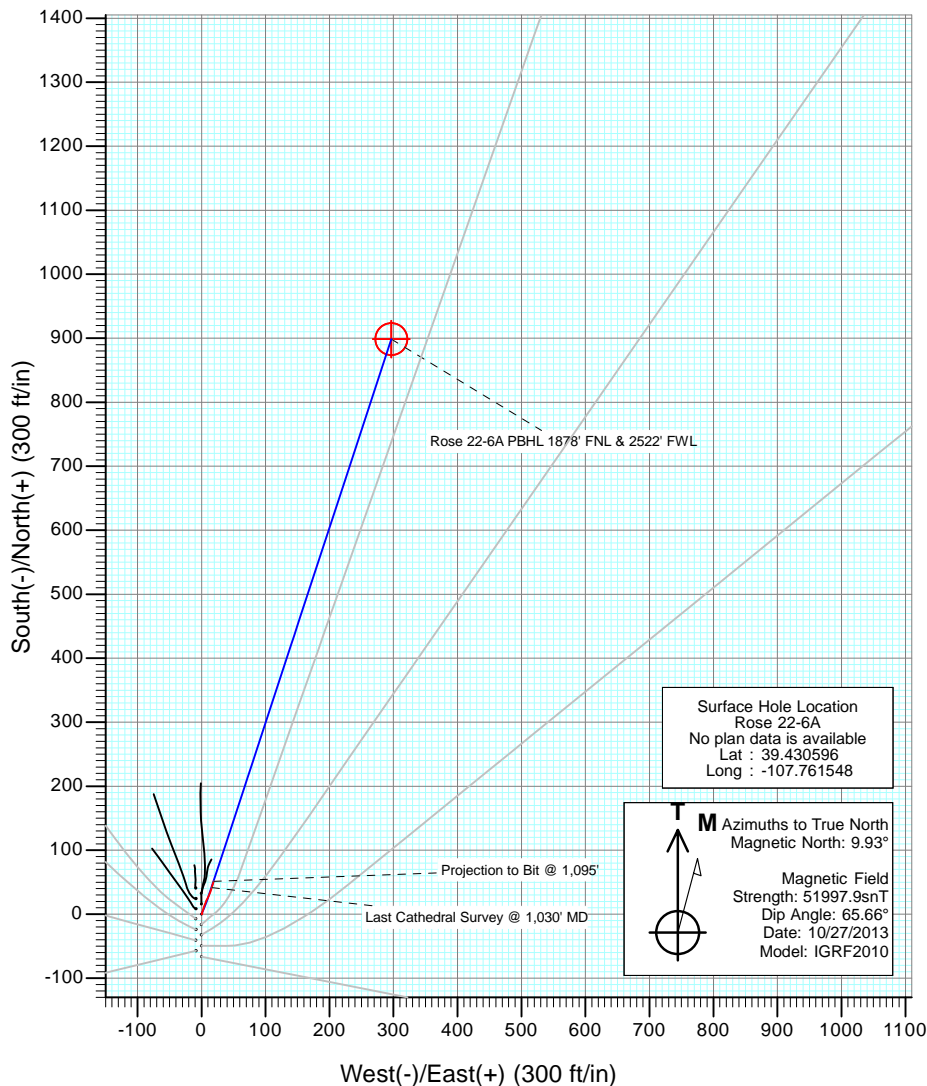
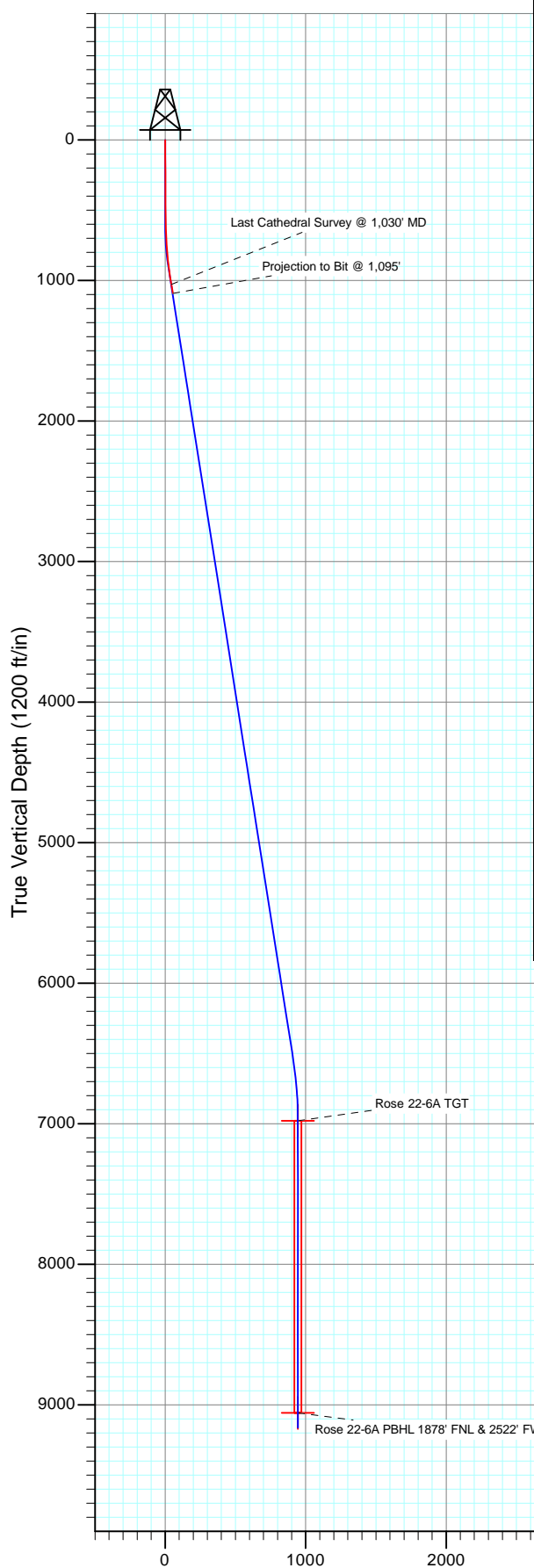




Project: Mamm Creek
Site: K22W Pad
Well: Rose 22-6A
Wellbore: OH
Design: SURFACE FINAL



DESIGN TARGET DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rose 22-6A TGT	898.6	296.6	1590569.26	2361586.60	39.433063	-107.760498
Rose 22-6A PBHL 1878' FNL & 2522' FWL	898.6	296.6	1590569.26	2361586.60	39.433063	-107.760498

SURFACE FINAL
Rose 22-6A
135514/274655 (SH); SC
KB=22' @ 6967.0ft (Patterson #303)
Ground Elevation @ 6945.0
North American Datum 1983
Well Rose 22-6A, True North

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Rose 22-6A
Project:	Mamm Creek	TVD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Site:	K22W Pad	MD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Well:	Rose 22-6A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	SURFACE FINAL	Database:	USA EDM 5000 Multi Users DB

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 22-6A					
Well Position	+N/-S	0.0 ft	Northing:	1,589,678.33 ft	Latitude:	39.430596
	+E/-W	0.0 ft	Easting:	2,361,267.75 ft	Longitude:	-107.761548
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,945.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/27/2013	9.93	65.66	51,998

Design	SURFACE FINAL			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	22.05

Survey Program		Date	12/16/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
118.0	1,095.0	Survey #1 (OH)	Geolink MWD	Geolink MWD	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
118.0	0.30	49.50	118.0	0.2	0.2	0.3	0.25	0.25	
148.0	0.50	46.50	148.0	0.3	0.4	0.5	0.67	0.67	
209.0	0.60	54.10	209.0	0.7	0.8	1.0	0.20	0.16	
239.0	0.50	49.40	239.0	0.9	1.1	1.2	0.37	-0.33	
269.0	0.40	19.00	269.0	1.1	1.2	1.4	0.85	-0.33	
300.0	0.30	359.40	300.0	1.3	1.2	1.6	0.50	-0.32	
330.0	0.30	337.00	330.0	1.4	1.2	1.8	0.39	0.00	
361.0	0.10	343.40	361.0	1.5	1.2	1.8	0.65	-0.65	
422.0	0.30	342.50	422.0	1.7	1.1	2.0	0.33	0.33	
452.0	0.20	327.30	452.0	1.8	1.0	2.1	0.40	-0.33	
483.0	0.20	350.00	483.0	1.9	1.0	2.2	0.25	0.00	
574.0	1.10	13.60	574.0	2.9	1.2	3.2	1.01	0.99	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Rose 22-6A
Project:	Mamm Creek	TVD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Site:	K22W Pad	MD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Well:	Rose 22-6A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	SURFACE FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
665.0	1.90	17.10	665.0	5.2	1.8	5.5	0.88	0.88	
756.0	4.10	16.80	755.8	9.8	3.2	10.3	2.42	2.42	
847.0	6.30	22.90	846.4	17.5	6.1	18.5	2.49	2.42	
937.0	8.50	24.90	935.7	28.1	10.8	30.1	2.46	2.44	
1,030.0	9.20	17.50	1,027.6	41.4	16.0	44.4	1.44	0.75	Last Cathedral Survey @ 1,030' MD Projection to Bit @ 1,095'
1,095.0	9.20	17.50	1,091.7	51.3	19.1	54.7	0.00	0.00	

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Rose 22-6A PBHL 1878'	0.00	0.00	9,057.0	898.6	296.6	1,590,569.26	2,361,586.60	39.433063	-107.760498
- hit/miss target									
- Shape									
- actual wellpath misses target center by 8015.0ft at 1095.0ft MD (1091.7 TVD, 51.3 N, 19.1 E)									
- Circle (radius 25.0)									
Rose 22-6A TGT	0.00	0.00	6,979.0	898.6	296.6	1,590,569.26	2,361,586.60	39.433063	-107.760498
- actual wellpath misses target center by 5954.4ft at 1095.0ft MD (1091.7 TVD, 51.3 N, 19.1 E)									
- Point									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,030.0	1,027.6	41.4	16.0	Last Cathedral Survey @ 1,030' MD Projection to Bit @ 1,095'	
1,095.0	1,091.7	51.3	19.1		

Checked By: _____ Approved By: _____ Date: _____