

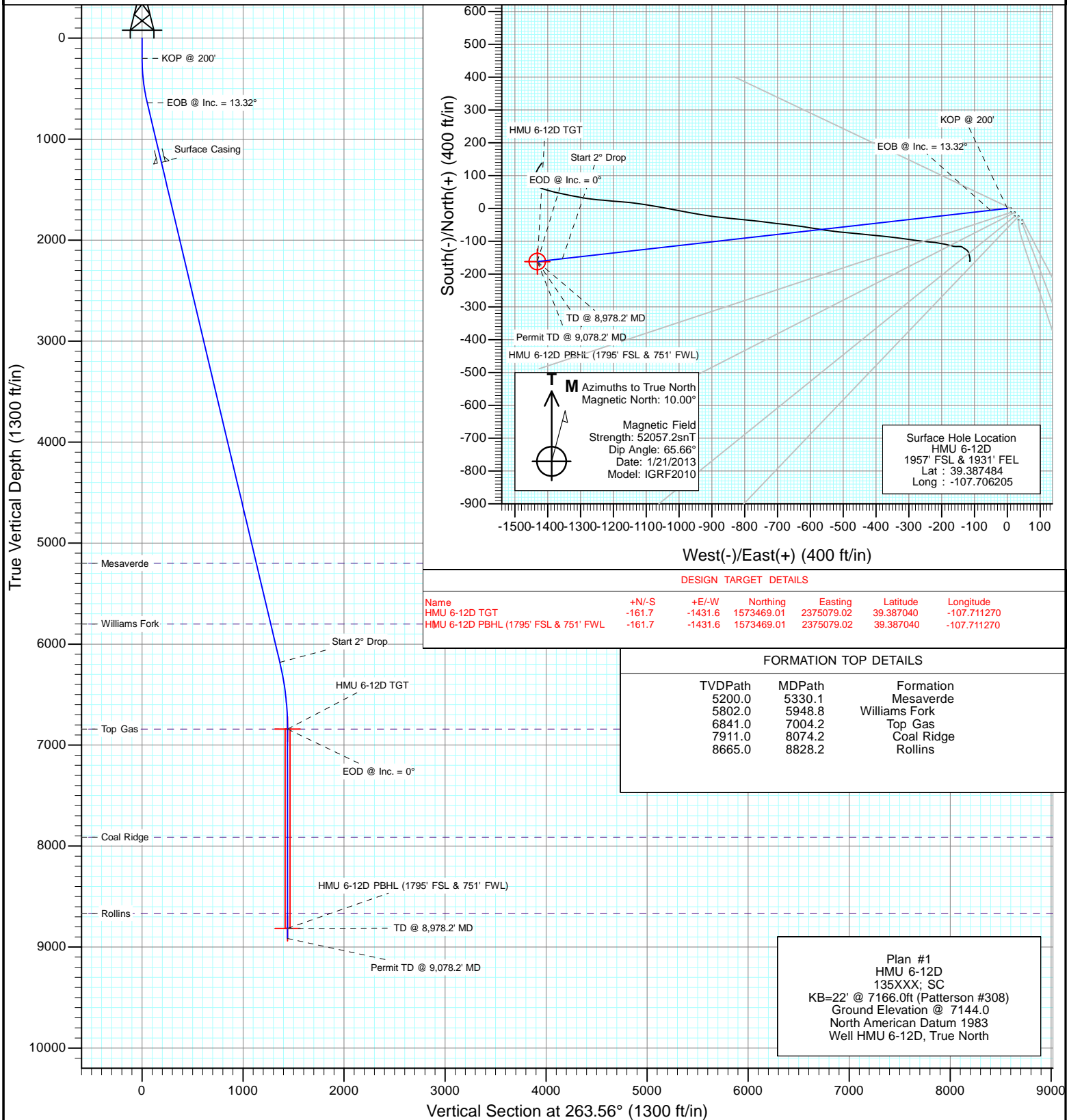


Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-12D
Wellbore: OH
Design: Plan #1



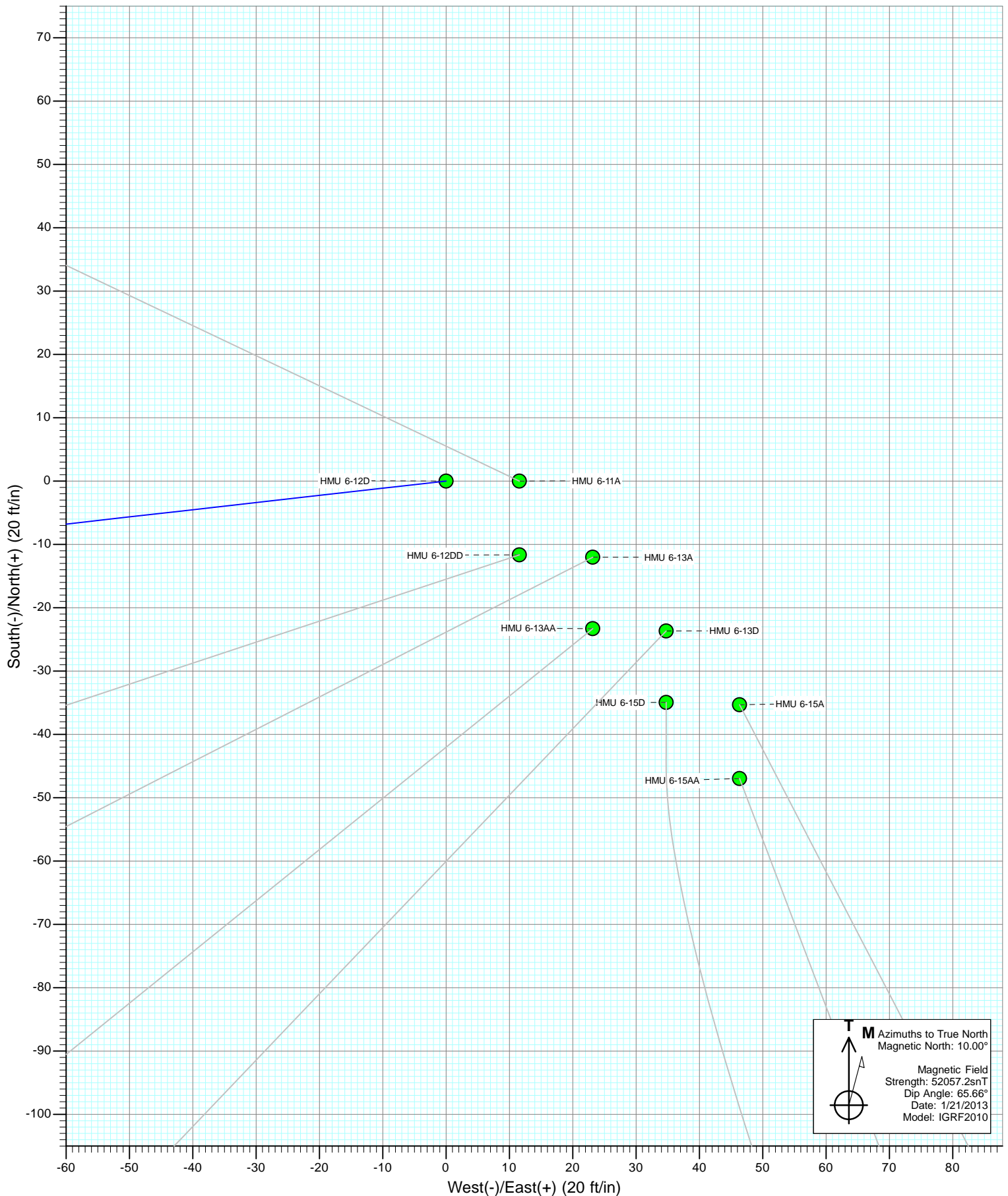
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	644.1	13.32	263.56	640.1	-5.8	-51.1	3.00	263.56	51.4	
4	6338.1	13.32	263.56	6180.8	-153.0	-1354.9	0.00	0.00	1363.6	
5	7004.2	0.00	0.00	6841.0	-161.7	-1431.6	2.00	180.00	1440.7	HMU 6-12D TGT
6	8978.2	0.00	0.00	8815.0	-161.7	-1431.6	0.00	0.00	1440.7	HMU 6-12D PBHL (1795' FSL & 751' FWL)
7	9078.2	0.00	0.00	8915.0	-161.7	-1431.6	0.00	0.00	1440.7	



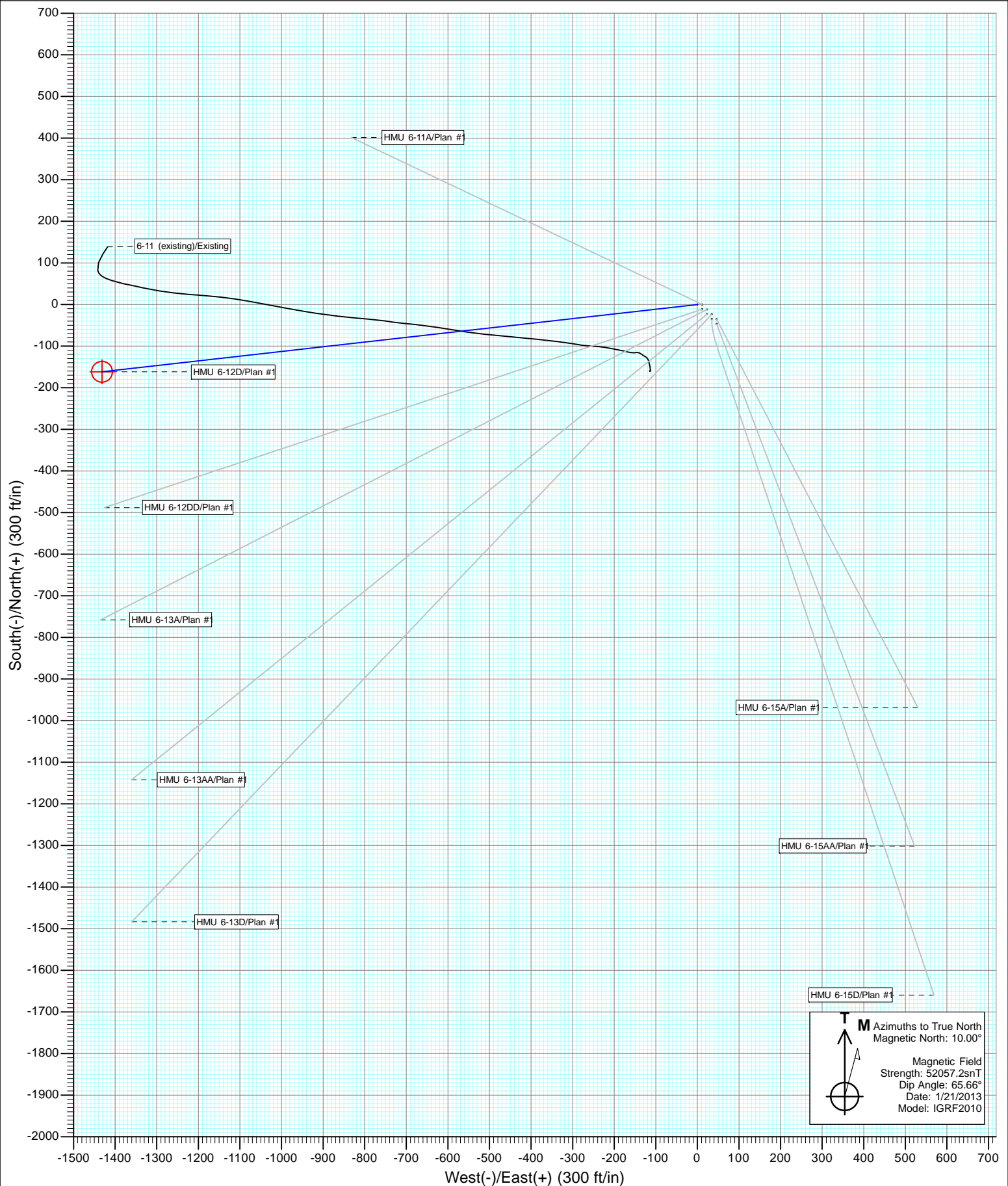


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Site: J6SEB Pad
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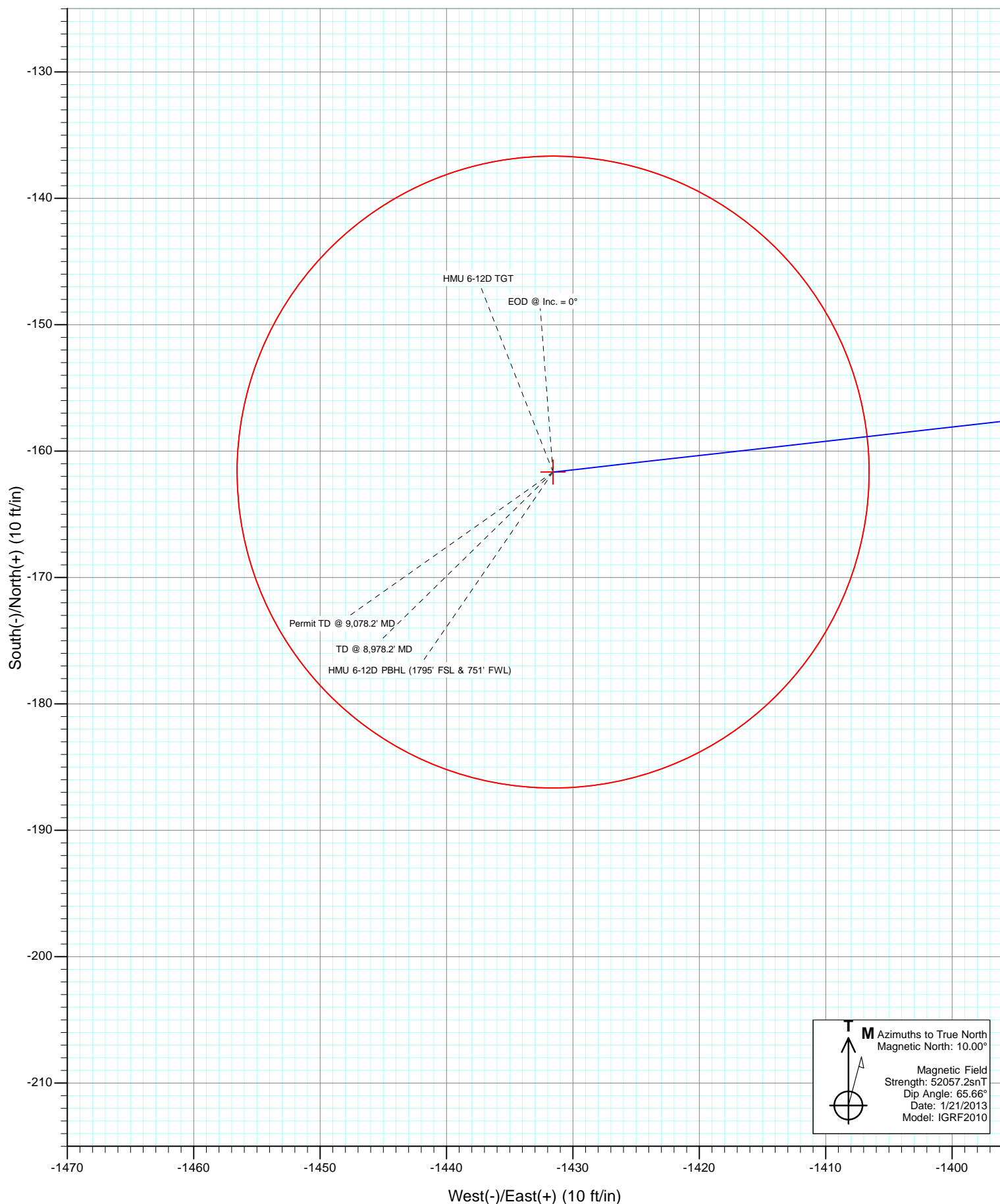


Project: Mamm Creek
Site: J6SEB Pad
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Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-12D
Wellbore: OH
Design: Plan #1



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HMU 6-12D
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	North Reference:	True
Well:	HMU 6-12D	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project	Mamm Creek		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		J6SEB Pad			
Site Position:		Northing:	1,573,595.87 ft	Latitude:	39.387484
From:	Lat/Long	Easting:	2,376,514.08 ft	Longitude:	-107.706205
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.39 °

Well	HMU 6-12D					
Well Position	+N/-S	0.0 ft	Northing:	1,573,595.85 ft	Latitude:	39.387484
	+E/-W	0.0 ft	Easting:	2,376,514.08 ft	Longitude:	-107.706205
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,144.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/21/2013	10.00	65.66	52,057

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	263.56

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
644.1	13.32	263.56	640.1	-5.8	-51.1	3.00	3.00	0.00	263.56	
6,338.1	13.32	263.56	6,180.8	-153.0	-1,354.9	0.00	0.00	0.00	0.00	
7,004.2	0.00	0.00	6,841.0	-161.7	-1,431.6	2.00	-2.00	0.00	180.00	HMU 6-12D TGT
8,978.2	0.00	0.00	8,815.0	-161.7	-1,431.6	0.00	0.00	0.00	0.00	HMU 6-12D PBHL (17
9,078.2	0.00	0.00	8,915.0	-161.7	-1,431.6	0.00	0.00	0.00	0.00	

Cathedral Energy Services

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Project:	Mamm Creek	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	North Reference:	True
Well:	HMU 6-12D	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	KOP @ 200'
300.0	3.00	263.56	300.0	-0.3	-2.6	2.6	3.00	3.00	
400.0	6.00	263.56	399.6	-1.2	-10.4	10.5	3.00	3.00	
500.0	9.00	263.56	498.8	-2.6	-23.4	23.5	3.00	3.00	
600.0	12.00	263.56	597.1	-4.7	-41.5	41.7	3.00	3.00	
644.1	13.32	263.56	640.1	-5.8	-51.1	51.4	3.00	3.00	EOB @ Inc. = 13.32°
700.0	13.32	263.56	694.5	-7.2	-63.9	64.3	0.00	0.00	
800.0	13.32	263.56	791.8	-9.8	-86.8	87.3	0.00	0.00	
900.0	13.32	263.56	889.1	-12.4	-109.7	110.4	0.00	0.00	
1,000.0	13.32	263.56	986.4	-15.0	-132.6	133.4	0.00	0.00	
1,100.0	13.32	263.56	1,083.7	-17.6	-155.5	156.5	0.00	0.00	
1,200.0	13.32	263.56	1,181.0	-20.1	-178.4	179.5	0.00	0.00	
1,250.3	13.32	263.56	1,230.0	-21.4	-189.9	191.1	0.00	0.00	Surface Casing
1,300.0	13.32	263.56	1,278.4	-22.7	-201.3	202.6	0.00	0.00	
1,400.0	13.32	263.56	1,375.7	-25.3	-224.2	225.6	0.00	0.00	
1,500.0	13.32	263.56	1,473.0	-27.9	-247.1	248.6	0.00	0.00	
1,600.0	13.32	263.56	1,570.3	-30.5	-270.0	271.7	0.00	0.00	
1,700.0	13.32	263.56	1,667.6	-33.1	-292.9	294.7	0.00	0.00	
1,800.0	13.32	263.56	1,764.9	-35.7	-315.8	317.8	0.00	0.00	
1,900.0	13.32	263.56	1,862.2	-38.2	-338.7	340.8	0.00	0.00	
2,000.0	13.32	263.56	1,959.5	-40.8	-361.6	363.9	0.00	0.00	
2,100.0	13.32	263.56	2,056.8	-43.4	-384.5	386.9	0.00	0.00	
2,200.0	13.32	263.56	2,154.1	-46.0	-407.4	410.0	0.00	0.00	
2,300.0	13.32	263.56	2,251.4	-48.6	-430.3	433.0	0.00	0.00	
2,400.0	13.32	263.56	2,348.7	-51.2	-453.2	456.0	0.00	0.00	
2,500.0	13.32	263.56	2,446.1	-53.8	-476.1	479.1	0.00	0.00	
2,600.0	13.32	263.56	2,543.4	-56.3	-499.0	502.1	0.00	0.00	
2,700.0	13.32	263.56	2,640.7	-58.9	-521.9	525.2	0.00	0.00	
2,800.0	13.32	263.56	2,738.0	-61.5	-544.8	548.2	0.00	0.00	
2,900.0	13.32	263.56	2,835.3	-64.1	-567.7	571.3	0.00	0.00	
3,000.0	13.32	263.56	2,932.6	-66.7	-590.6	594.3	0.00	0.00	
3,100.0	13.32	263.56	3,029.9	-69.3	-613.5	617.4	0.00	0.00	
3,200.0	13.32	263.56	3,127.2	-71.9	-636.4	640.4	0.00	0.00	
3,300.0	13.32	263.56	3,224.5	-74.4	-659.3	663.4	0.00	0.00	
3,400.0	13.32	263.56	3,321.8	-77.0	-682.2	686.5	0.00	0.00	
3,500.0	13.32	263.56	3,419.1	-79.6	-705.1	709.5	0.00	0.00	
3,600.0	13.32	263.56	3,516.5	-82.2	-728.0	732.6	0.00	0.00	
3,700.0	13.32	263.56	3,613.8	-84.8	-750.8	755.6	0.00	0.00	
3,800.0	13.32	263.56	3,711.1	-87.4	-773.7	778.7	0.00	0.00	
3,900.0	13.32	263.56	3,808.4	-90.0	-796.6	801.7	0.00	0.00	
4,000.0	13.32	263.56	3,905.7	-92.5	-819.5	824.8	0.00	0.00	
4,100.0	13.32	263.56	4,003.0	-95.1	-842.4	847.8	0.00	0.00	
4,200.0	13.32	263.56	4,100.3	-97.7	-865.3	870.8	0.00	0.00	
4,300.0	13.32	263.56	4,197.6	-100.3	-888.2	893.9	0.00	0.00	
4,400.0	13.32	263.56	4,294.9	-102.9	-911.1	916.9	0.00	0.00	
4,500.0	13.32	263.56	4,392.2	-105.5	-934.0	940.0	0.00	0.00	
4,600.0	13.32	263.56	4,489.5	-108.1	-956.9	963.0	0.00	0.00	
4,700.0	13.32	263.56	4,586.8	-110.6	-979.8	986.1	0.00	0.00	
4,800.0	13.32	263.56	4,684.2	-113.2	-1,002.7	1,009.1	0.00	0.00	
4,900.0	13.32	263.56	4,781.5	-115.8	-1,025.6	1,032.2	0.00	0.00	

Cathedral Energy Services

Planning Report

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Project:	Mamm Creek	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	North Reference:	True
Well:	HMU 6-12D	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
5,000.0	13.32	263.56	4,878.8	-118.4	-1,048.5	1,055.2	0.00	0.00	
5,100.0	13.32	263.56	4,976.1	-121.0	-1,071.4	1,078.2	0.00	0.00	
5,200.0	13.32	263.56	5,073.4	-123.6	-1,094.3	1,101.3	0.00	0.00	
5,300.0	13.32	263.56	5,170.7	-126.2	-1,117.2	1,124.3	0.00	0.00	
5,330.1	13.32	263.56	5,200.0	-126.9	-1,124.1	1,131.3	0.00	0.00	Mesaverde
5,400.0	13.32	263.56	5,268.0	-128.7	-1,140.1	1,147.4	0.00	0.00	
5,500.0	13.32	263.56	5,365.3	-131.3	-1,163.0	1,170.4	0.00	0.00	
5,600.0	13.32	263.56	5,462.6	-133.9	-1,185.9	1,193.5	0.00	0.00	
5,700.0	13.32	263.56	5,559.9	-136.5	-1,208.8	1,216.5	0.00	0.00	
5,800.0	13.32	263.56	5,657.2	-139.1	-1,231.7	1,239.6	0.00	0.00	
5,900.0	13.32	263.56	5,754.5	-141.7	-1,254.6	1,262.6	0.00	0.00	
5,948.8	13.32	263.56	5,802.0	-142.9	-1,265.8	1,273.8	0.00	0.00	Williams Fork
6,000.0	13.32	263.56	5,851.9	-144.3	-1,277.5	1,285.6	0.00	0.00	
6,100.0	13.32	263.56	5,949.2	-146.8	-1,300.4	1,308.7	0.00	0.00	
6,200.0	13.32	263.56	6,046.5	-149.4	-1,323.3	1,331.7	0.00	0.00	
6,300.0	13.32	263.56	6,143.8	-152.0	-1,346.2	1,354.8	0.00	0.00	
6,338.1	13.32	263.56	6,180.8	-153.0	-1,354.9	1,363.6	0.00	0.00	Start 2° Drop
6,400.0	12.08	263.56	6,241.2	-154.5	-1,368.5	1,377.2	2.00	-2.00	
6,500.0	10.08	263.56	6,339.4	-156.7	-1,387.6	1,396.4	2.00	-2.00	
6,600.0	8.08	263.56	6,438.1	-158.5	-1,403.3	1,412.2	2.00	-2.00	
6,700.0	6.08	263.56	6,537.3	-159.8	-1,415.5	1,424.5	2.00	-2.00	
6,800.0	4.08	263.56	6,636.9	-160.8	-1,424.3	1,433.4	2.00	-2.00	
6,900.0	2.08	263.56	6,736.8	-161.4	-1,429.7	1,438.8	2.00	-2.00	
7,004.2	0.00	0.00	6,841.0	-161.7	-1,431.6	1,440.7	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
7,100.0	0.00	0.00	6,936.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,200.0	0.00	0.00	7,036.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,300.0	0.00	0.00	7,136.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,400.0	0.00	0.00	7,236.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,500.0	0.00	0.00	7,336.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,600.0	0.00	0.00	7,436.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,700.0	0.00	0.00	7,536.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,800.0	0.00	0.00	7,636.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
7,900.0	0.00	0.00	7,736.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,000.0	0.00	0.00	7,836.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,074.2	0.00	0.00	7,911.0	-161.7	-1,431.6	1,440.7	0.00	0.00	Coal Ridge
8,100.0	0.00	0.00	7,936.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,200.0	0.00	0.00	8,036.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,300.0	0.00	0.00	8,136.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,400.0	0.00	0.00	8,236.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,500.0	0.00	0.00	8,336.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,600.0	0.00	0.00	8,436.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,700.0	0.00	0.00	8,536.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,800.0	0.00	0.00	8,636.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,828.2	0.00	0.00	8,665.0	-161.7	-1,431.6	1,440.7	0.00	0.00	Rollins
8,900.0	0.00	0.00	8,736.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
8,978.2	0.00	0.00	8,815.0	-161.7	-1,431.6	1,440.7	0.00	0.00	TD @ 8,978.2' MD
9,000.0	0.00	0.00	8,836.8	-161.7	-1,431.6	1,440.7	0.00	0.00	
9,078.2	0.00	0.00	8,915.0	-161.7	-1,431.6	1,440.7	0.00	0.00	Permit TD @ 9,078.2' MD

Cathedral Energy Services

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Project:	Mamm Creek	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	North Reference:	True
Well:	HMU 6-12D	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
HMU 6-12D PBHL (179E - plan hits target center - Circle (radius 25.0))	0.00	0.00	8,815.0	-161.7	-1,431.6	1,573,469.01	2,375,079.02	39.387040	-107.711270
HMU 6-12D TGT - plan hits target center - Point	0.00	0.00	6,841.0	-161.7	-1,431.6	1,573,469.01	2,375,079.02	39.387040	-107.711270

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,250.3	1,230.0	Surface Casing		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,330.1	5,200.0	Mesaverde			
5,948.8	5,802.0	Williams Fork			
7,004.2	6,841.0	Top Gas			
8,074.2	7,911.0	Coal Ridge			
8,828.2	8,665.0	Rollins			

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
200.0	200.0	0.0	0.0	KOP @ 200'	
644.1	640.1	-5.8	-51.1	EOB @ Inc. = 13.32°	
6,338.1	6,180.8	-153.0	-1,354.9	Start 2° Drop	
7,004.2	6,841.0	-161.7	-1,431.6	EOD @ Inc. = 0°	
8,978.2	8,815.0	-161.7	-1,431.6	TD @ 8,978.2' MD	
9,078.2	8,915.0	-161.7	-1,431.6	Permit TD @ 9,078.2' MD	