	179.50	11,551.0	-7,527.8	-634.0	7,554.5	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	-7,397.9	-635.2	470,610.18	765,930.29	32° 17' 27.208 N	103° 28' 21.954 W
- plan misses target center by 7425.1usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)									
FTP Gettysburg State Co - plan misses target center by 712.0usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E) - Point	0.00	0.00	0.0	-136.7	-698.7	477,871.42	765,866.76	32° 18' 39.064 N	103° 28' 22.015 W
T1 Gettysburg State Cor - plan hits target center - Point	0.00	0.00	11,410.0	-2,451.7	-678.5	475,556.39	765,887.03	32° 18' 16.154 N	103° 28' 21.995 W
T2 Gettysburg State Cor - plan hits target center - Point	0.00	0.00	11,500.0	-4,962.4	-656.5	473,045.69	765,909.03	32° 17' 51.309 N	103° 28' 21.974 W
PBHL Gettysburg State Co - plan hits target center - Point	0.00	0.00	11,551.0	-7,527.8	-634.0	470,480.30	765,931.50	32° 17' 25.922 N	103° 28' 21.952 W

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,700.0	1,700.0	0.0	0.0	Drift 1°/100'	
1,800.0	1,800.0	0.0	-0.9	Hold 1.00° Inc., 270.00° Azm	
10,879.9	10,878.5	0.0	-159.3	KOP: Build 12°/100' @ 10879.9' MD	
11,612.1	11,351.0	-376.8	-430.9	EOC: 11612.1' MD, 88.43° Inc, 214.97° Azm / Turn 4°/100'	
12,498.7	11,376.0	-1,209.7	-689.3	Hold 88.43° Inc., 179.50° Azm	
13,741.2	11,410.0	-2,451.7	-678.5	Drop 2°/100'	
13,765.6	11,410.8	-2,476.1	-678.2	Hold 87.95° Inc., 179.50° Azm	
16,253.6	11,500.0	-4,962.4	-656.5	Build 2°/100'	
16,299.8	11,501.3	-5,008.6	-656.1	Hold 88.87° Inc., 179.50° Azm	
18,819.6	11,551.0	-7,527.8	-634.0	TD @ 18819.6' MD/11551.0' TVD	

Gettysburg State Com 12H

Casing and Cement

<u>String</u>	<u>Hole Size</u>	<u>Csg OD</u>	<u>PPF</u>	<u>Depth</u>	<u>Sx Cement</u>	<u>TOC</u>
Surface	13-1/2"	10-3/4"	45.5#	1425'	900	0'
Intermediate	9-7/8"	7-5/8"	29.7#	10,735'	1300	0'
Production	6-3/4"	5-1/2"	23#	0'-10,235'		
Production	6-3/4"	5"	18#	10,235'-18,820'	1600	10,225'

Well Plan

Drill 13-1/2" hole to ~1425' w/ fresh water spud mud. Run 10-3/4" 45.5# HCN80 BTC casing to TD and cement to surface in one stage.

Drill 9-7/8" hole to ~10,735' with brine diesel emulsion WBM. Run 7-5/8" 29.7# HCP110 BTC casing to TD and cement to surface in one stage.

Drill 6-3/4" vertical hole, curve & lateral to 18,820' with OBM. Run 5-1/2" 23# P110 BTC casing from 0' – 10,235' and 5" 18# HCP110 BTC from 10,235' to TD and cement to 10,235' in one stage.

Well Control

<u>Type</u>	<u>Working Pressure</u>	<u>Test Pressure</u>	<u>Manufacture</u>
Double Ram	5000 psi	5000 psi	Cameron