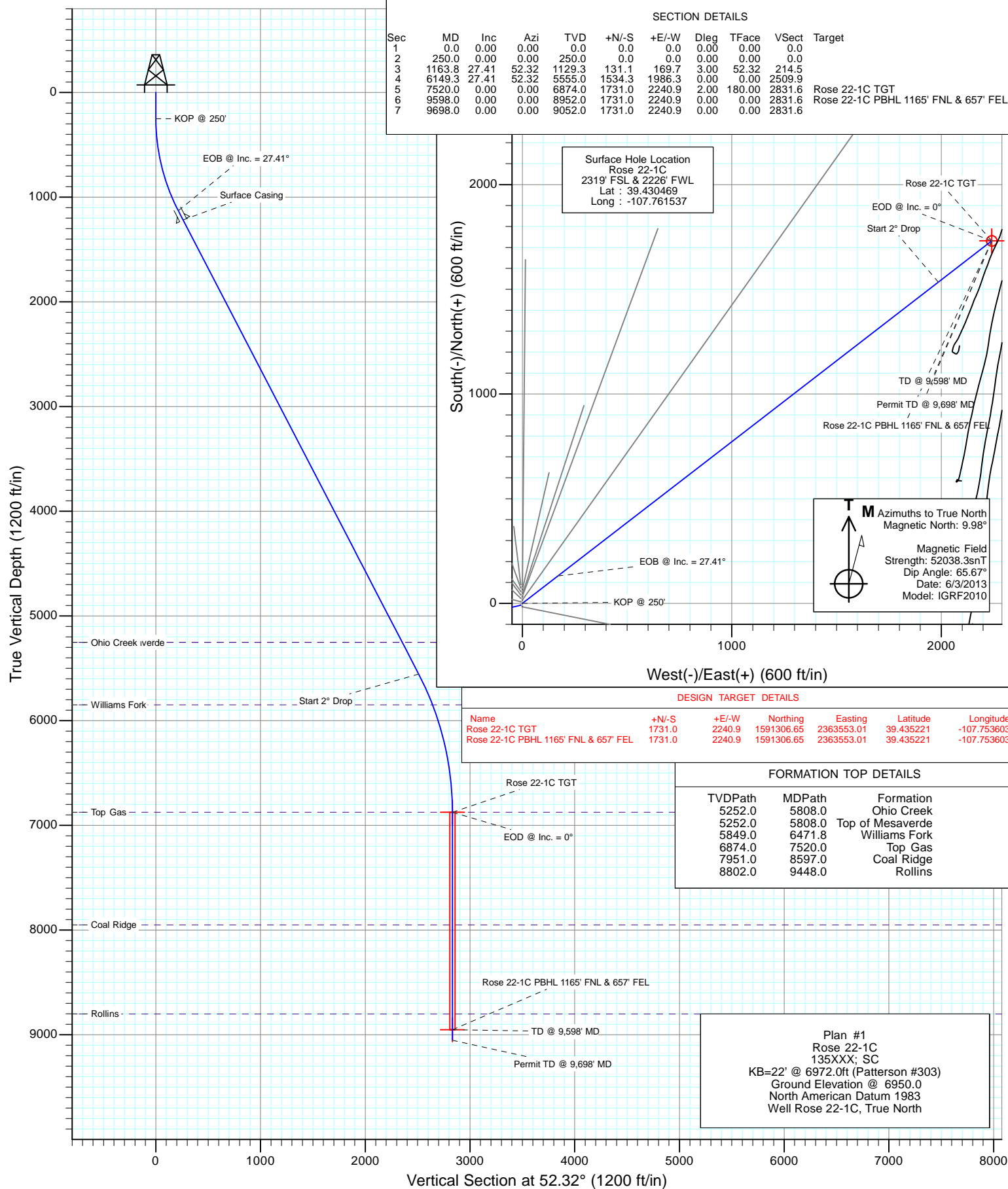
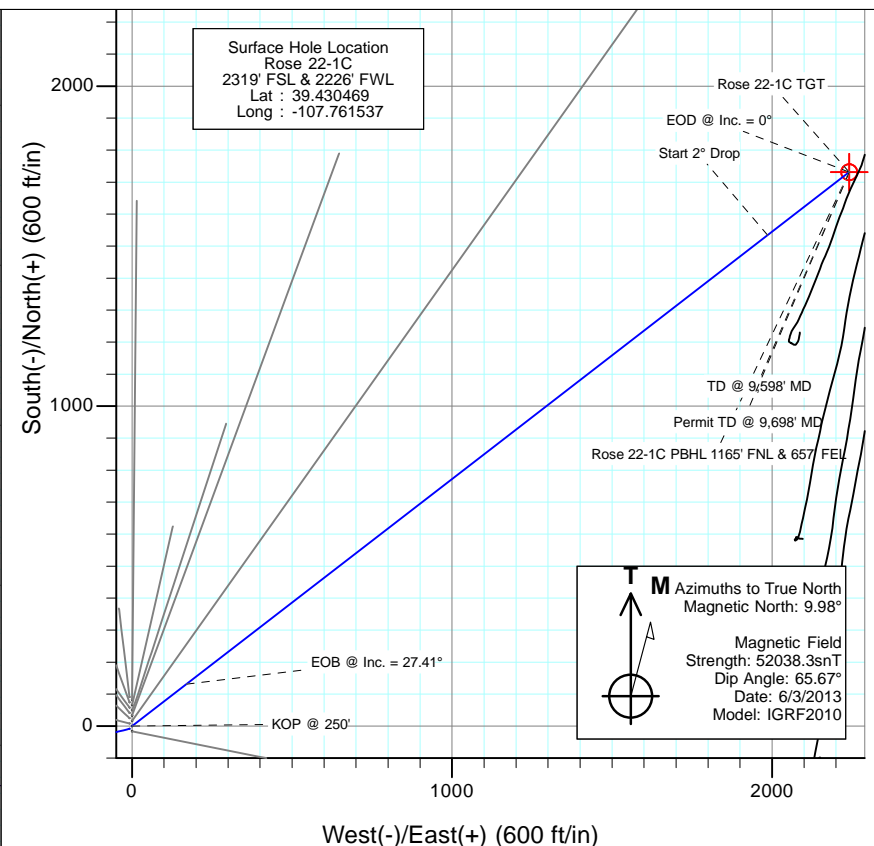




Project: Mamm Creek  
Site: K22W Pad  
Well: Rose 22-1C  
Wellbore: OH  
Design: Plan #1



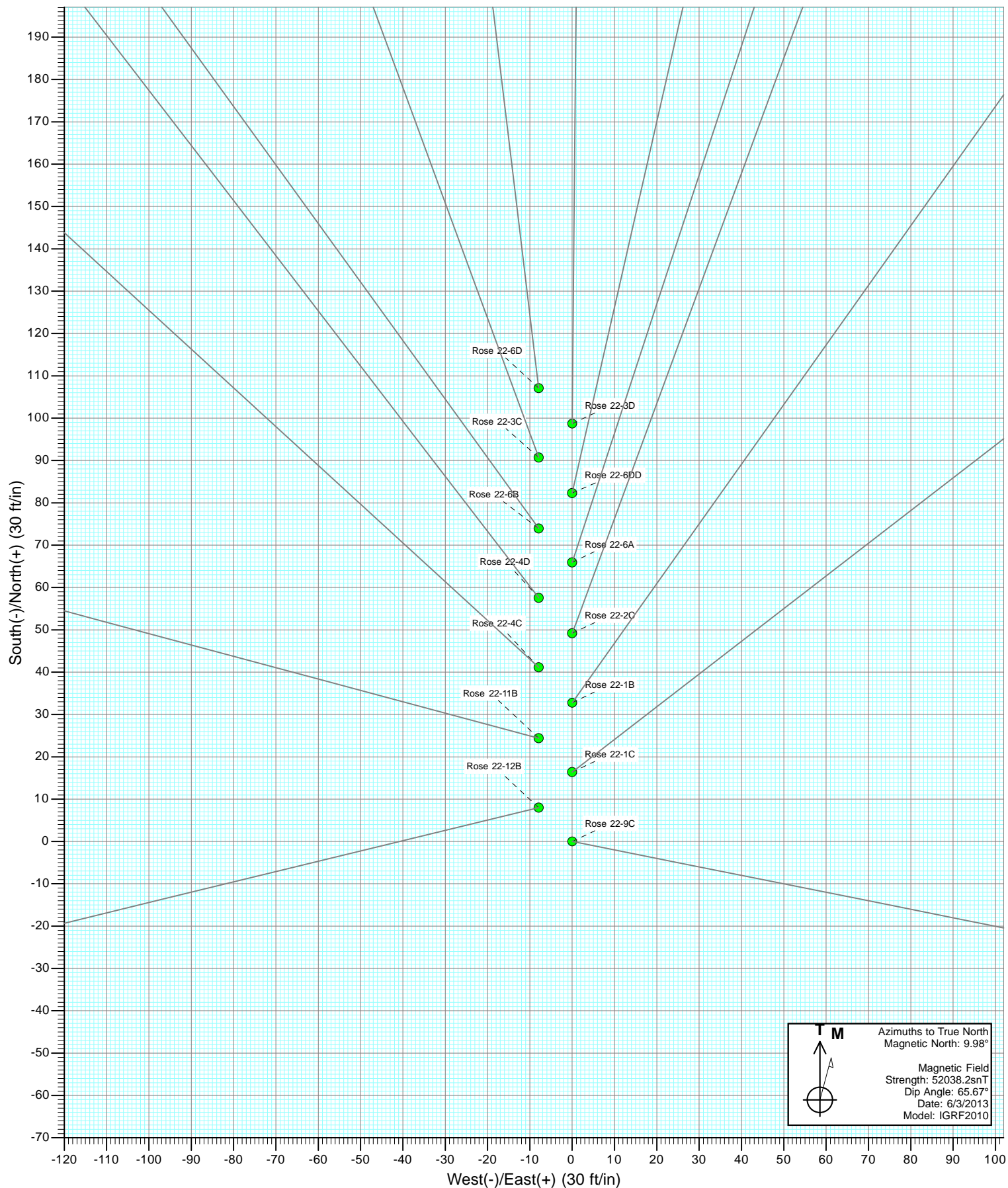
SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.0	
3	1163.8	27.41	52.32	1129.3	131.1	169.7	3.00	52.32	214.5	
4	6149.3	27.41	52.32	5555.0	1534.3	1986.3	0.00	0.00	2509.9	
5	7520.0	0.00	0.00	6874.0	1731.0	2240.9	2.00	180.00	2831.6	Rose 22-1C TGT
6	9598.0	0.00	0.00	8952.0	1731.0	2240.9	0.00	0.00	2831.6	Rose 22-1C PBHL 1165' FNL & 657' FEL
7	9698.0	0.00	0.00	9052.0	1731.0	2240.9	0.00	0.00	2831.6	

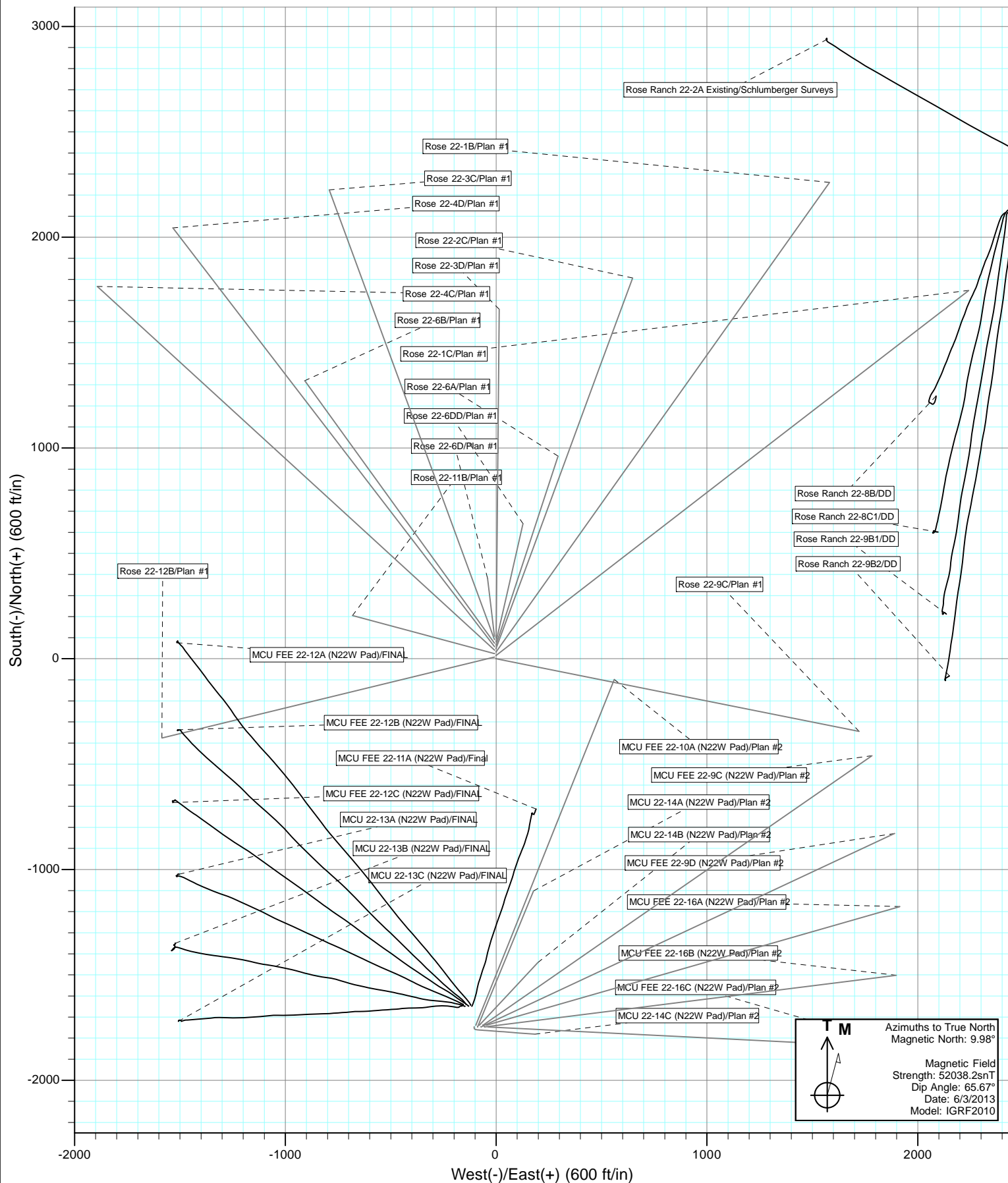


DESIGN TARGET DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rose 22-1C TGT	1731.0	2240.9	1591306.65	2363553.01	39.435221	-107.753603
Rose 22-1C PBHL 1165' FNL & 657' FEL	1731.0	2240.9	1591306.65	2363553.01	39.435221	-107.753603

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
5252.0	5808.0	Ohio Creek
5252.0	5808.0	Top of Mesaverde
5849.0	6471.8	Williams Fork
6874.0	7520.0	Top Gas
7951.0	8597.0	Coal Ridge
8802.0	9448.0	Rollins

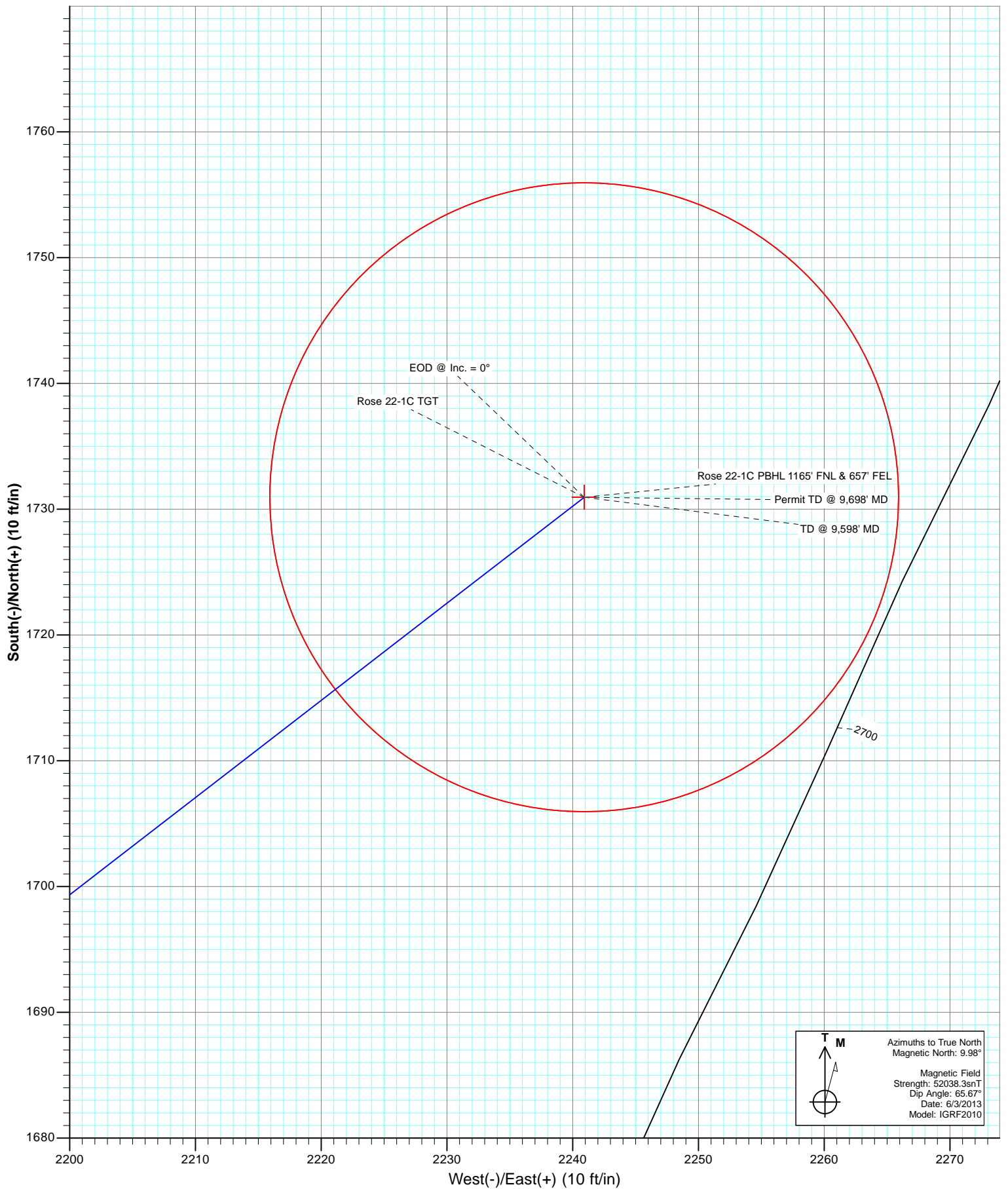
Plan #1  
Rose 22-1C  
135XXX; SC  
KB=22' @ 6972.0ft (Patterson #303)  
Ground Elevation @ 6950.0  
North American Datum 1983  
Well Rose 22-1C, True North







Project: Mamm Creek  
Site: K22W Pad  
Well: Rose 22-1C  
Wellbore: OH  
Plan: Plan #1



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Rose 22-1C
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Site:</b>	K22W Pad	<b>North Reference:</b>	True
<b>Well:</b>	Rose 22-1C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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		K22W Pad			
Site Position:		Northing:	1,589,615.65 ft	Latitude:	39.430424
From:	Lat/Long	Easting:	2,361,269.29 ft	Longitude:	-107.761537
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.43 °

Well	Rose 22-1C					
Well Position	+N/-S	0.0 ft	Northing:	1,589,632.02 ft	Latitude:	39.430469
	+E/-W	0.0 ft	Easting:	2,361,269.70 ft	Longitude:	-107.761537
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,950.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	6/3/2013	9.98	65.67	52,038

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	52.32

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	
1,163.8	27.41	52.32	1,129.3	131.1	169.7	3.00	3.00	0.00	52.32	
6,149.3	27.41	52.32	5,555.0	1,534.3	1,986.3	0.00	0.00	0.00	0.00	
7,520.0	0.00	0.00	6,874.0	1,731.0	2,240.9	2.00	-2.00	0.00	180.00	Rose 22-1C TGT
9,598.0	0.00	0.00	8,952.0	1,731.0	2,240.9	0.00	0.00	0.00	0.00	Rose 22-1C PBHL 11'
9,698.0	0.00	0.00	9,052.0	1,731.0	2,240.9	0.00	0.00	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Rose 22-1C
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Site:</b>	K22W Pad	<b>North Reference:</b>	True
<b>Well:</b>	Rose 22-1C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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	52.32	300.0	0.4	0.5	0.7	3.00	3.00	
400.0	4.50	52.32	399.8	3.6	4.7	5.9	3.00	3.00	
500.0	7.50	52.32	499.3	10.0	12.9	16.3	3.00	3.00	
600.0	10.50	52.32	598.0	19.5	25.3	32.0	3.00	3.00	
700.0	13.50	52.32	695.8	32.3	41.8	52.8	3.00	3.00	
800.0	16.50	52.32	792.4	48.1	62.2	78.6	3.00	3.00	
900.0	19.50	52.32	887.5	67.0	86.7	109.5	3.00	3.00	
1,000.0	22.50	52.32	980.9	88.9	115.1	145.4	3.00	3.00	
1,100.0	25.50	52.32	1,072.2	113.7	147.2	186.0	3.00	3.00	
1,163.8	27.41	52.32	1,129.3	131.1	169.7	214.5	3.00	3.00	EOB @ Inc. = 27.41°
1,200.0	27.41	52.32	1,161.5	141.3	182.9	231.1	0.00	0.00	
1,263.8	27.41	52.32	1,218.1	159.3	206.2	260.5	0.00	0.00	Surface Casing
1,300.0	27.41	52.32	1,250.2	169.4	219.4	277.2	0.00	0.00	
1,400.0	27.41	52.32	1,339.0	197.6	255.8	323.2	0.00	0.00	
1,500.0	27.41	52.32	1,427.8	225.7	292.2	369.3	0.00	0.00	
1,600.0	27.41	52.32	1,516.5	253.9	328.7	415.3	0.00	0.00	
1,700.0	27.41	52.32	1,605.3	282.0	365.1	461.3	0.00	0.00	
1,800.0	27.41	52.32	1,694.1	310.2	401.5	507.4	0.00	0.00	
1,900.0	27.41	52.32	1,782.9	338.3	438.0	553.4	0.00	0.00	
2,000.0	27.41	52.32	1,871.6	366.5	474.4	599.5	0.00	0.00	
2,100.0	27.41	52.32	1,960.4	394.6	510.9	645.5	0.00	0.00	
2,200.0	27.41	52.32	2,049.2	422.7	547.3	691.6	0.00	0.00	
2,300.0	27.41	52.32	2,137.9	450.9	583.7	737.6	0.00	0.00	
2,400.0	27.41	52.32	2,226.7	479.0	620.2	783.6	0.00	0.00	
2,500.0	27.41	52.32	2,315.5	507.2	656.6	829.7	0.00	0.00	
2,600.0	27.41	52.32	2,404.3	535.3	693.0	875.7	0.00	0.00	
2,700.0	27.41	52.32	2,493.0	563.5	729.5	921.8	0.00	0.00	
2,800.0	27.41	52.32	2,581.8	591.6	765.9	967.8	0.00	0.00	
2,900.0	27.41	52.32	2,670.6	619.8	802.4	1,013.8	0.00	0.00	
3,000.0	27.41	52.32	2,759.3	647.9	838.8	1,059.9	0.00	0.00	
3,100.0	27.41	52.32	2,848.1	676.1	875.2	1,105.9	0.00	0.00	
3,200.0	27.41	52.32	2,936.9	704.2	911.7	1,152.0	0.00	0.00	
3,300.0	27.41	52.32	3,025.6	732.3	948.1	1,198.0	0.00	0.00	
3,400.0	27.41	52.32	3,114.4	760.5	984.5	1,244.1	0.00	0.00	
3,500.0	27.41	52.32	3,203.2	788.6	1,021.0	1,290.1	0.00	0.00	
3,600.0	27.41	52.32	3,292.0	816.8	1,057.4	1,336.1	0.00	0.00	
3,700.0	27.41	52.32	3,380.7	844.9	1,093.9	1,382.2	0.00	0.00	
3,800.0	27.41	52.32	3,469.5	873.1	1,130.3	1,428.2	0.00	0.00	
3,900.0	27.41	52.32	3,558.3	901.2	1,166.7	1,474.3	0.00	0.00	
4,000.0	27.41	52.32	3,647.0	929.4	1,203.2	1,520.3	0.00	0.00	
4,100.0	27.41	52.32	3,735.8	957.5	1,239.6	1,566.3	0.00	0.00	
4,200.0	27.41	52.32	3,824.6	985.6	1,276.0	1,612.4	0.00	0.00	
4,300.0	27.41	52.32	3,913.3	1,013.8	1,312.5	1,658.4	0.00	0.00	
4,400.0	27.41	52.32	4,002.1	1,041.9	1,348.9	1,704.5	0.00	0.00	
4,500.0	27.41	52.32	4,090.9	1,070.1	1,385.3	1,750.5	0.00	0.00	
4,600.0	27.41	52.32	4,179.7	1,098.2	1,421.8	1,796.5	0.00	0.00	
4,700.0	27.41	52.32	4,268.4	1,126.4	1,458.2	1,842.6	0.00	0.00	
4,800.0	27.41	52.32	4,357.2	1,154.5	1,494.7	1,888.6	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Rose 22-1C
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Site:</b>	K22W Pad	<b>North Reference:</b>	True
<b>Well:</b>	Rose 22-1C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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
4,900.0	27.41	52.32	4,446.0	1,182.7	1,531.1	1,934.7	0.00	0.00	
5,000.0	27.41	52.32	4,534.7	1,210.8	1,567.5	1,980.7	0.00	0.00	
5,100.0	27.41	52.32	4,623.5	1,239.0	1,604.0	2,026.8	0.00	0.00	
5,200.0	27.41	52.32	4,712.3	1,267.1	1,640.4	2,072.8	0.00	0.00	
5,300.0	27.41	52.32	4,801.1	1,295.2	1,676.8	2,118.8	0.00	0.00	
5,400.0	27.41	52.32	4,889.8	1,323.4	1,713.3	2,164.9	0.00	0.00	
5,500.0	27.41	52.32	4,978.6	1,351.5	1,749.7	2,210.9	0.00	0.00	
5,600.0	27.41	52.32	5,067.4	1,379.7	1,786.2	2,257.0	0.00	0.00	
5,700.0	27.41	52.32	5,156.1	1,407.8	1,822.6	2,303.0	0.00	0.00	
5,800.0	27.41	52.32	5,244.9	1,436.0	1,859.0	2,349.0	0.00	0.00	
5,808.0	27.41	52.32	5,252.0	1,438.2	1,861.9	2,352.7	0.00	0.00	Top of Mesaverde - Ohio Creek
5,900.0	27.41	52.32	5,333.7	1,464.1	1,895.5	2,395.1	0.00	0.00	
6,000.0	27.41	52.32	5,422.4	1,492.3	1,931.9	2,441.1	0.00	0.00	
6,100.0	27.41	52.32	5,511.2	1,520.4	1,968.3	2,487.2	0.00	0.00	
6,149.3	27.41	52.32	5,555.0	1,534.3	1,986.3	2,509.9	0.00	0.00	Start 2° Drop
6,200.0	26.40	52.32	5,600.2	1,548.3	2,004.5	2,532.8	2.00	-2.00	
6,300.0	24.40	52.32	5,690.5	1,574.5	2,038.4	2,575.7	2.00	-2.00	
6,400.0	22.40	52.32	5,782.3	1,598.8	2,069.8	2,615.4	2.00	-2.00	
6,471.8	20.96	52.32	5,849.0	1,615.0	2,090.8	2,641.9	2.00	-2.00	Williams Fork
6,500.0	20.40	52.32	5,875.4	1,621.1	2,098.7	2,651.9	2.00	-2.00	
6,600.0	18.40	52.32	5,969.7	1,641.4	2,125.0	2,685.1	2.00	-2.00	
6,700.0	16.40	52.32	6,065.1	1,659.7	2,148.7	2,715.0	2.00	-2.00	
6,800.0	14.40	52.32	6,161.5	1,675.9	2,169.7	2,741.6	2.00	-2.00	
6,900.0	12.40	52.32	6,258.8	1,690.1	2,188.0	2,764.8	2.00	-2.00	
7,000.0	10.40	52.32	6,356.8	1,702.2	2,203.7	2,784.5	2.00	-2.00	
7,100.0	8.40	52.32	6,455.5	1,712.2	2,216.6	2,800.9	2.00	-2.00	
7,200.0	6.40	52.32	6,554.6	1,720.0	2,226.8	2,813.7	2.00	-2.00	
7,300.0	4.40	52.32	6,654.2	1,725.8	2,234.2	2,823.1	2.00	-2.00	
7,400.0	2.40	52.32	6,754.0	1,729.4	2,238.9	2,829.1	2.00	-2.00	
7,500.0	0.40	52.32	6,854.0	1,730.9	2,240.9	2,831.5	2.00	-2.00	
7,520.0	0.00	0.00	6,874.0	1,731.0	2,240.9	2,831.6	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
7,600.0	0.00	0.00	6,954.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
7,700.0	0.00	0.00	7,054.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
7,800.0	0.00	0.00	7,154.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
7,900.0	0.00	0.00	7,254.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,000.0	0.00	0.00	7,354.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,100.0	0.00	0.00	7,454.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,200.0	0.00	0.00	7,554.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,300.0	0.00	0.00	7,654.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,400.0	0.00	0.00	7,754.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,500.0	0.00	0.00	7,854.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,597.0	0.00	0.00	7,951.0	1,731.0	2,240.9	2,831.6	0.00	0.00	Coal Ridge
8,600.0	0.00	0.00	7,954.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,700.0	0.00	0.00	8,054.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,800.0	0.00	0.00	8,154.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
8,900.0	0.00	0.00	8,254.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,000.0	0.00	0.00	8,354.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,100.0	0.00	0.00	8,454.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,200.0	0.00	0.00	8,554.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,300.0	0.00	0.00	8,654.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,400.0	0.00	0.00	8,754.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,448.0	0.00	0.00	8,802.0	1,731.0	2,240.9	2,831.6	0.00	0.00	Rollins

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Rose 22-1C
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6972.0ft (Patterson #303)
<b>Site:</b>	K22W Pad	<b>North Reference:</b>	True
<b>Well:</b>	Rose 22-1C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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
9,500.0	0.00	0.00	8,854.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,598.0	0.00	0.00	8,952.0	1,731.0	2,240.9	2,831.6	0.00	0.00	TD @ 9,598' MD
9,600.0	0.00	0.00	8,954.0	1,731.0	2,240.9	2,831.6	0.00	0.00	
9,698.0	0.00	0.00	9,052.0	1,731.0	2,240.9	2,831.6	0.00	0.00	Permit TD @ 9,698' MD

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									
Rose 22-1C PBHL 1165'	0.00	0.00	8,952.0	1,731.0	2,240.9	1,591,306.65	2,363,553.01	39.435221	-107.753603
- plan hits target center									
- Circle (radius 25.0)									
Rose 22-1C TGT	0.00	0.00	6,874.0	1,731.0	2,240.9	1,591,306.65	2,363,553.01	39.435221	-107.753603
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,263.8	1,218.1	Surface Casing			

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,808.0	5,252.0	Top of Mesaverde			
5,808.0	5,252.0	Ohio Creek			
6,471.8	5,849.0	Williams Fork			
7,520.0	6,874.0	Top Gas			
8,597.0	7,951.0	Coal Ridge			
9,448.0	8,802.0	Rollins			

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
250.0	250.0	0.0	0.0	KOP @ 250'
1,163.8	1,129.3	131.1	169.7	EOB @ Inc. = 27.41°
6,149.3	5,555.0	1,534.3	1,986.3	Start 2° Drop
7,520.0	6,874.0	1,731.0	2,240.9	EOD @ Inc. = 0°
9,598.0	8,952.0	1,731.0	2,240.9	TD @ 9,598' MD
9,698.0	9,052.0	1,731.0	2,240.9	Permit TD @ 9,698' MD