

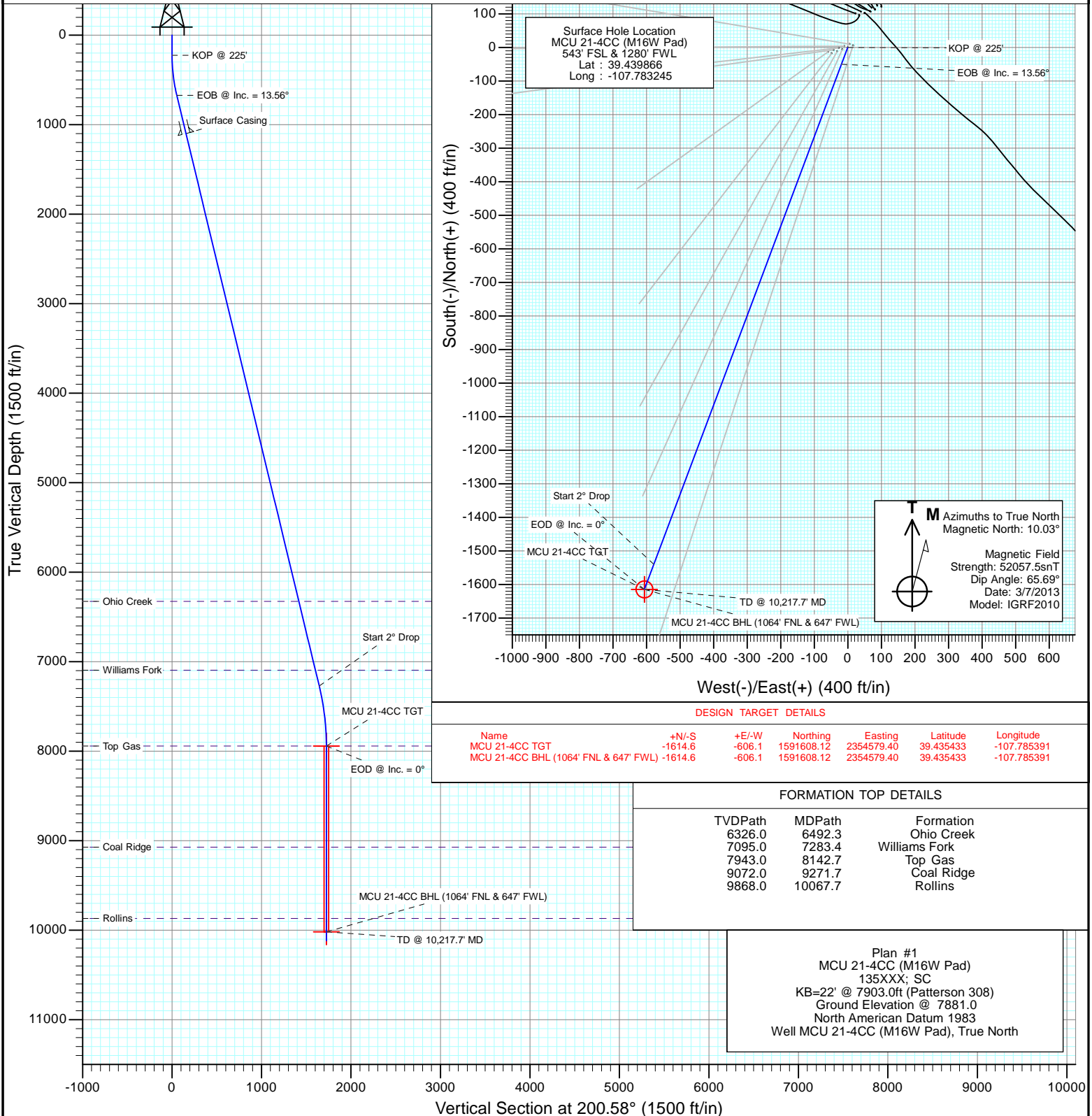


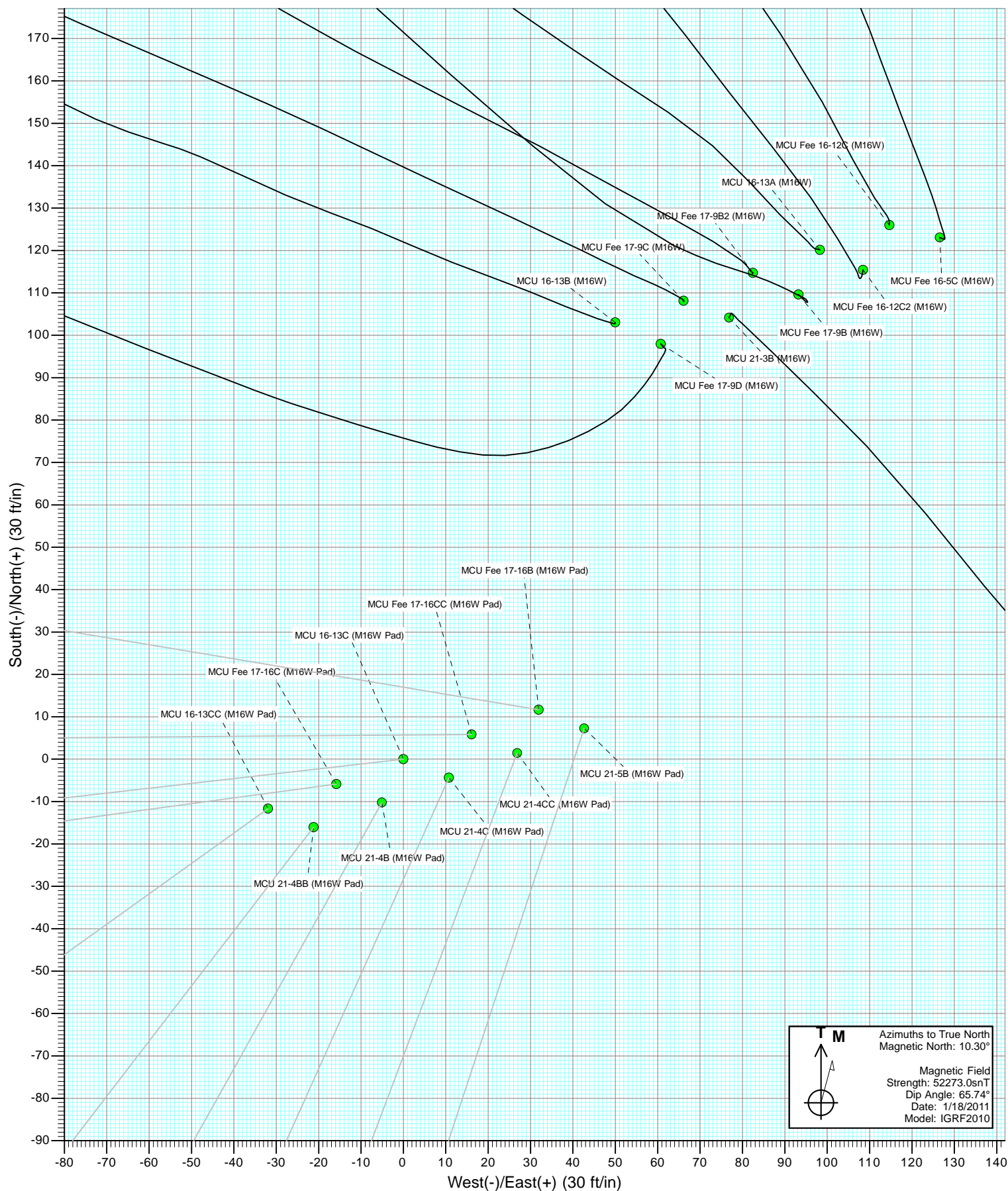
Project: Mamm Creek  
Site: M16W Pad (SWSW S16-T7S-R93W)  
Well: MCU 21-4CC (M16W Pad)  
Wellbore: DD  
Design: Plan #1

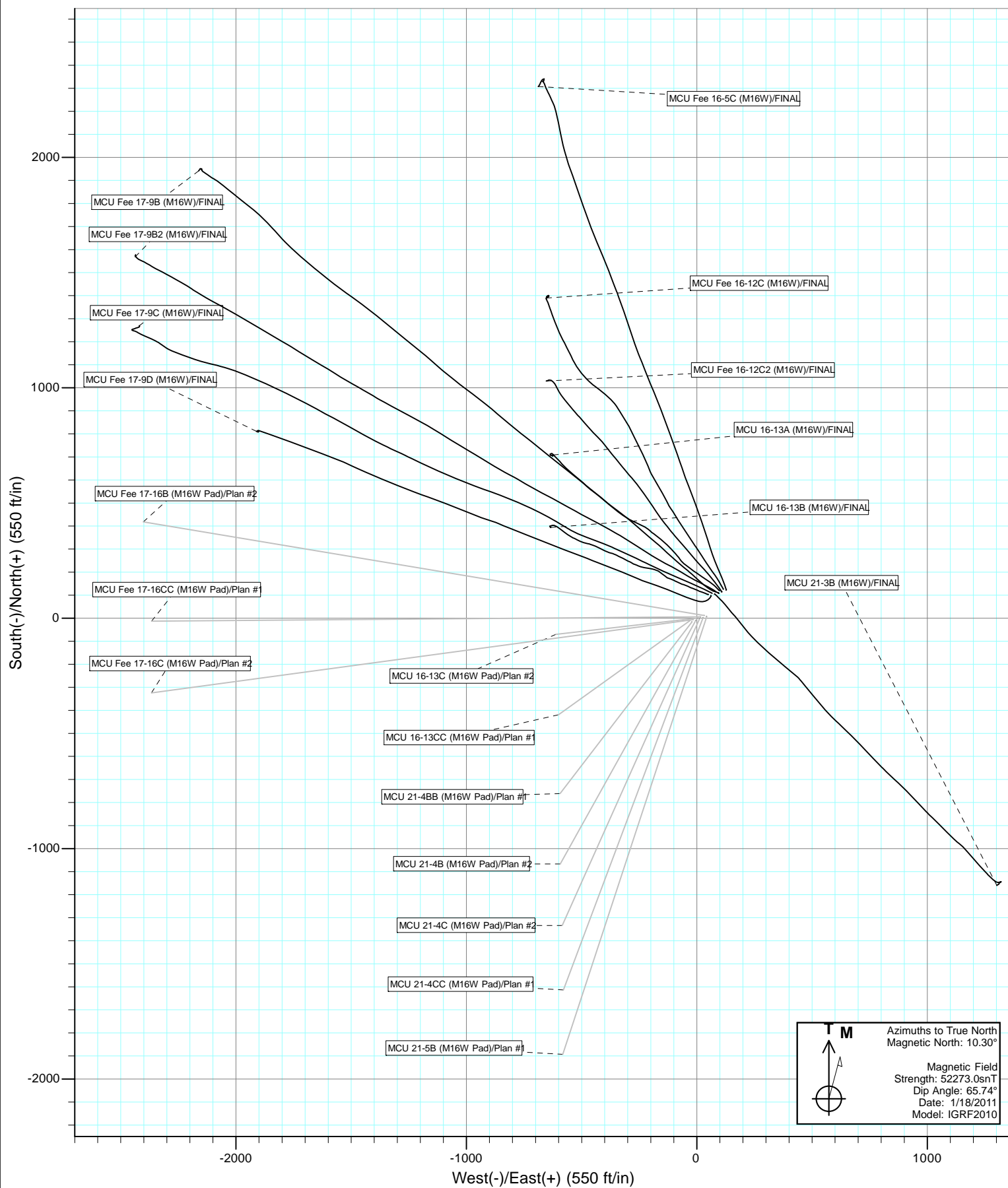


#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	225.0	0.00	0.00	225.0	0.0	0.0	0.00	0.00	0.0	
3	677.0	13.56	200.58	672.8	-49.8	-18.7	3.00	200.58	53.2	
4	7464.7	13.56	200.58	7271.3	-1539.9	-578.1	0.00	0.00	1644.8	
5	8142.7	0.00	0.00	7943.0	-1614.6	-606.1	2.00	180.00	1724.6	MCU 21-4CC TGT
6	10217.7	0.00	0.00	10018.0	-1614.6	-606.1	0.00	0.00	1724.6	MCU 21-4CC BHL (1064' FNL & 647' FWL)
7	10317.7	0.00	0.00	10118.0	-1614.6	-606.1	0.00	0.00	1724.6	

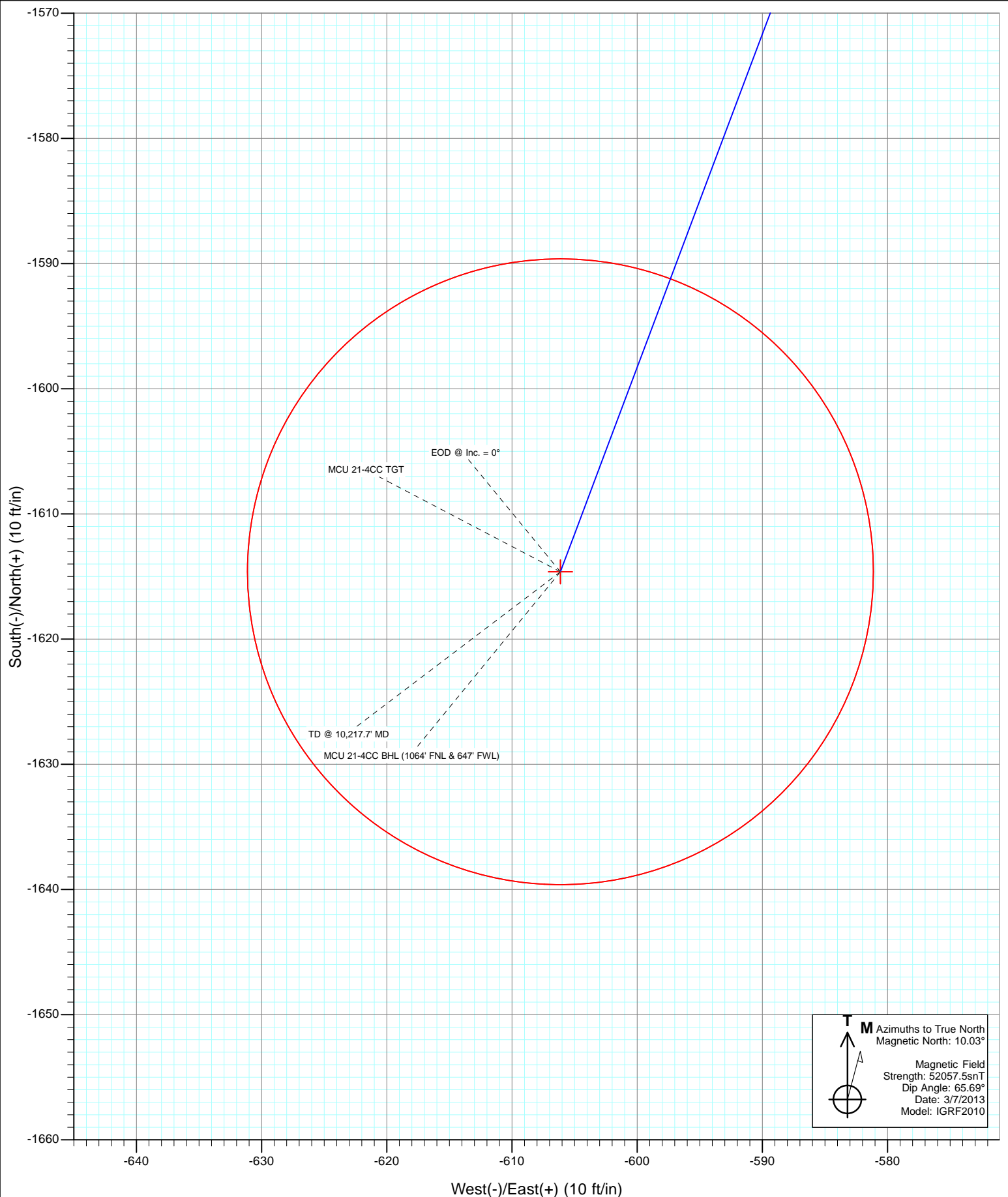








Project: Mamm Creek  
Site: M16W Pad (SWSW S16-T7S-R93W)  
Well: MCU 21-4CC (M16W Pad)  
Wellbore: DD  
Design: Plan #1



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well MCU 21-4CC (M16W Pad)
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Site:</b>	M16W Pad (SWSW S16-T7S-R93W)	<b>North Reference:</b>	True
<b>Well:</b>	MCU 21-4CC (M16W Pad)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<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		M16W Pad (SWSW S16-T7S-R93W)			
Site Position:		Northing:	1,593,196.15 ft	Latitude:	39.439834
From:	Lat/Long	Easting:	2,355,193.71 ft	Longitude:	-107.783358
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.44 °

Well	MCU 21-4CC (M16W Pad)					
Well Position	+N/-S	0.0 ft	Northing:	1,593,207.00 ft	Latitude:	39.439866
	+E/-W	0.0 ft	Easting:	2,355,225.91 ft	Longitude:	-107.783245
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,881.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/7/2013	10.03	65.69	52,058

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	200.58

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	
225.0	0.00	0.00	225.0	0.0	0.0	0.00	0.00	0.00	0.00	
677.0	13.56	200.58	672.8	-49.8	-18.7	3.00	3.00	0.00	200.58	
7,464.7	13.56	200.58	7,271.3	-1,539.9	-578.1	0.00	0.00	0.00	0.00	
8,142.7	0.00	0.00	7,943.0	-1,614.6	-606.1	2.00	-2.00	0.00	180.00	MCU 21-4CC TGT
10,217.7	0.00	0.00	10,018.0	-1,614.6	-606.1	0.00	0.00	0.00	0.00	MCU 21-4CC BHL (10
10,317.7	0.00	0.00	10,118.0	-1,614.6	-606.1	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 MCU 21-4CC (M16W Pad)
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Site:</b>	M16W Pad (SWSW S16-T7S-R93W)	<b>North Reference:</b>	True
<b>Well:</b>	MCU 21-4CC (M16W Pad)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<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	
225.0	0.00	0.00	225.0	0.0	0.0	0.0	0.00	0.00	KOP @ 225'
300.0	2.25	200.58	300.0	-1.4	-0.5	1.5	3.00	3.00	
400.0	5.25	200.58	399.8	-7.5	-2.8	8.0	3.00	3.00	
500.0	8.25	200.58	499.1	-18.5	-6.9	19.8	3.00	3.00	
600.0	11.25	200.58	597.6	-34.4	-12.9	36.7	3.00	3.00	
677.0	13.56	200.58	672.8	-49.8	-18.7	53.2	3.00	3.00	EOB @ Inc. = 13.56°
700.0	13.56	200.58	695.2	-54.9	-20.6	58.6	0.00	0.00	
800.0	13.56	200.58	792.4	-76.8	-28.8	82.1	0.00	0.00	
900.0	13.56	200.58	889.6	-98.8	-37.1	105.5	0.00	0.00	
1,000.0	13.56	200.58	986.8	-120.7	-45.3	129.0	0.00	0.00	
1,100.0	13.56	200.58	1,084.0	-142.7	-53.6	152.4	0.00	0.00	
1,116.5	13.56	200.58	1,100.0	-146.3	-54.9	156.3	0.00	0.00	Surface Casing
1,200.0	13.56	200.58	1,181.2	-164.6	-61.8	175.9	0.00	0.00	
1,300.0	13.56	200.58	1,278.4	-186.6	-70.0	199.3	0.00	0.00	
1,400.0	13.56	200.58	1,375.6	-208.6	-78.3	222.8	0.00	0.00	
1,500.0	13.56	200.58	1,472.8	-230.5	-86.5	246.2	0.00	0.00	
1,600.0	13.56	200.58	1,570.1	-252.5	-94.8	269.7	0.00	0.00	
1,700.0	13.56	200.58	1,667.3	-274.4	-103.0	293.1	0.00	0.00	
1,800.0	13.56	200.58	1,764.5	-296.4	-111.3	316.6	0.00	0.00	
1,900.0	13.56	200.58	1,861.7	-318.3	-119.5	340.0	0.00	0.00	
2,000.0	13.56	200.58	1,958.9	-340.3	-127.7	363.4	0.00	0.00	
2,100.0	13.56	200.58	2,056.1	-362.2	-136.0	386.9	0.00	0.00	
2,200.0	13.56	200.58	2,153.3	-384.2	-144.2	410.3	0.00	0.00	
2,300.0	13.56	200.58	2,250.5	-406.1	-152.5	433.8	0.00	0.00	
2,400.0	13.56	200.58	2,347.8	-428.1	-160.7	457.2	0.00	0.00	
2,500.0	13.56	200.58	2,445.0	-450.0	-168.9	480.7	0.00	0.00	
2,600.0	13.56	200.58	2,542.2	-472.0	-177.2	504.1	0.00	0.00	
2,700.0	13.56	200.58	2,639.4	-493.9	-185.4	527.6	0.00	0.00	
2,800.0	13.56	200.58	2,736.6	-515.9	-193.7	551.0	0.00	0.00	
2,900.0	13.56	200.58	2,833.8	-537.8	-201.9	574.5	0.00	0.00	
3,000.0	13.56	200.58	2,931.0	-559.8	-210.1	597.9	0.00	0.00	
3,100.0	13.56	200.58	3,028.2	-581.7	-218.4	621.4	0.00	0.00	
3,200.0	13.56	200.58	3,125.5	-603.7	-226.6	644.8	0.00	0.00	
3,300.0	13.56	200.58	3,222.7	-625.6	-234.9	668.3	0.00	0.00	
3,400.0	13.56	200.58	3,319.9	-647.6	-243.1	691.7	0.00	0.00	
3,500.0	13.56	200.58	3,417.1	-669.5	-251.3	715.2	0.00	0.00	
3,600.0	13.56	200.58	3,514.3	-691.5	-259.6	738.6	0.00	0.00	
3,700.0	13.56	200.58	3,611.5	-713.4	-267.8	762.1	0.00	0.00	
3,800.0	13.56	200.58	3,708.7	-735.4	-276.1	785.5	0.00	0.00	
3,900.0	13.56	200.58	3,805.9	-757.3	-284.3	808.9	0.00	0.00	
4,000.0	13.56	200.58	3,903.2	-779.3	-292.5	832.4	0.00	0.00	
4,100.0	13.56	200.58	4,000.4	-801.2	-300.8	855.8	0.00	0.00	
4,200.0	13.56	200.58	4,097.6	-823.2	-309.0	879.3	0.00	0.00	
4,300.0	13.56	200.58	4,194.8	-845.1	-317.3	902.7	0.00	0.00	
4,400.0	13.56	200.58	4,292.0	-867.1	-325.5	926.2	0.00	0.00	
4,500.0	13.56	200.58	4,389.2	-889.1	-333.7	949.6	0.00	0.00	
4,600.0	13.56	200.58	4,486.4	-911.0	-342.0	973.1	0.00	0.00	
4,700.0	13.56	200.58	4,583.6	-933.0	-350.2	996.5	0.00	0.00	
4,800.0	13.56	200.58	4,680.9	-954.9	-358.5	1,020.0	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 MCU 21-4CC (M16W Pad)
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Site:</b>	M16W Pad (SWSW S16-T7S-R93W)	<b>North Reference:</b>	True
<b>Well:</b>	MCU 21-4CC (M16W Pad)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<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	13.56	200.58	4,778.1	-976.9	-366.7	1,043.4	0.00	0.00	
5,000.0	13.56	200.58	4,875.3	-998.8	-375.0	1,066.9	0.00	0.00	
5,100.0	13.56	200.58	4,972.5	-1,020.8	-383.2	1,090.3	0.00	0.00	
5,200.0	13.56	200.58	5,069.7	-1,042.7	-391.4	1,113.8	0.00	0.00	
5,300.0	13.56	200.58	5,166.9	-1,064.7	-399.7	1,137.2	0.00	0.00	
5,400.0	13.56	200.58	5,264.1	-1,086.6	-407.9	1,160.7	0.00	0.00	
5,500.0	13.56	200.58	5,361.3	-1,108.6	-416.2	1,184.1	0.00	0.00	
5,600.0	13.56	200.58	5,458.6	-1,130.5	-424.4	1,207.6	0.00	0.00	
5,700.0	13.56	200.58	5,555.8	-1,152.5	-432.6	1,231.0	0.00	0.00	
5,800.0	13.56	200.58	5,653.0	-1,174.4	-440.9	1,254.4	0.00	0.00	
5,900.0	13.56	200.58	5,750.2	-1,196.4	-449.1	1,277.9	0.00	0.00	
6,000.0	13.56	200.58	5,847.4	-1,218.3	-457.4	1,301.3	0.00	0.00	
6,100.0	13.56	200.58	5,944.6	-1,240.3	-465.6	1,324.8	0.00	0.00	
6,200.0	13.56	200.58	6,041.8	-1,262.2	-473.8	1,348.2	0.00	0.00	
6,300.0	13.56	200.58	6,139.0	-1,284.2	-482.1	1,371.7	0.00	0.00	
6,400.0	13.56	200.58	6,236.2	-1,306.1	-490.3	1,395.1	0.00	0.00	
6,492.3	13.56	200.58	6,326.0	-1,326.4	-497.9	1,416.8	0.00	0.00	Ohio Creek
6,500.0	13.56	200.58	6,333.5	-1,328.1	-498.6	1,418.6	0.00	0.00	
6,600.0	13.56	200.58	6,430.7	-1,350.0	-506.8	1,442.0	0.00	0.00	
6,700.0	13.56	200.58	6,527.9	-1,372.0	-515.0	1,465.5	0.00	0.00	
6,800.0	13.56	200.58	6,625.1	-1,393.9	-523.3	1,488.9	0.00	0.00	
6,900.0	13.56	200.58	6,722.3	-1,415.9	-531.5	1,512.4	0.00	0.00	
7,000.0	13.56	200.58	6,819.5	-1,437.8	-539.8	1,535.8	0.00	0.00	
7,100.0	13.56	200.58	6,916.7	-1,459.8	-548.0	1,559.3	0.00	0.00	
7,200.0	13.56	200.58	7,013.9	-1,481.7	-556.2	1,582.7	0.00	0.00	
7,283.4	13.56	200.58	7,095.0	-1,500.0	-563.1	1,602.3	0.00	0.00	Williams Fork
7,300.0	13.56	200.58	7,111.2	-1,503.7	-564.5	1,606.2	0.00	0.00	
7,400.0	13.56	200.58	7,208.4	-1,525.6	-572.7	1,629.6	0.00	0.00	
7,464.7	13.56	200.58	7,271.3	-1,539.9	-578.1	1,644.8	0.00	0.00	Start 2° Drop
7,500.0	12.85	200.58	7,305.6	-1,547.4	-580.9	1,652.8	2.00	-2.00	
7,600.0	10.85	200.58	7,403.5	-1,566.6	-588.1	1,673.4	2.00	-2.00	
7,700.0	8.85	200.58	7,502.0	-1,582.7	-594.1	1,690.5	2.00	-2.00	
7,800.0	6.85	200.58	7,601.1	-1,595.4	-598.9	1,704.2	2.00	-2.00	
7,900.0	4.85	200.58	7,700.5	-1,605.0	-602.5	1,714.4	2.00	-2.00	
8,000.0	2.85	200.58	7,800.3	-1,611.3	-604.9	1,721.1	2.00	-2.00	
8,100.0	0.85	200.58	7,900.3	-1,614.3	-606.0	1,724.3	2.00	-2.00	
8,142.7	0.00	0.00	7,943.0	-1,614.6	-606.1	1,724.6	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
8,200.0	0.00	0.00	8,000.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,300.0	0.00	0.00	8,100.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,400.0	0.00	0.00	8,200.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,500.0	0.00	0.00	8,300.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,600.0	0.00	0.00	8,400.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,700.0	0.00	0.00	8,500.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,800.0	0.00	0.00	8,600.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
8,900.0	0.00	0.00	8,700.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,000.0	0.00	0.00	8,800.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,100.0	0.00	0.00	8,900.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,200.0	0.00	0.00	9,000.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,271.7	0.00	0.00	9,072.0	-1,614.6	-606.1	1,724.6	0.00	0.00	Coal Ridge
9,300.0	0.00	0.00	9,100.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,400.0	0.00	0.00	9,200.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,500.0	0.00	0.00	9,300.3	-1,614.6	-606.1	1,724.6	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 MCU 21-4CC (M16W Pad)
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Site:</b>	M16W Pad (SWSW S16-T7S-R93W)	<b>North Reference:</b>	True
<b>Well:</b>	MCU 21-4CC (M16W Pad)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<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
9,600.0	0.00	0.00	9,400.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,700.0	0.00	0.00	9,500.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,800.0	0.00	0.00	9,600.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
9,900.0	0.00	0.00	9,700.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
10,000.0	0.00	0.00	9,800.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
10,067.7	0.00	0.00	9,868.0	-1,614.6	-606.1	1,724.6	0.00	0.00	Rollins
10,100.0	0.00	0.00	9,900.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
10,200.0	0.00	0.00	10,000.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
10,217.7	0.00	0.00	10,018.0	-1,614.6	-606.1	1,724.6	0.00	0.00	TD @ 10,217.7' MD
10,300.0	0.00	0.00	10,100.3	-1,614.6	-606.1	1,724.6	0.00	0.00	
10,317.7	0.00	0.00	10,118.0	-1,614.6	-606.1	1,724.6	0.00	0.00	Permit TD @ 10,317.7' MD

### Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
MCU 21-4CC TGT - plan hits target center - Point	0.00	0.00	7,943.0	-1,614.6	-606.1	1,591,608.12	2,354,579.40	39.435433	-107.785391
MCU 21-4CC BHL (1064 - plan hits target center - Circle (radius 25.0)	0.00	0.00	10,018.0	-1,614.6	-606.1	1,591,608.12	2,354,579.40	39.435433	-107.785391

### Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,116.5	1,100.0	Surface Casing		

### Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,492.3	6,326.0	Ohio Creek			
7,283.4	7,095.0	Williams Fork			
8,142.7	7,943.0	Top Gas			
9,271.7	9,072.0	Coal Ridge			
10,067.7	9,868.0	Rollins			



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well MCU 21-4CC (M16W Pad)
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 7903.0ft (Patterson 308)
<b>Site:</b>	M16W Pad (SWSW S16-T7S-R93W)	<b>North Reference:</b>	True
<b>Well:</b>	MCU 21-4CC (M16W Pad)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
225.0	225.0	0.0	0.0	KOP @ 225'
677.0	672.8	-49.8	-18.7	EOB @ Inc. = 13.56°
7,464.7	7,271.3	-1,539.9	-578.1	Start 2° Drop
8,142.7	7,943.0	-1,614.6	-606.1	EOD @ Inc. = 0°
10,217.7	10,018.0	-1,614.6	-606.1	TD @ 10,217.7' MD
10,317.7	10,118.0	-1,614.6	-606.1	Permit TD @ 10,317.7' MD