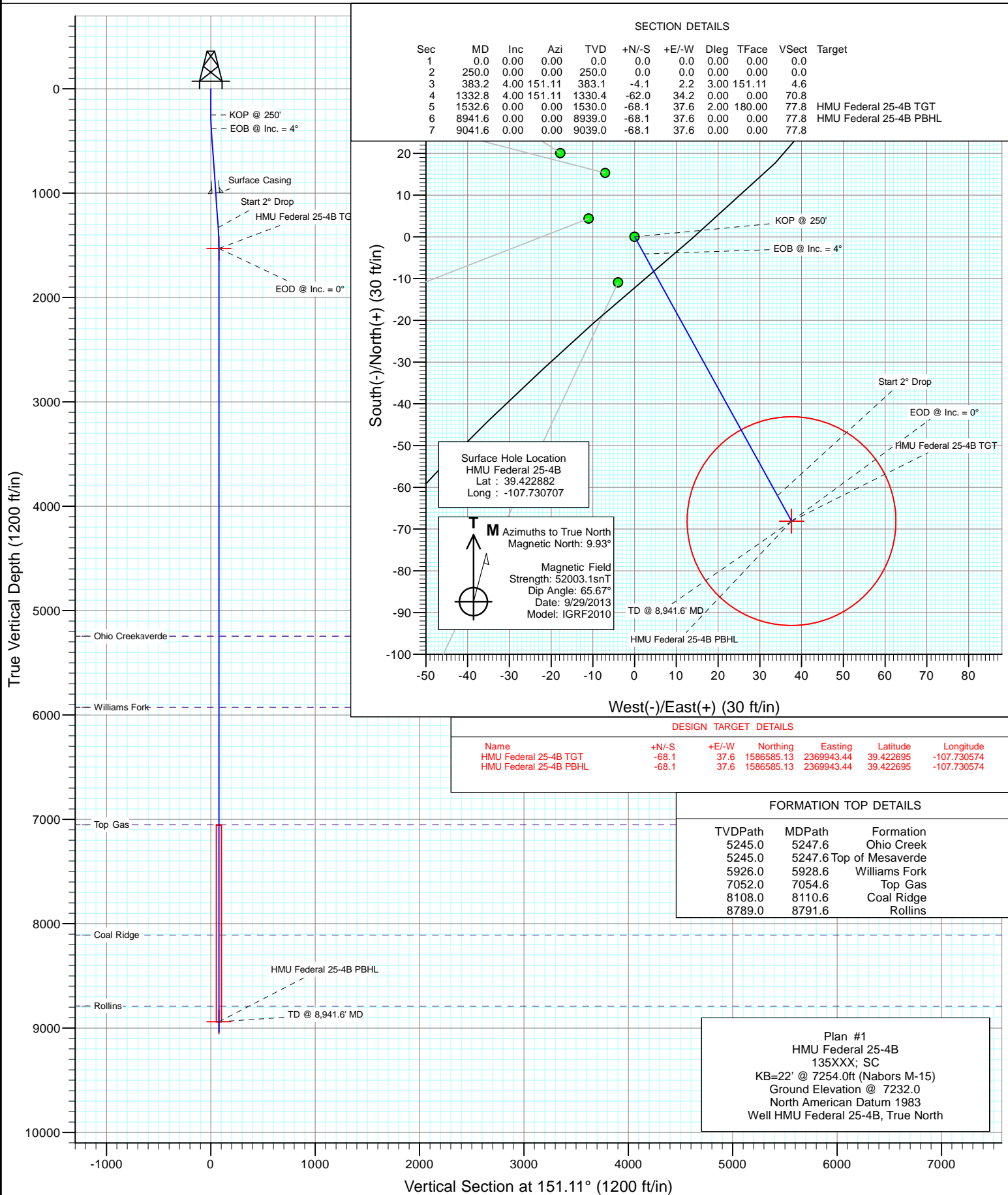


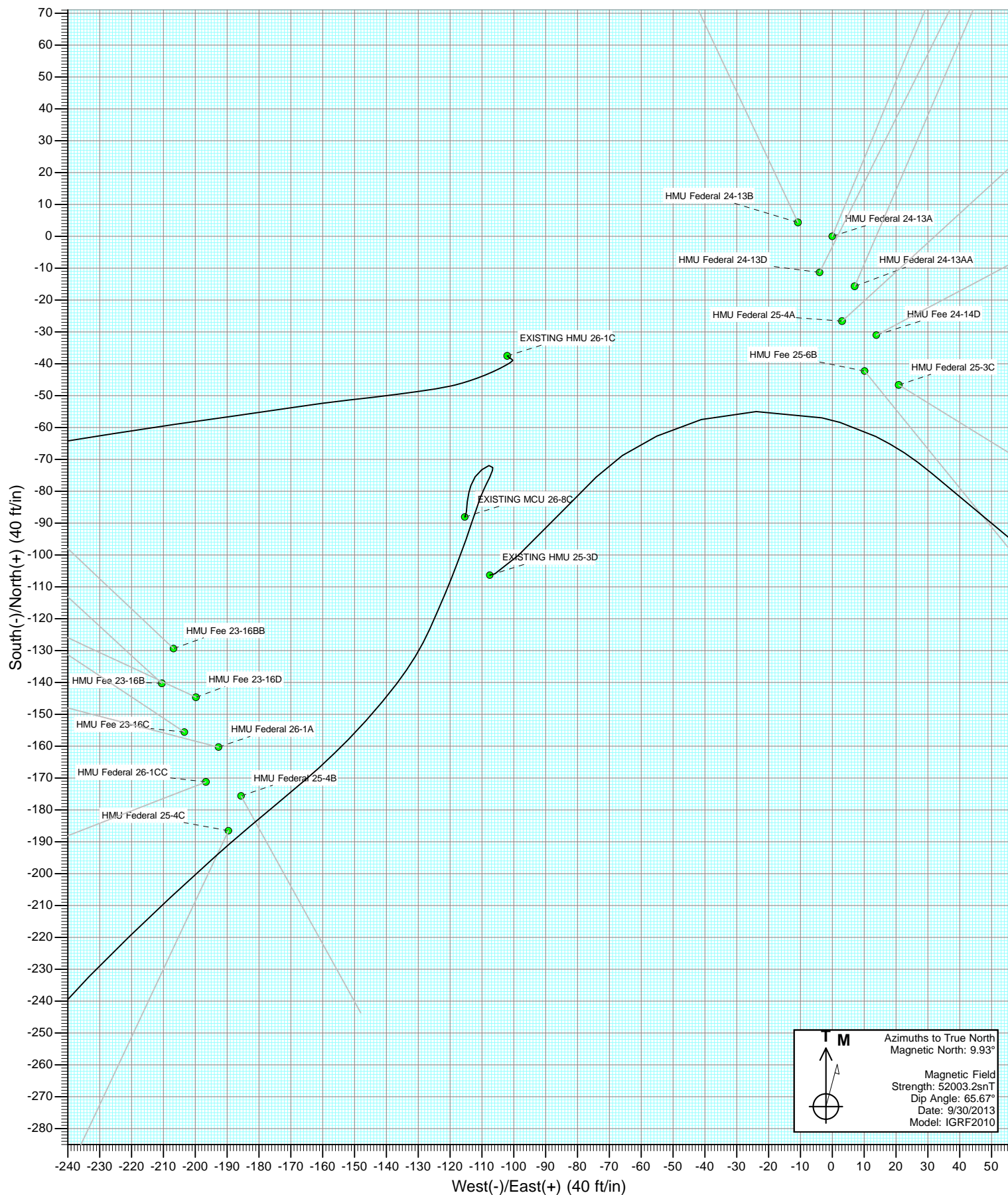


Project: Mamm Creek
Site: D25W Pad
Well: HMU Federal 25-4B
Wellbore: OH
Design: Plan #1



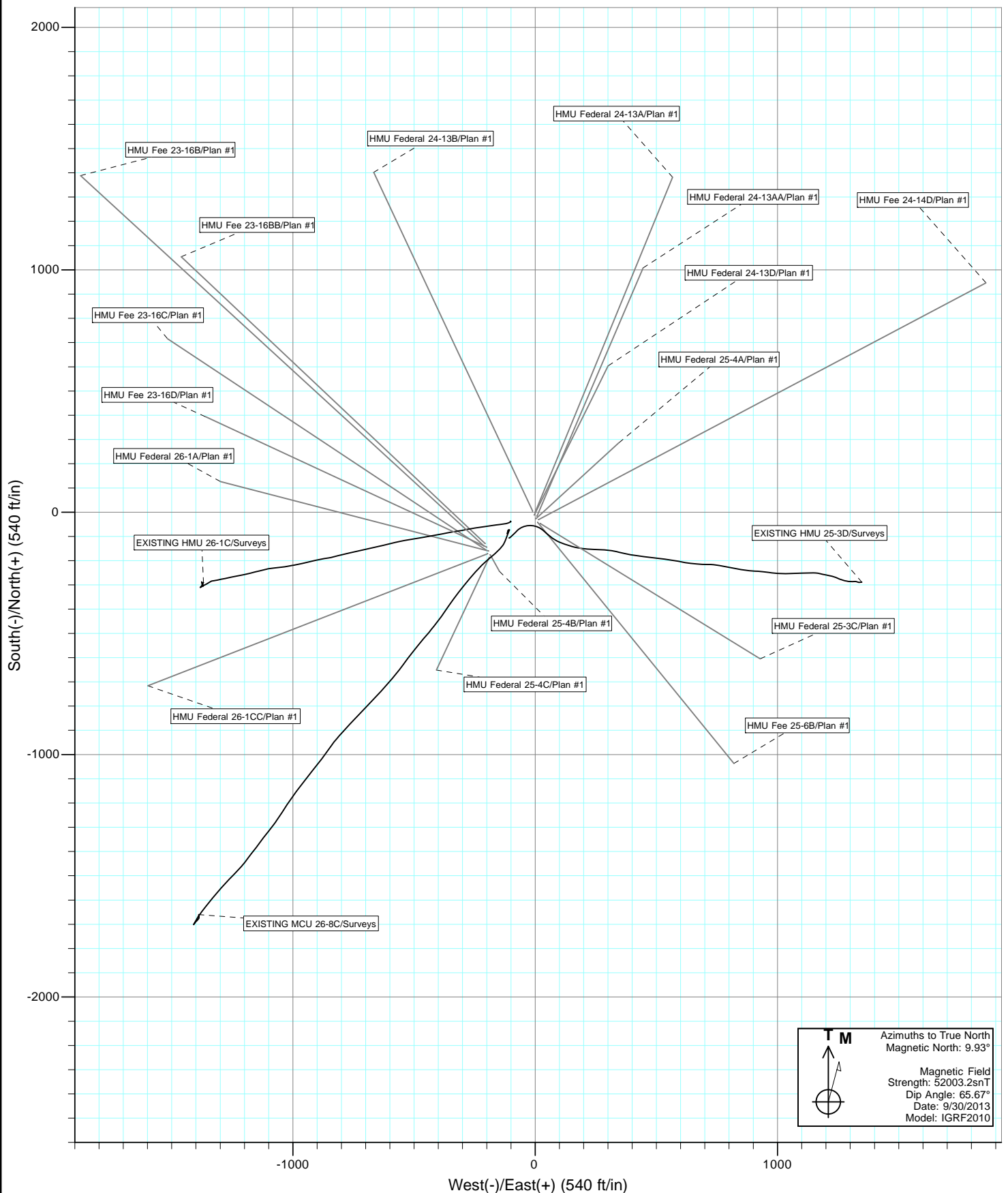


Project: Mamm Creek
Site: D25W Pad





Project: Mamm Creek
Site: D25W Pad



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 25-4B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Site:	D25W Pad	North Reference:	True
Well:	HMU Federal 25-4B	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		D25W Pad			
Site Position:		Northing:	1,586,700.88 ft	Latitude:	39.423009
From:	Lat/Long	Easting:	2,369,887.50 ft	Longitude:	-107.730782
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.41 °

Well	HMU Federal 25-4B					
Well Position	+N/-S	0.0 ft	Northing:	1,586,654.13 ft	Latitude:	39.422882
	+E/-W	0.0 ft	Easting:	2,369,907.55 ft	Longitude:	-107.730707
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,232.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/29/2013	9.93	65.67	52,003

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	151.11

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	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.00	0.00	
383.2	4.00	151.11	383.1	-4.1	2.2	3.00	3.00	0.00	151.11	
1,332.8	4.00	151.11	1,330.4	-62.0	34.2	0.00	0.00	0.00	0.00	
1,532.6	0.00	0.00	1,530.0	-68.1	37.6	2.00	-2.00	0.00	180.00	HMU Federal 25-4B T
8,941.6	0.00	0.00	8,939.0	-68.1	37.6	0.00	0.00	0.00	0.00	HMU Federal 25-4B F
9,041.6	0.00	0.00	9,039.0	-68.1	37.6	0.00	0.00	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 25-4B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Site:	D25W Pad	North Reference:	True
Well:	HMU Federal 25-4B	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	
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	KOP @ 250'
300.0	1.50	151.11	300.0	-0.6	0.3	0.7	3.00	3.00	
383.2	4.00	151.11	383.1	-4.1	2.2	4.6	3.00	3.00	EOB @ Inc. = 4°
400.0	4.00	151.11	399.9	-5.1	2.8	5.8	0.00	0.00	
500.0	4.00	151.11	499.6	-11.2	6.2	12.8	0.00	0.00	
600.0	4.00	151.11	599.4	-17.3	9.5	19.7	0.00	0.00	
700.0	4.00	151.11	699.1	-23.4	12.9	26.7	0.00	0.00	
800.0	4.00	151.11	798.9	-29.5	16.3	33.7	0.00	0.00	
900.0	4.00	151.11	898.6	-35.6	19.6	40.7	0.00	0.00	
1,000.0	4.00	151.11	998.4	-41.7	23.0	47.6	0.00	0.00	
1,001.6	4.00	151.11	1,000.0	-41.8	23.1	47.7	0.00	0.00	Surface Casing
1,100.0	4.00	151.11	1,098.1	-47.8	26.4	54.6	0.00	0.00	
1,200.0	4.00	151.11	1,197.9	-53.9	29.7	61.6	0.00	0.00	
1,300.0	4.00	151.11	1,297.7	-60.0	33.1	68.5	0.00	0.00	
1,332.8	4.00	151.11	1,330.4	-62.0	34.2	70.8	0.00	0.00	Start 2° Drop
1,400.0	2.65	151.11	1,397.5	-65.4	36.1	74.7	2.00	-2.00	
1,500.0	0.65	151.11	1,497.4	-67.9	37.5	77.6	2.00	-2.00	
1,532.6	0.00	0.00	1,530.0	-68.1	37.6	77.8	2.00	-2.00	EOD @ Inc. = 0°
1,600.0	0.00	0.00	1,597.4	-68.1	37.6	77.8	0.00	0.00	
1,700.0	0.00	0.00	1,697.4	-68.1	37.6	77.8	0.00	0.00	
1,800.0	0.00	0.00	1,797.4	-68.1	37.6	77.8	0.00	0.00	
1,900.0	0.00	0.00	1,897.4	-68.1	37.6	77.8	0.00	0.00	
2,000.0	0.00	0.00	1,997.4	-68.1	37.6	77.8	0.00	0.00	
2,100.0	0.00	0.00	2,097.4	-68.1	37.6	77.8	0.00	0.00	
2,200.0	0.00	0.00	2,197.4	-68.1	37.6	77.8	0.00	0.00	
2,300.0	0.00	0.00	2,297.4	-68.1	37.6	77.8	0.00	0.00	
2,400.0	0.00	0.00	2,397.4	-68.1	37.6	77.8	0.00	0.00	
2,500.0	0.00	0.00	2,497.4	-68.1	37.6	77.8	0.00	0.00	
2,600.0	0.00	0.00	2,597.4	-68.1	37.6	77.8	0.00	0.00	
2,700.0	0.00	0.00	2,697.4	-68.1	37.6	77.8	0.00	0.00	
2,800.0	0.00	0.00	2,797.4	-68.1	37.6	77.8	0.00	0.00	
2,900.0	0.00	0.00	2,897.4	-68.1	37.6	77.8	0.00	0.00	
3,000.0	0.00	0.00	2,997.4	-68.1	37.6	77.8	0.00	0.00	
3,100.0	0.00	0.00	3,097.4	-68.1	37.6	77.8	0.00	0.00	
3,200.0	0.00	0.00	3,197.4	-68.1	37.6	77.8	0.00	0.00	
3,300.0	0.00	0.00	3,297.4	-68.1	37.6	77.8	0.00	0.00	
3,400.0	0.00	0.00	3,397.4	-68.1	37.6	77.8	0.00	0.00	
3,500.0	0.00	0.00	3,497.4	-68.1	37.6	77.8	0.00	0.00	
3,600.0	0.00	0.00	3,597.4	-68.1	37.6	77.8	0.00	0.00	
3,700.0	0.00	0.00	3,697.4	-68.1	37.6	77.8	0.00	0.00	
3,800.0	0.00	0.00	3,797.4	-68.1	37.6	77.8	0.00	0.00	
3,900.0	0.00	0.00	3,897.4	-68.1	37.6	77.8	0.00	0.00	
4,000.0	0.00	0.00	3,997.4	-68.1	37.6	77.8	0.00	0.00	
4,100.0	0.00	0.00	4,097.4	-68.1	37.6	77.8	0.00	0.00	
4,200.0	0.00	0.00	4,197.4	-68.1	37.6	77.8	0.00	0.00	
4,300.0	0.00	0.00	4,297.4	-68.1	37.6	77.8	0.00	0.00	
4,400.0	0.00	0.00	4,397.4	-68.1	37.6	77.8	0.00	0.00	
4,500.0	0.00	0.00	4,497.4	-68.1	37.6	77.8	0.00	0.00	
4,600.0	0.00	0.00	4,597.4	-68.1	37.6	77.8	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 25-4B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Site:	D25W Pad	North Reference:	True
Well:	HMU Federal 25-4B	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
4,700.0	0.00	0.00	4,697.4	-68.1	37.6	77.8	0.00	0.00	
4,800.0	0.00	0.00	4,797.4	-68.1	37.6	77.8	0.00	0.00	
4,900.0	0.00	0.00	4,897.4	-68.1	37.6	77.8	0.00	0.00	
5,000.0	0.00	0.00	4,997.4	-68.1	37.6	77.8	0.00	0.00	
5,100.0	0.00	0.00	5,097.4	-68.1	37.6	77.8	0.00	0.00	
5,200.0	0.00	0.00	5,197.4	-68.1	37.6	77.8	0.00	0.00	
5,247.6	0.00	0.00	5,245.0	-68.1	37.6	77.8	0.00	0.00	Top of Mesaverde - Ohio Creek
5,300.0	0.00	0.00	5,297.4	-68.1	37.6	77.8	0.00	0.00	
5,400.0	0.00	0.00	5,397.4	-68.1	37.6	77.8	0.00	0.00	
5,500.0	0.00	0.00	5,497.4	-68.1	37.6	77.8	0.00	0.00	
5,600.0	0.00	0.00	5,597.4	-68.1	37.6	77.8	0.00	0.00	
5,700.0	0.00	0.00	5,697.4	-68.1	37.6	77.8	0.00	0.00	
5,800.0	0.00	0.00	5,797.4	-68.1	37.6	77.8	0.00	0.00	
5,900.0	0.00	0.00	5,897.4	-68.1	37.6	77.8	0.00	0.00	
5,928.6	0.00	0.00	5,926.0	-68.1	37.6	77.8	0.00	0.00	Williams Fork
6,000.0	0.00	0.00	5,997.4	-68.1	37.6	77.8	0.00	0.00	
6,100.0	0.00	0.00	6,097.4	-68.1	37.6	77.8	0.00	0.00	
6,200.0	0.00	0.00	6,197.4	-68.1	37.6	77.8	0.00	0.00	
6,300.0	0.00	0.00	6,297.4	-68.1	37.6	77.8	0.00	0.00	
6,400.0	0.00	0.00	6,397.4	-68.1	37.6	77.8	0.00	0.00	
6,500.0	0.00	0.00	6,497.4	-68.1	37.6	77.8	0.00	0.00	
6,600.0	0.00	0.00	6,597.4	-68.1	37.6	77.8	0.00	0.00	
6,700.0	0.00	0.00	6,697.4	-68.1	37.6	77.8	0.00	0.00	
6,800.0	0.00	0.00	6,797.4	-68.1	37.6	77.8	0.00	0.00	
6,900.0	0.00	0.00	6,897.4	-68.1	37.6	77.8	0.00	0.00	
7,000.0	0.00	0.00	6,997.4	-68.1	37.6	77.8	0.00	0.00	
7,054.6	0.00	0.00	7,052.0	-68.1	37.6	77.8	0.00	0.00	Top Gas
7,100.0	0.00	0.00	7,097.4	-68.1	37.6	77.8	0.00	0.00	
7,200.0	0.00	0.00	7,197.4	-68.1	37.6	77.8	0.00	0.00	
7,300.0	0.00	0.00	7,297.4	-68.1	37.6	77.8	0.00	0.00	
7,400.0	0.00	0.00	7,397.4	-68.1	37.6	77.8	0.00	0.00	
7,500.0	0.00	0.00	7,497.4	-68.1	37.6	77.8	0.00	0.00	
7,600.0	0.00	0.00	7,597.4	-68.1	37.6	77.8	0.00	0.00	
7,700.0	0.00	0.00	7,697.4	-68.1	37.6	77.8	0.00	0.00	
7,800.0	0.00	0.00	7,797.4	-68.1	37.6	77.8	0.00	0.00	
7,900.0	0.00	0.00	7,897.4	-68.1	37.6	77.8	0.00	0.00	
8,000.0	0.00	0.00	7,997.4	-68.1	37.6	77.8	0.00	0.00	
8,100.0	0.00	0.00	8,097.4	-68.1	37.6	77.8	0.00	0.00	
8,110.6	0.00	0.00	8,108.0	-68.1	37.6	77.8	0.00	0.00	Coal Ridge
8,200.0	0.00	0.00	8,197.4	-68.1	37.6	77.8	0.00	0.00	
8,300.0	0.00	0.00	8,297.4	-68.1	37.6	77.8	0.00	0.00	
8,400.0	0.00	0.00	8,397.4	-68.1	37.6	77.8	0.00	0.00	
8,500.0	0.00	0.00	8,497.4	-68.1	37.6	77.8	0.00	0.00	
8,600.0	0.00	0.00	8,597.4	-68.1	37.6	77.8	0.00	0.00	
8,700.0	0.00	0.00	8,697.4	-68.1	37.6	77.8	0.00	0.00	
8,791.6	0.00	0.00	8,789.0	-68.1	37.6	77.8	0.00	0.00	Rollins
8,800.0	0.00	0.00	8,797.4	-68.1	37.6	77.8	0.00	0.00	
8,900.0	0.00	0.00	8,897.4	-68.1	37.6	77.8	0.00	0.00	
8,941.6	0.00	0.00	8,939.0	-68.1	37.6	77.8	0.00	0.00	TD @ 8,941.6' MD
9,000.0	0.00	0.00	8,997.4	-68.1	37.6	77.8	0.00	0.00	
9,041.6	0.00	0.00	9,039.0	-68.1	37.6	77.8	0.00	0.00	Permit TD @ 9,041.6' MD

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 25-4B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7254.0ft (Nabors M-15)
Site:	D25W Pad	North Reference:	True
Well:	HMU Federal 25-4B	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
HMU Federal 25-4B TG ⁻	0.00	0.00	1,530.0	-68.1	37.6	1,586,585.13	2,369,943.44	39.422695	-107.730574
- plan hits target center									
- Point									
HMU Federal 25-4B PB†	0.00	0.00	8,939.0	-68.1	37.6	1,586,585.13	2,369,943.44	39.422695	-107.730574
- plan hits target center									
- Circle (radius 25.0)									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,001.6	1,000.0	Surface Casing		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,247.6	5,245.0	Ohio Creek			
5,247.6	5,245.0	Top of Mesaverde			
5,928.6	5,926.0	Williams Fork			
7,054.6	7,052.0	Top Gas			
8,110.6	8,108.0	Coal Ridge			
8,791.6	8,789.0	Rollins			

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
250.0	250.0	0.0	0.0	KOP @ 250'	
383.2	383.1	-4.1	2.2	EOB @ Inc. = 4°	
1,332.8	1,330.4	-62.0	34.2	Start 2° Drop	
1,532.6	1,530.0	-68.1	37.6	EOD @ Inc. = 0°	
8,941.6	8,939.0	-68.1	37.6	TD @ 8,941.6' MD	
9,041.6	9,039.0	-68.1	37.6	Permit TD @ 9,041.6' MD	