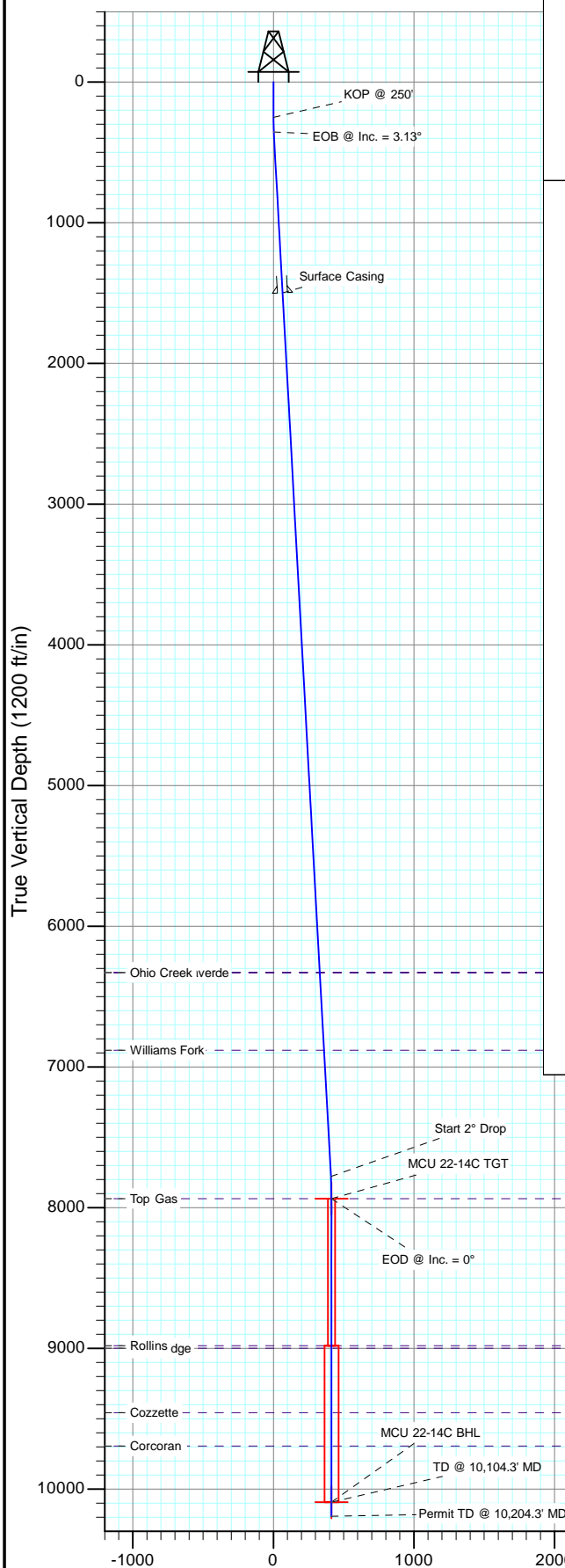
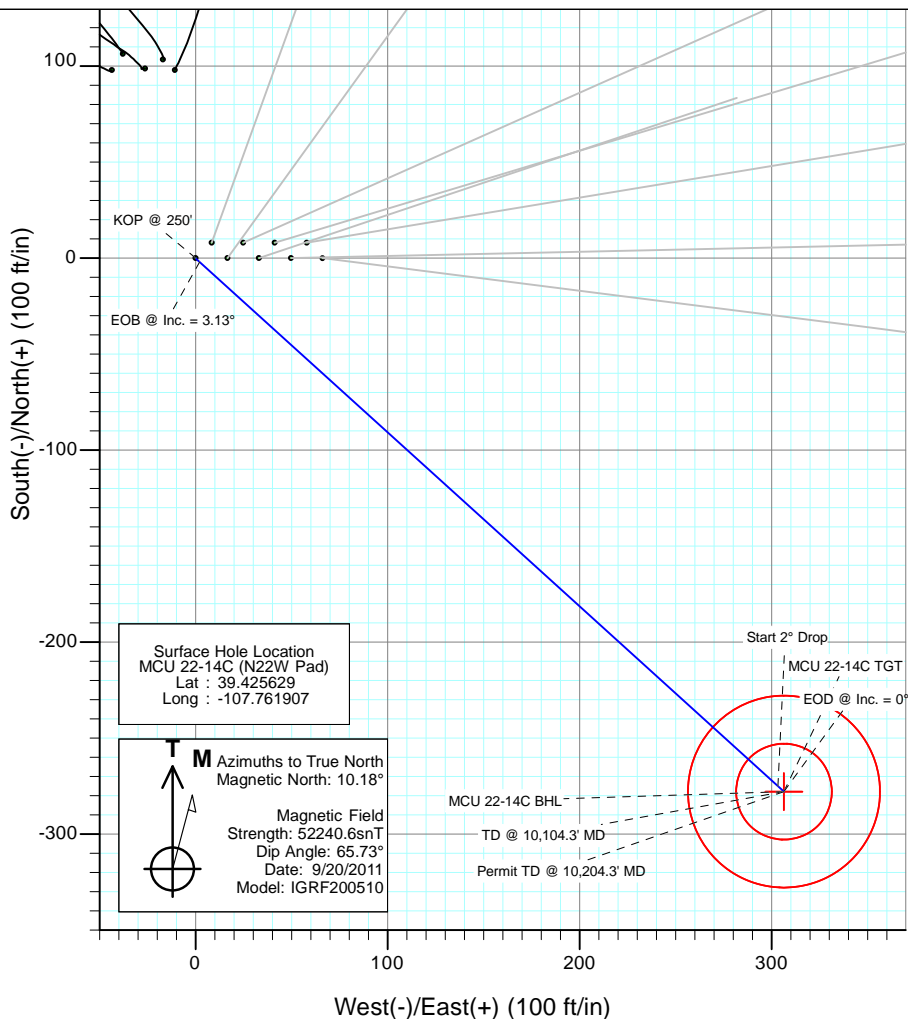




Project: Mamm Creek
Site: N22W Pad
Well: MCU 22-14C (N22W Pad)
Wellbore: DD
Design: Plan #3



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	354.5	3.13	132.19	354.4	-1.9	2.1	3.00	132.19	2.9	
4	7789.5	3.13	132.19	7778.4	-275.0	303.3	0.00	0.00	409.4	
5	7946.3	0.00	0.00	7935.0	-277.9	306.5	2.00	180.00	413.7	MCU 22-14C TGT
6	10104.3	0.00	0.00	10093.0	-277.9	306.5	0.00	0.00	413.7	MCU 22-14C BHL
7	10204.3	0.00	0.00	10193.0	-277.9	306.5	0.00	0.00	413.7	



DESIGN TARGET DETAILS					
Name	+N/-S	+E/-W	Northing	Easting	Latitude
MCU 22-14C TGT	-277.9	306.5	1587586.84	2361420.82	39.424866
MCU 22-14C BHL	-277.9	306.5	1587586.84	2361420.82	39.424866

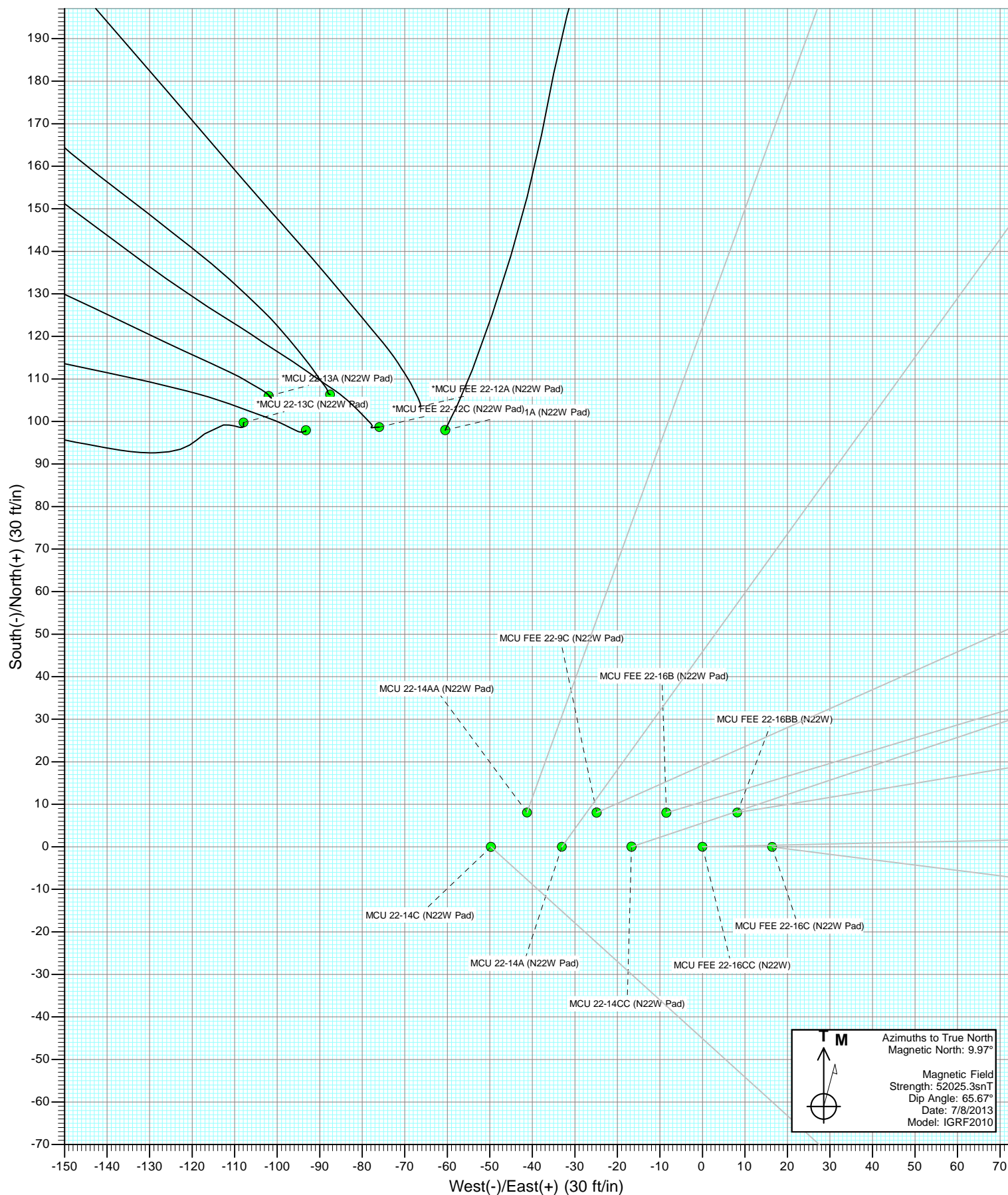
FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
6328.0	6337.0	Ohio Creek
6328.0	6337.0	Top of Mesaverde
6881.0	6890.8	Williams Fork
7935.0	7946.3	Top Gas
8981.0	8992.3	Rollins
8998.0	9009.3	Coal Ridge
9457.0	9468.3	Cozzette
9693.0	9704.3	Corcoran

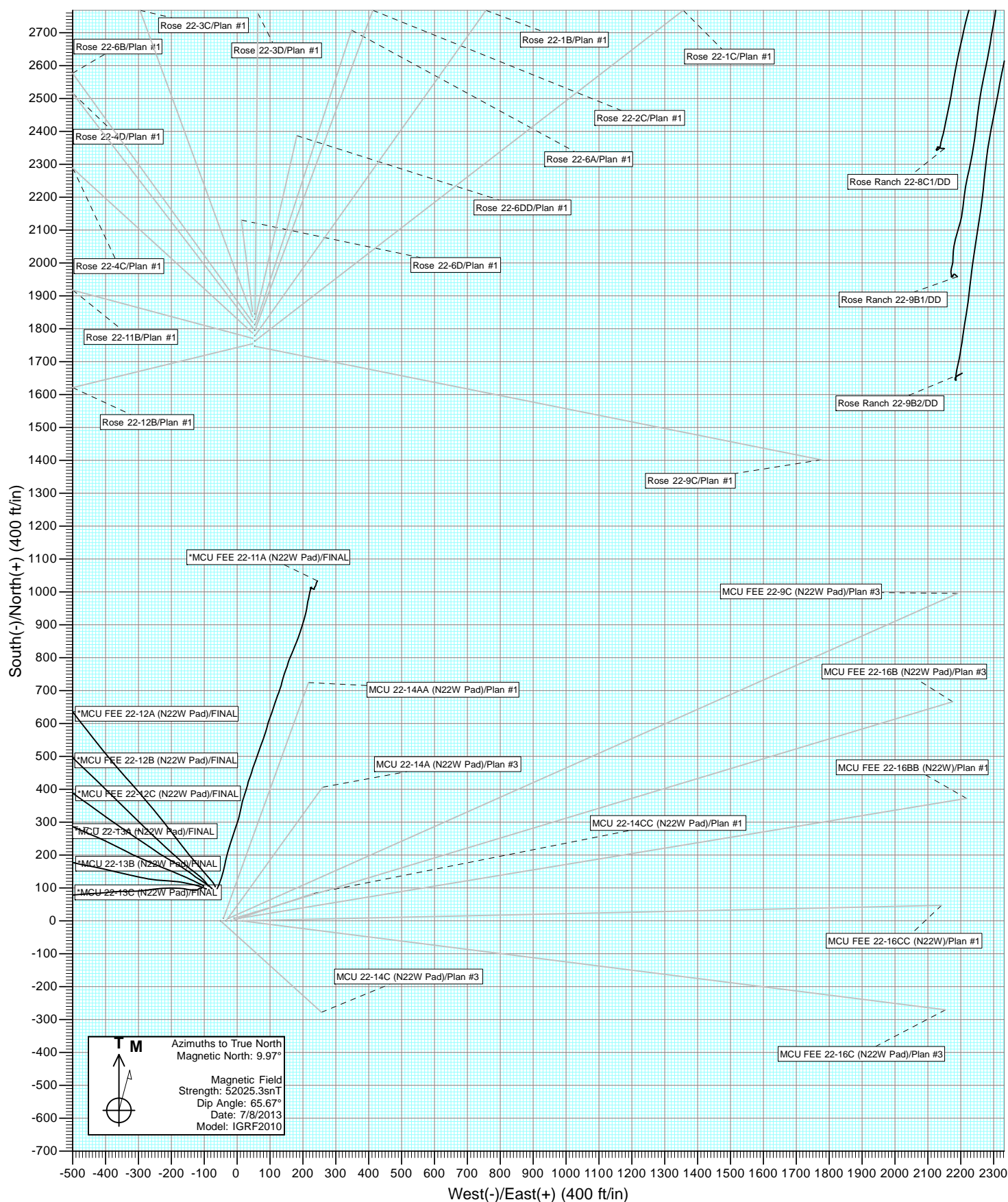
Plan #3
MCU 22-14C (N22W Pad)
125XXX; SC
KB=22' @ 7048.0ft (Nabors M-15)
Ground Elevation @ 7026.0
North American Datum 1983
Well MCU 22-14C (N22W Pad), True North

Vertical Section at 132.19° (1200 ft/in)



Project: Mamm Creek
Site: N22W Pad





Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well MCU 22-14C (N22W Pad)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Site:	N22W Pad	North Reference:	True
Well:	MCU 22-14C (N22W Pad)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #3		

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	N22W Pad			
Site Position:		Northing:	1,587,870.64 ft	Latitude: 39.425629
From:	Lat/Long	Easting:	2,361,187.41 ft	Longitude: -107.761673
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence: -1.43 °

Well	MCU 22-14C (N22W Pad)			
Well Position	+N/-S	0.0 ft	Northing:	1,587,872.24 ft
	+E/-W	0.0 ft	Easting:	2,361,121.33 ft
Position Uncertainty	0.0 ft		Wellhead Elevation:	ft
			Ground Level:	7,026.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	9/20/2011	10.18	65.73	52,241

Design	Plan #3			
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	132.19

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	
354.5	3.13	132.19	354.4	-1.9	2.1	3.00	3.00	0.00	132.19	
7,789.5	3.13	132.19	7,778.4	-275.0	303.3	0.00	0.00	0.00	0.00	
7,946.3	0.00	0.00	7,935.0	-277.9	306.5	2.00	-2.00	0.00	180.00	MCU 22-14C TGT
10,104.3	0.00	0.00	10,093.0	-277.9	306.5	0.00	0.00	0.00	0.00	MCU 22-14C BHL
10,204.3	0.00	0.00	10,193.0	-277.9	306.5	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 MCU 22-14C (N22W Pad)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Site:	N22W Pad	North Reference:	True
Well:	MCU 22-14C (N22W Pad)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #3		

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	132.19	300.0	-0.4	0.5	0.7	3.00	3.00	
354.5	3.13	132.19	354.4	-1.9	2.1	2.9	3.00	3.00	EOB @ Inc. = 3.13°
400.0	3.13	132.19	399.9	-3.6	4.0	5.3	0.00	0.00	
500.0	3.13	132.19	499.7	-7.3	8.0	10.8	0.00	0.00	
600.0	3.13	132.19	599.6	-10.9	12.1	16.3	0.00	0.00	
700.0	3.13	132.19	699.4	-14.6	16.1	21.8	0.00	0.00	
800.0	3.13	132.19	799.3	-18.3	20.2	27.2	0.00	0.00	
900.0	3.13	132.19	899.1	-22.0	24.2	32.7	0.00	0.00	
1,000.0	3.13	132.19	999.0	-25.6	28.3	38.2	0.00	0.00	
1,100.0	3.13	132.19	1,098.8	-29.3	32.3	43.6	0.00	0.00	
1,200.0	3.13	132.19	1,198.7	-33.0	36.4	49.1	0.00	0.00	
1,300.0	3.13	132.19	1,298.5	-36.6	40.4	54.6	0.00	0.00	
1,400.0	3.13	132.19	1,398.4	-40.3	44.5	60.0	0.00	0.00	
1,500.0	3.13	132.19	1,498.2	-44.0	48.5	65.5	0.00	0.00	Surface Casing
1,600.0	3.13	132.19	1,598.1	-47.7	52.6	71.0	0.00	0.00	
1,700.0	3.13	132.19	1,697.9	-51.3	56.6	76.4	0.00	0.00	
1,800.0	3.13	132.19	1,797.8	-55.0	60.7	81.9	0.00	0.00	
1,900.0	3.13	132.19	1,897.6	-58.7	64.7	87.4	0.00	0.00	
2,000.0	3.13	132.19	1,997.5	-62.4	68.8	92.8	0.00	0.00	
2,100.0	3.13	132.19	2,097.3	-66.0	72.8	98.3	0.00	0.00	
2,200.0	3.13	132.19	2,197.2	-69.7	76.9	103.8	0.00	0.00	
2,300.0	3.13	132.19	2,297.0	-73.4	80.9	109.2	0.00	0.00	
2,400.0	3.13	132.19	2,396.9	-77.0	85.0	114.7	0.00	0.00	
2,500.0	3.13	132.19	2,496.7	-80.7	89.0	120.2	0.00	0.00	
2,600.0	3.13	132.19	2,596.6	-84.4	93.1	125.6	0.00	0.00	
2,700.0	3.13	132.19	2,696.4	-88.1	97.1	131.1	0.00	0.00	
2,800.0	3.13	132.19	2,796.3	-91.7	101.2	136.6	0.00	0.00	
2,900.0	3.13	132.19	2,896.1	-95.4	105.2	142.0	0.00	0.00	
3,000.0	3.13	132.19	2,996.0	-99.1	109.3	147.5	0.00	0.00	
3,100.0	3.13	132.19	3,095.8	-102.8	113.3	153.0	0.00	0.00	
3,200.0	3.13	132.19	3,195.7	-106.4	117.4	158.5	0.00	0.00	
3,300.0	3.13	132.19	3,295.5	-110.1	121.4	163.9	0.00	0.00	
3,400.0	3.13	132.19	3,395.4	-113.8	125.5	169.4	0.00	0.00	
3,500.0	3.13	132.19	3,495.2	-117.4	129.5	174.9	0.00	0.00	
3,600.0	3.13	132.19	3,595.1	-121.1	133.6	180.3	0.00	0.00	
3,700.0	3.13	132.19	3,694.9	-124.8	137.6	185.8	0.00	0.00	
3,800.0	3.13	132.19	3,794.8	-128.5	141.7	191.3	0.00	0.00	
3,900.0	3.13	132.19	3,894.6	-132.1	145.8	196.7	0.00	0.00	
4,000.0	3.13	132.19	3,994.5	-135.8	149.8	202.2	0.00	0.00	
4,100.0	3.13	132.19	4,094.3	-139.5	153.9	207.7	0.00	0.00	
4,200.0	3.13	132.19	4,194.2	-143.2	157.9	213.1	0.00	0.00	
4,300.0	3.13	132.19	4,294.0	-146.8	162.0	218.6	0.00	0.00	
4,400.0	3.13	132.19	4,393.9	-150.5	166.0	224.1	0.00	0.00	
4,500.0	3.13	132.19	4,493.7	-154.2	170.1	229.5	0.00	0.00	
4,600.0	3.13	132.19	4,593.6	-157.8	174.1	235.0	0.00	0.00	
4,700.0	3.13	132.19	4,693.4	-161.5	178.2	240.5	0.00	0.00	
4,800.0	3.13	132.19	4,793.3	-165.2	182.2	245.9	0.00	0.00	
4,900.0	3.13	132.19	4,893.1	-168.9	186.3	251.4	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well MCU 22-14C (N22W Pad)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Site:	N22W Pad	North Reference:	True
Well:	MCU 22-14C (N22W Pad)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #3		

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	3.13	132.19	4,993.0	-172.5	190.3	256.9	0.00	0.00	
5,100.0	3.13	132.19	5,092.8	-176.2	194.4	262.3	0.00	0.00	
5,200.0	3.13	132.19	5,192.7	-179.9	198.4	267.8	0.00	0.00	
5,300.0	3.13	132.19	5,292.5	-183.5	202.5	273.3	0.00	0.00	
5,400.0	3.13	132.19	5,392.4	-187.2	206.5	278.8	0.00	0.00	
5,500.0	3.13	132.19	5,492.2	-190.9	210.6	284.2	0.00	0.00	
5,600.0	3.13	132.19	5,592.1	-194.6	214.6	289.7	0.00	0.00	
5,700.0	3.13	132.19	5,692.0	-198.2	218.7	295.2	0.00	0.00	
5,800.0	3.13	132.19	5,791.8	-201.9	222.7	300.6	0.00	0.00	
5,900.0	3.13	132.19	5,891.7	-205.6	226.8	306.1	0.00	0.00	
6,000.0	3.13	132.19	5,991.5	-209.3	230.8	311.6	0.00	0.00	
6,100.0	3.13	132.19	6,091.4	-212.9	234.9	317.0	0.00	0.00	
6,200.0	3.13	132.19	6,191.2	-216.6	238.9	322.5	0.00	0.00	
6,300.0	3.13	132.19	6,291.1	-220.3	243.0	328.0	0.00	0.00	
6,337.0	3.13	132.19	6,328.0	-221.6	244.5	330.0	0.00	0.00	Top of Mesaverde - Ohio Creek
6,400.0	3.13	132.19	6,390.9	-223.9	247.0	333.4	0.00	0.00	
6,500.0	3.13	132.19	6,490.8	-227.6	251.1	338.9	0.00	0.00	
6,600.0	3.13	132.19	6,590.6	-231.3	255.1	344.4	0.00	0.00	
6,700.0	3.13	132.19	6,690.5	-235.0	259.2	349.8	0.00	0.00	
6,800.0	3.13	132.19	6,790.3	-238.6	263.2	355.3	0.00	0.00	
6,890.8	3.13	132.19	6,881.0	-242.0	266.9	360.3	0.00	0.00	Williams Fork
6,900.0	3.13	132.19	6,890.2	-242.3	267.3	360.8	0.00	0.00	
7,000.0	3.13	132.19	6,990.0	-246.0	271.3	366.2	0.00	0.00	
7,100.0	3.13	132.19	7,089.9	-249.7	275.4	371.7	0.00	0.00	
7,200.0	3.13	132.19	7,189.7	-253.3	279.4	377.2	0.00	0.00	
7,300.0	3.13	132.19	7,289.6	-257.0	283.5	382.6	0.00	0.00	
7,400.0	3.13	132.19	7,389.4	-260.7	287.5	388.1	0.00	0.00	
7,500.0	3.13	132.19	7,489.3	-264.3	291.6	393.6	0.00	0.00	
7,600.0	3.13	132.19	7,589.1	-268.0	295.6	399.0	0.00	0.00	
7,700.0	3.13	132.19	7,689.0	-271.7	299.7	404.5	0.00	0.00	
7,789.5	3.13	132.19	7,778.4	-275.0	303.3	409.4	0.00	0.00	Start 2° Drop
7,800.0	2.93	132.19	7,788.8	-275.4	303.7	410.0	2.00	-2.00	
7,900.0	0.93	132.19	7,888.7	-277.6	306.2	413.3	2.00	-2.00	
7,946.3	0.00	0.00	7,935.0	-277.9	306.5	413.7	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
8,000.0	0.00	0.00	7,988.7	-277.9	306.5	413.7	0.00	0.00	
8,100.0	0.00	0.00	8,088.7	-277.9	306.5	413.7	0.00	0.00	
8,200.0	0.00	0.00	8,188.7	-277.9	306.5	413.7	0.00	0.00	
8,300.0	0.00	0.00	8,288.7	-277.9	306.5	413.7	0.00	0.00	
8,400.0	0.00	0.00	8,388.7	-277.9	306.5	413.7	0.00	0.00	
8,500.0	0.00	0.00	8,488.7	-277.9	306.5	413.7	0.00	0.00	
8,600.0	0.00	0.00	8,588.7	-277.9	306.5	413.7	0.00	0.00	
8,700.0	0.00	0.00	8,688.7	-277.9	306.5	413.7	0.00	0.00	
8,800.0	0.00	0.00	8,788.7	-277.9	306.5	413.7	0.00	0.00	
8,900.0	0.00	0.00	8,888.7	-277.9	306.5	413.7	0.00	0.00	
8,992.3	0.00	0.00	8,981.0	-277.9	306.5	413.7	0.00	0.00	Rollins
9,000.0	0.00	0.00	8,988.7	-277.9	306.5	413.7	0.00	0.00	
9,009.3	0.00	0.00	8,998.0	-277.9	306.5	413.7	0.00	0.00	Coal Ridge
9,100.0	0.00	0.00	9,088.7	-277.9	306.5	413.7	0.00	0.00	
9,200.0	0.00	0.00	9,188.7	-277.9	306.5	413.7	0.00	0.00	
9,300.0	0.00	0.00	9,288.7	-277.9	306.5	413.7	0.00	0.00	
9,400.0	0.00	0.00	9,388.7	-277.9	306.5	413.7	0.00	0.00	
9,468.3	0.00	0.00	9,457.0	-277.9	306.5	413.7	0.00	0.00	Cozzette

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well MCU 22-14C (N22W Pad)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Site:	N22W Pad	North Reference:	True
Well:	MCU 22-14C (N22W Pad)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #3		

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	9,488.7	-277.9	306.5	413.7	0.00	0.00	
9,600.0	0.00	0.00	9,588.7	-277.9	306.5	413.7	0.00	0.00	
9,700.0	0.00	0.00	9,688.7	-277.9	306.5	413.7	0.00	0.00	
9,704.3	0.00	0.00	9,693.0	-277.9	306.5	413.7	0.00	0.00	Corcoran
9,800.0	0.00	0.00	9,788.7	-277.9	306.5	413.7	0.00	0.00	
9,900.0	0.00	0.00	9,888.7	-277.9	306.5	413.7	0.00	0.00	
10,000.0	0.00	0.00	9,988.7	-277.9	306.5	413.7	0.00	0.00	
10,104.3	0.00	0.00	10,093.0	-277.9	306.5	413.7	0.00	0.00	TD @ 10,104.3' MD
10,204.3	0.00	0.00	10,193.0	-277.9	306.5	413.7	0.00	0.00	Permit TD @ 10,204.3' 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 22-14C TGT - plan hits target center - Circle (radius 25.0)	0.00	0.00	7,935.0	-277.9	306.5	1,587,586.84	2,361,420.82	39.424866	-107.760822
MCU 22-14C BHL - plan hits target center - Circle (radius 50.0)	0.00	0.00	10,093.0	-277.9	306.5	1,587,586.84	2,361,420.82	39.424866	-107.760822

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,500.0	1,498.2	Surface Casing		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,337.0	6,328.0	Top of Mesaverde			
6,337.0	6,328.0	Ohio Creek			
6,890.8	6,881.0	Williams Fork			
7,946.3	7,935.0	Top Gas			
8,992.3	8,981.0	Rollins			
9,009.3	8,998.0	Coal Ridge			
9,468.3	9,457.0	Cozzette			
9,704.3	9,693.0	Corcoran			

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well MCU 22-14C (N22W Pad)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Project:	Mamm Creek	MD Reference:	KB=22' @ 7048.0ft (Nabors M-15)
Site:	N22W Pad	North Reference:	True
Well:	MCU 22-14C (N22W Pad)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #3		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
250.0	250.0	0.0	0.0	KOP @ 250'
354.5	354.4	-1.9	2.1	EOB @ Inc. = 3.13°
7,789.5	7,778.4	-275.0	303.3	Start 2° Drop
7,946.3	7,935.0	-277.9	306.5	EOD @ Inc. = 0°
10,104.3	10,093.0	-277.9	306.5	TD @ 10,104.3' MD
10,204.3	10,193.0	-277.9	306.5	Permit TD @ 10,204.3' MD