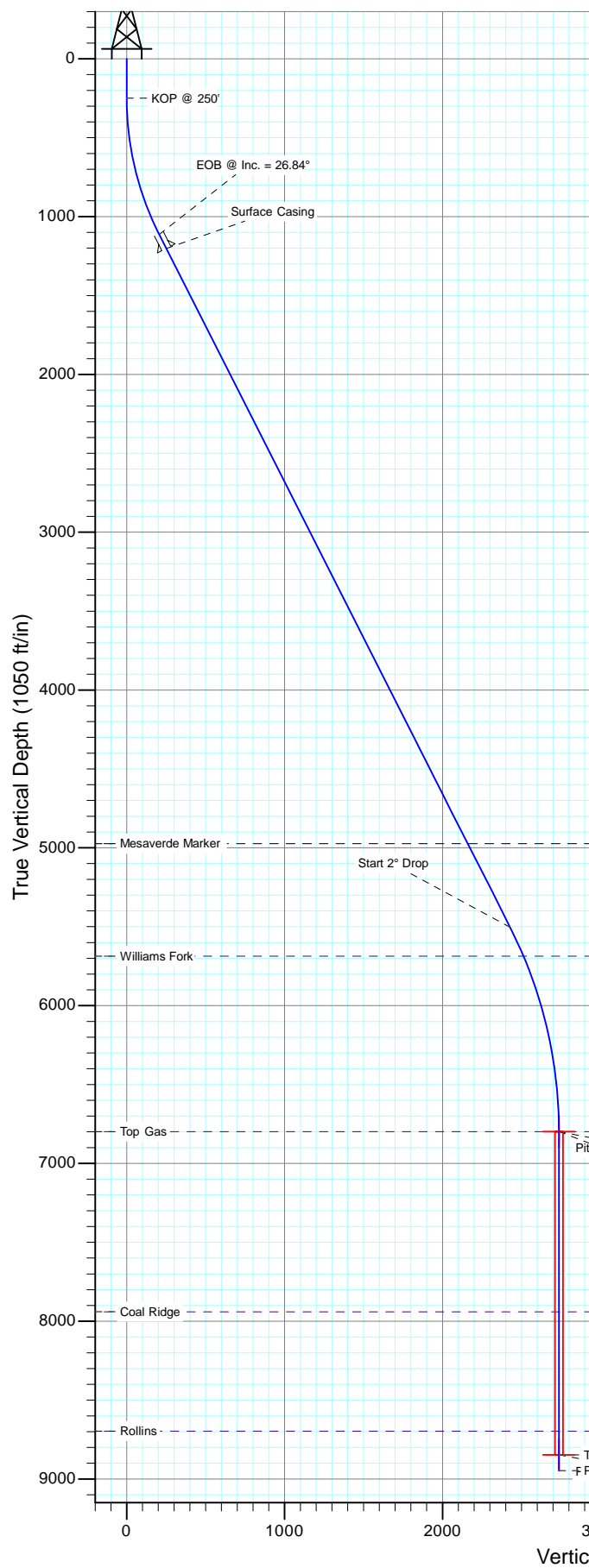
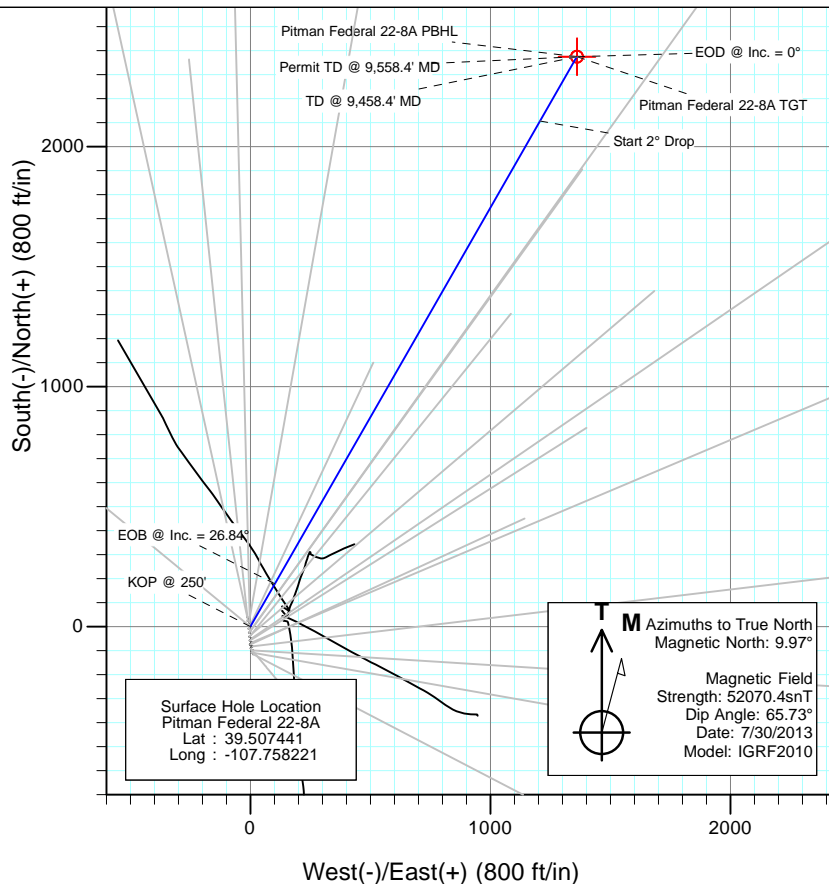




Project: Mamm Creek  
Site: O22NW  
Well: Pitman Federal 22-8A  
Wellbore: OH  
Design: Plan #1



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	250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.0	
3	1144.8	26.84	29.82	1112.4	178.6	102.3	3.00	29.82	205.8	
4	6067.2	26.84	29.82	5504.4	2107.1	1207.5	0.00	0.00	2428.5	
5	7409.4	0.00	0.00	6798.0	2374.9	1361.0	2.00	180.00	2737.2	Pitman Federal 22-8A TGT
6	9458.4	0.00	0.00	8847.0	2374.9	1361.0	0.00	0.00	2737.2	Pitman Federal 22-8A PBHL
7	9558.4	0.00	0.00	8947.0	2374.9	1361.0	0.00	0.00	2737.2	



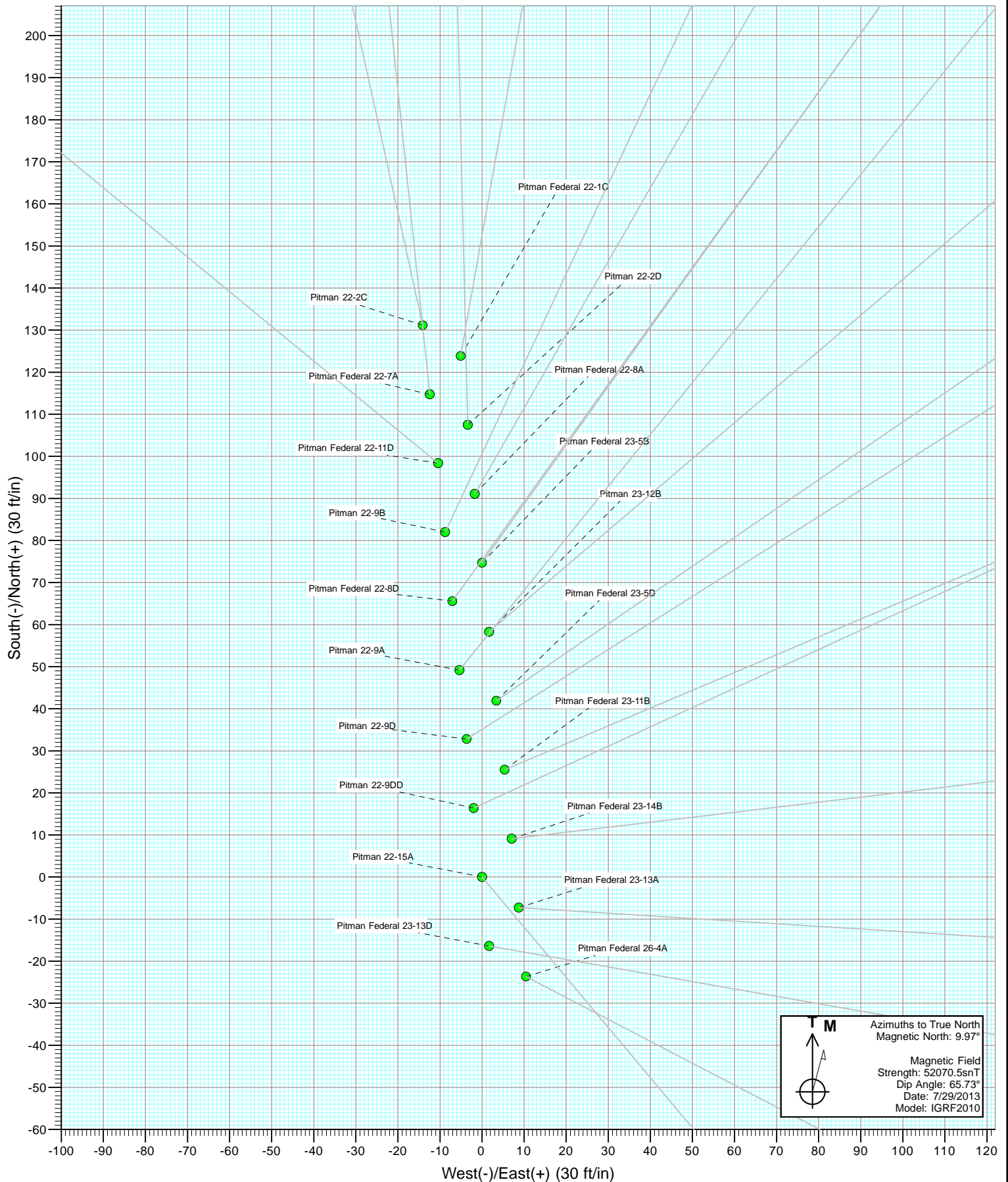
DESIGN TARGET DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Pitman Federal 22-8A TGT	2374.9	1361.0	1619976.50	2364322.50	39.513961	-107.753397
Pitman Federal 22-8A PBHL	2374.9	1361.0	1619976.50	2364322.50	39.513961	-107.753397

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4974.0	5472.7	Mesaverde Marker
4974.0	5472.7	Ohio Creek
5687.0	6268.4	Williams Fork
6798.0	7409.4	Top Gas
7941.0	8552.4	Coal Ridge
8697.0	9308.4	Rollins

Plan #1  
Pitman Federal 22-8A  
135XXX; SC  
KB=22' @ 6262.0ft (Patterson 308)  
Ground Elevation @ 6240.0  
North American Datum 1983  
Well Pitman Federal 22-8A, True North

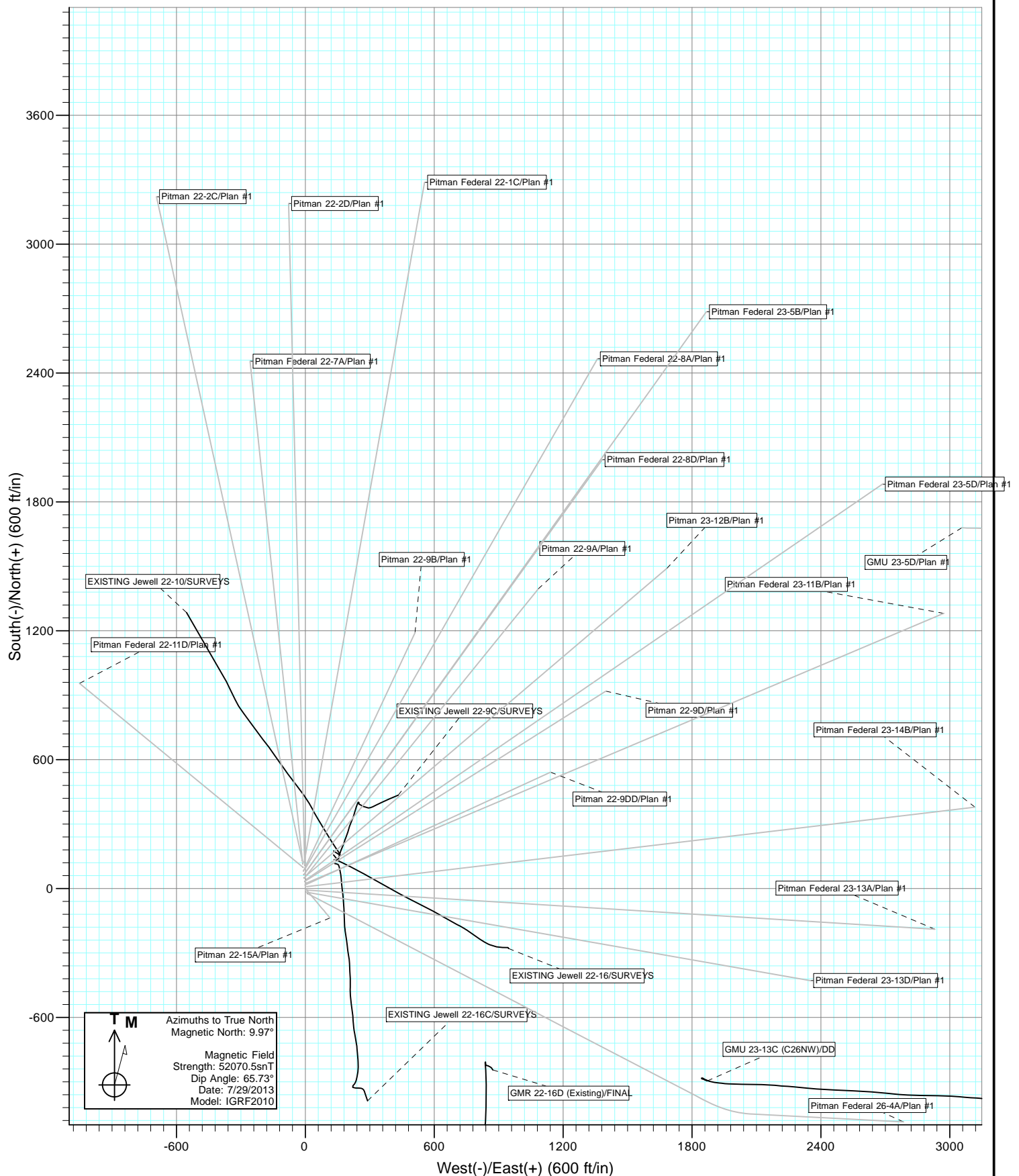


Project: Mamm Creek  
Site: O22NW





Project: Mamm Creek  
Site: O22NW



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Pitman Federal 22-8A
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Site:</b>	O22NW	<b>North Reference:</b>	True
<b>Well:</b>	Pitman Federal 22-8A	<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		O22NW			
Site Position:		Northing:	1,617,521.17 ft	Latitude:	39.507126
From:	Lat/Long	Easting:	2,362,912.18 ft	Longitude:	-107.758178
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.42 °

Well	Pitman Federal 22-8A					
Well Position	+N/-S	0.0 ft	Northing:	1,617,636.16 ft	Latitude:	39.507441
	+E/-W	0.0 ft	Easting:	2,362,902.90 ft	Longitude:	-107.758221
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,240.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/30/2013	9.97	65.73	52,070

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	29.82

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	
1,144.8	26.84	29.82	1,112.4	178.6	102.3	3.00	3.00	0.00	29.82	
6,067.2	26.84	29.82	5,504.4	2,107.1	1,207.5	0.00	0.00	0.00	0.00	
7,409.4	0.00	0.00	6,798.0	2,374.9	1,361.0	2.00	-2.00	0.00	180.00	Pitman Federal 22-8A
9,458.4	0.00	0.00	8,847.0	2,374.9	1,361.0	0.00	0.00	0.00	0.00	Pitman Federal 22-8A
9,558.4	0.00	0.00	8,947.0	2,374.9	1,361.0	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 Pitman Federal 22-8A
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Site:</b>	O22NW	<b>North Reference:</b>	True
<b>Well:</b>	Pitman Federal 22-8A	<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	29.82	300.0	0.6	0.3	0.7	3.00	3.00	
400.0	4.50	29.82	399.8	5.1	2.9	5.9	3.00	3.00	
500.0	7.50	29.82	499.3	14.2	8.1	16.3	3.00	3.00	
600.0	10.50	29.82	598.0	27.7	15.9	32.0	3.00	3.00	
700.0	13.50	29.82	695.8	45.8	26.2	52.8	3.00	3.00	
800.0	16.50	29.82	792.4	68.2	39.1	78.6	3.00	3.00	
900.0	19.50	29.82	887.5	95.0	54.5	109.5	3.00	3.00	
1,000.0	22.50	29.82	980.9	126.1	72.3	145.4	3.00	3.00	
1,100.0	25.50	29.82	1,072.2	161.4	92.5	186.0	3.00	3.00	
1,144.8	26.84	29.82	1,112.4	178.6	102.3	205.8	3.00	3.00	EOB @ Inc. = 26.84°
1,200.0	26.84	29.82	1,161.7	200.2	114.7	230.7	0.00	0.00	
1,244.8	26.84	29.82	1,201.6	217.7	124.8	251.0	0.00	0.00	Surface Casing
1,300.0	26.84	29.82	1,250.9	239.4	137.2	275.9	0.00	0.00	
1,400.0	26.84	29.82	1,340.1	278.5	159.6	321.0	0.00	0.00	
1,500.0	26.84	29.82	1,429.3	317.7	182.1	366.2	0.00	0.00	
1,600.0	26.84	29.82	1,518.6	356.9	204.5	411.4	0.00	0.00	
1,700.0	26.84	29.82	1,607.8	396.1	227.0	456.5	0.00	0.00	
1,800.0	26.84	29.82	1,697.0	435.3	249.4	501.7	0.00	0.00	
1,900.0	26.84	29.82	1,786.2	474.4	271.9	546.8	0.00	0.00	
2,000.0	26.84	29.82	1,875.5	513.6	294.3	592.0	0.00	0.00	
2,100.0	26.84	29.82	1,964.7	552.8	316.8	637.1	0.00	0.00	
2,200.0	26.84	29.82	2,053.9	592.0	339.2	682.3	0.00	0.00	
2,300.0	26.84	29.82	2,143.1	631.2	361.7	727.4	0.00	0.00	
2,400.0	26.84	29.82	2,232.4	670.3	384.1	772.6	0.00	0.00	
2,500.0	26.84	29.82	2,321.6	709.5	406.6	817.8	0.00	0.00	
2,600.0	26.84	29.82	2,410.8	748.7	429.1	862.9	0.00	0.00	
2,700.0	26.84	29.82	2,500.0	787.9	451.5	908.1	0.00	0.00	
2,800.0	26.84	29.82	2,589.3	827.0	474.0	953.2	0.00	0.00	
2,900.0	26.84	29.82	2,678.5	866.2	496.4	998.4	0.00	0.00	
3,000.0	26.84	29.82	2,767.7	905.4	518.9	1,043.5	0.00	0.00	
3,100.0	26.84	29.82	2,856.9	944.6	541.3	1,088.7	0.00	0.00	
3,200.0	26.84	29.82	2,946.2	983.8	563.8	1,133.8	0.00	0.00	
3,300.0	26.84	29.82	3,035.4	1,022.9	586.2	1,179.0	0.00	0.00	
3,400.0	26.84	29.82	3,124.6	1,062.1	608.7	1,224.2	0.00	0.00	
3,500.0	26.84	29.82	3,213.8	1,101.3	631.1	1,269.3	0.00	0.00	
3,600.0	26.84	29.82	3,303.1	1,140.5	653.6	1,314.5	0.00	0.00	
3,700.0	26.84	29.82	3,392.3	1,179.6	676.0	1,359.6	0.00	0.00	
3,800.0	26.84	29.82	3,481.5	1,218.8	698.5	1,404.8	0.00	0.00	
3,900.0	26.84	29.82	3,570.7	1,258.0	720.9	1,449.9	0.00	0.00	
4,000.0	26.84	29.82	3,660.0	1,297.2	743.4	1,495.1	0.00	0.00	
4,100.0	26.84	29.82	3,749.2	1,336.4	765.8	1,540.2	0.00	0.00	
4,200.0	26.84	29.82	3,838.4	1,375.5	788.3	1,585.4	0.00	0.00	
4,300.0	26.84	29.82	3,927.6	1,414.7	810.7	1,630.6	0.00	0.00	
4,400.0	26.84	29.82	4,016.9	1,453.9	833.2	1,675.7	0.00	0.00	
4,500.0	26.84	29.82	4,106.1	1,493.1	855.6	1,720.9	0.00	0.00	
4,600.0	26.84	29.82	4,195.3	1,532.3	878.1	1,766.0	0.00	0.00	
4,700.0	26.84	29.82	4,284.5	1,571.4	900.5	1,811.2	0.00	0.00	
4,800.0	26.84	29.82	4,373.7	1,610.6	923.0	1,856.3	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 Pitman Federal 22-8A
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Site:</b>	O22NW	<b>North Reference:</b>	True
<b>Well:</b>	Pitman Federal 22-8A	<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	26.84	29.82	4,463.0	1,649.8	945.4	1,901.5	0.00	0.00	
5,000.0	26.84	29.82	4,552.2	1,689.0	967.9	1,946.6	0.00	0.00	
5,100.0	26.84	29.82	4,641.4	1,728.1	990.3	1,991.8	0.00	0.00	
5,200.0	26.84	29.82	4,730.6	1,767.3	1,012.8	2,037.0	0.00	0.00	
5,300.0	26.84	29.82	4,819.9	1,806.5	1,035.3	2,082.1	0.00	0.00	
5,400.0	26.84	29.82	4,909.1	1,845.7	1,057.7	2,127.3	0.00	0.00	
5,472.7	26.84	29.82	4,974.0	1,874.2	1,074.0	2,160.1	0.00	0.00	Ohio Creek - Mesaverde Marker
5,500.0	26.84	29.82	4,998.3	1,884.9	1,080.2	2,172.4	0.00	0.00	
5,600.0	26.84	29.82	5,087.5	1,924.0	1,102.6	2,217.6	0.00	0.00	
5,700.0	26.84	29.82	5,176.8	1,963.2	1,125.1	2,262.7	0.00	0.00	
5,800.0	26.84	29.82	5,266.0	2,002.4	1,147.5	2,307.9	0.00	0.00	
5,900.0	26.84	29.82	5,355.2	2,041.6	1,170.0	2,353.0	0.00	0.00	
6,000.0	26.84	29.82	5,444.4	2,080.7	1,192.4	2,398.2	0.00	0.00	
6,067.2	26.84	29.82	5,504.4	2,107.1	1,207.5	2,428.5	0.00	0.00	Start 2° Drop
6,100.0	26.19	29.82	5,533.7	2,119.8	1,214.8	2,443.2	2.00	-2.00	
6,200.0	24.19	29.82	5,624.2	2,156.7	1,235.9	2,485.7	2.00	-2.00	
6,268.4	22.82	29.82	5,687.0	2,180.4	1,249.5	2,513.0	2.00	-2.00	Williams Fork
6,300.0	22.19	29.82	5,716.2	2,190.9	1,255.5	2,525.1	2.00	-2.00	
6,400.0	20.19	29.82	5,809.4	2,222.2	1,273.5	2,561.3	2.00	-2.00	
6,500.0	18.19	29.82	5,903.8	2,250.7	1,289.8	2,594.1	2.00	-2.00	
6,600.0	16.19	29.82	5,999.4	2,276.4	1,304.5	2,623.7	2.00	-2.00	
6,700.0	14.19	29.82	6,095.9	2,299.1	1,317.5	2,649.9	2.00	-2.00	
6,800.0	12.19	29.82	6,193.2	2,318.9	1,328.9	2,672.7	2.00	-2.00	
6,900.0	10.19	29.82	6,291.3	2,335.7	1,338.5	2,692.1	2.00	-2.00	
7,000.0	8.19	29.82	6,390.0	2,349.6	1,346.5	2,708.0	2.00	-2.00	
7,100.0	6.19	29.82	6,489.2	2,360.4	1,352.7	2,720.6	2.00	-2.00	
7,200.0	4.19	29.82	6,588.8	2,368.3	1,357.2	2,729.6	2.00	-2.00	
7,300.0	2.19	29.82	6,688.7	2,373.1	1,360.0	2,735.2	2.00	-2.00	
7,409.4	0.00	0.00	6,798.0	2,374.9	1,361.0	2,737.2	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
7,500.0	0.00	0.00	6,888.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
7,600.0	0.00	0.00	6,988.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
7,700.0	0.00	0.00	7,088.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
7,800.0	0.00	0.00	7,188.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
7,900.0	0.00	0.00	7,288.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,000.0	0.00	0.00	7,388.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,100.0	0.00	0.00	7,488.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,200.0	0.00	0.00	7,588.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,300.0	0.00	0.00	7,688.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,400.0	0.00	0.00	7,788.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,500.0	0.00	0.00	7,888.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,552.4	0.00	0.00	7,941.0	2,374.9	1,361.0	2,737.2	0.00	0.00	Coal Ridge
8,600.0	0.00	0.00	7,988.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,700.0	0.00	0.00	8,088.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,800.0	0.00	0.00	8,188.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
8,900.0	0.00	0.00	8,288.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,000.0	0.00	0.00	8,388.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,100.0	0.00	0.00	8,488.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,200.0	0.00	0.00	8,588.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,300.0	0.00	0.00	8,688.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,308.4	0.00	0.00	8,697.0	2,374.9	1,361.0	2,737.2	0.00	0.00	Rollins
9,400.0	0.00	0.00	8,788.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,458.4	0.00	0.00	8,847.0	2,374.9	1,361.0	2,737.2	0.00	0.00	TD @ 9,458.4' MD

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Pitman Federal 22-8A
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KB=22' @ 6262.0ft (Patterson 308)
<b>Site:</b>	O22NW	<b>North Reference:</b>	True
<b>Well:</b>	Pitman Federal 22-8A	<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	8,888.6	2,374.9	1,361.0	2,737.2	0.00	0.00	
9,558.4	0.00	0.00	8,947.0	2,374.9	1,361.0	2,737.2	0.00	0.00	Permit TD @ 9,558.4' MD

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude Longitude
Pitman Federal 22-8A T	- plan hits target center	0.00	0.00	6,798.0	2,374.9	1,361.0	1,619,976.50	2,364,322.50	39.513961 -107.753397
Pitman Federal 22-8A PI	- plan hits target center	0.00	0.00	8,847.0	2,374.9	1,361.0	1,619,976.50	2,364,322.50	39.513961 -107.753397
	- Circle (radius 25.0)								

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,244.8	1,201.6	Surface Casing		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,472.7	4,974.0	Mesaverde Marker			
5,472.7	4,974.0	Ohio Creek			
6,268.4	5,687.0	Williams Fork			
7,409.4	6,798.0	Top Gas			
8,552.4	7,941.0	Coal Ridge			
9,308.4	8,697.0	Rollins			

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'	
1,144.8	1,112.4	178.6	102.3	EOB @ Inc. = 26.84°	
6,067.2	5,504.4	2,107.1	1,207.5	Start 2° Drop	
7,409.4	6,798.0	2,374.9	1,361.0	EOD @ Inc. = 0°	
9,458.4	8,847.0	2,374.9	1,361.0	TD @ 9,458.4' MD	
9,558.4	8,947.0	2,374.9	1,361.0	Permit TD @ 9,558.4' MD	