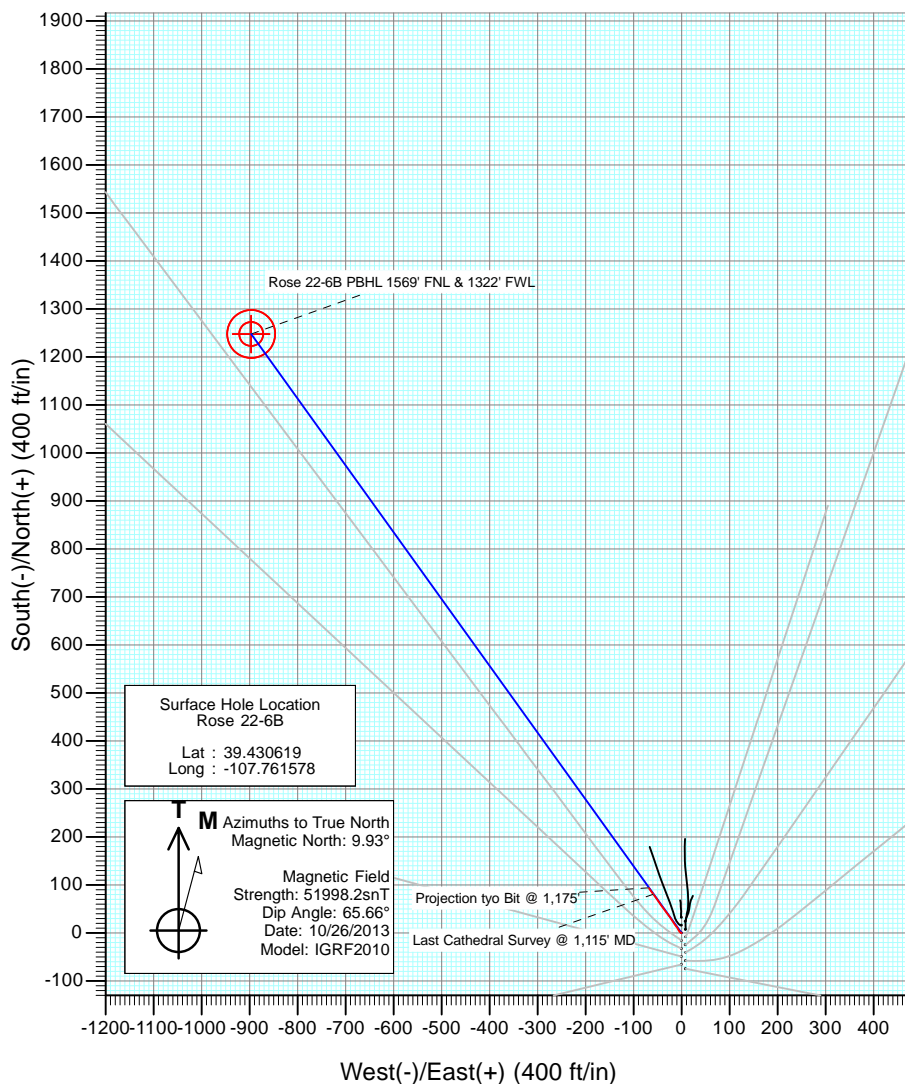
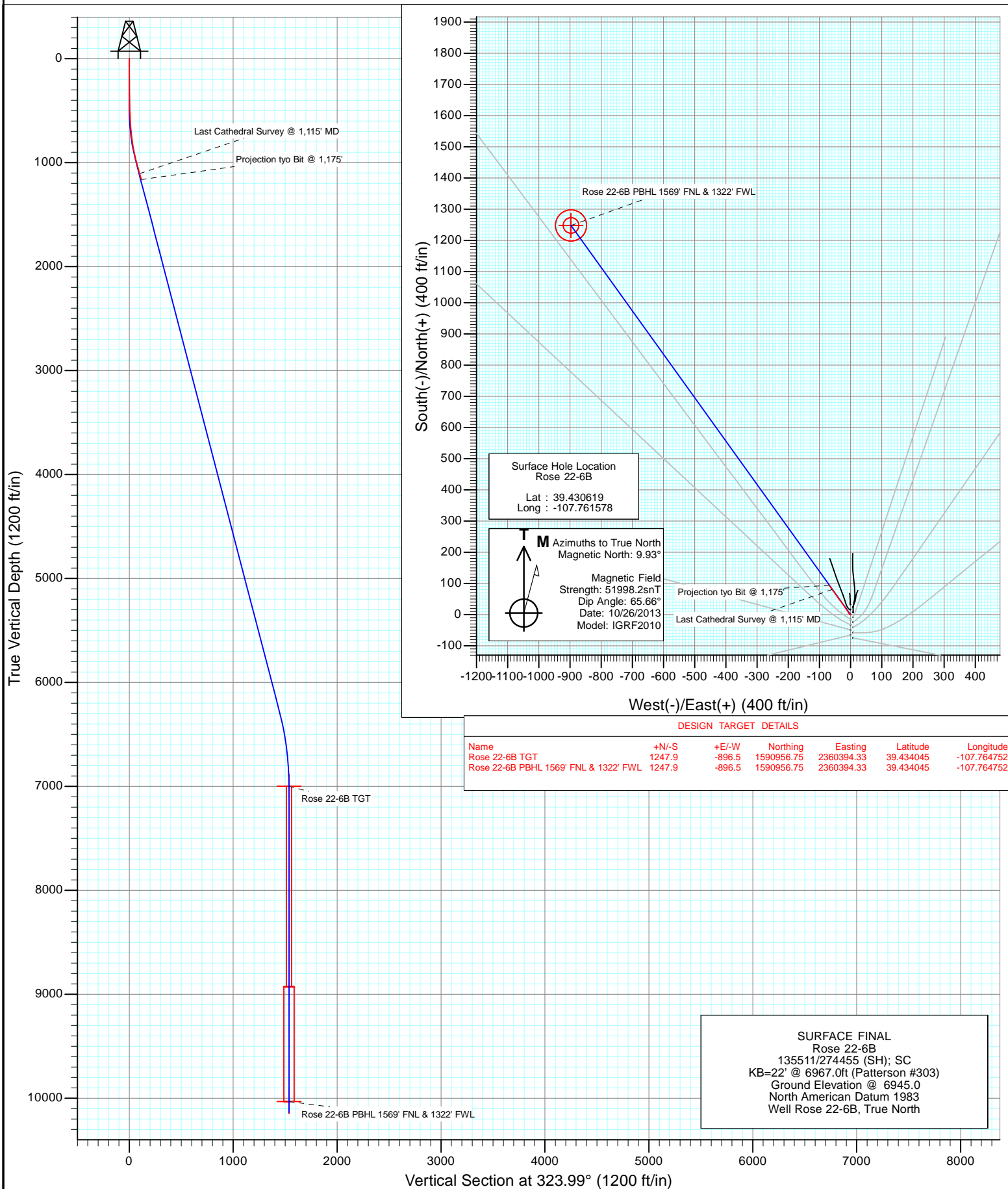




Project: Mamm Creek
Site: K22W Pad
Well: Rose 22-6B
Wellbore: OH
Design: SURFACE FINAL



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rose 22-6B TGT	1247.9	-896.5	1590956.75	2360394.33	39.434045	-107.764752
Rose 22-6B PBHL 1569' FNL & 1322' FWL	1247.9	-896.5	1590956.75	2360394.33	39.434045	-107.764752

SURFACE FINAL
Rose 22-6B
135511/274455 (SH); SC
KB=22' @ 6967.0ft (Patterson #303)
Ground Elevation @ 6945.0
North American Datum 1983
Well Rose 22-6B, True North

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Rose 22-6B
Project:	Mamm Creek	TVD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Site:	K22W Pad	MD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Well:	Rose 22-6B	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 22-6B					
Well Position	+N/-S	0.0 ft	Northing:	1,589,686.91 ft	Latitude:	39.430619
	+E/-W	0.0 ft	Easting:	2,361,259.48 ft	Longitude:	-107.761578
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	10/26/2013	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	323.99

Survey Program		Date	12/16/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
152.0	1,175.0	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	
152.0	0.40	282.10	152.0	0.1	-0.5	0.4	0.26	0.26	
212.0	0.70	297.60	212.0	0.3	-1.0	0.9	0.55	0.50	
242.0	0.40	289.50	242.0	0.4	-1.3	1.1	1.03	-1.00	
303.0	0.70	307.40	303.0	0.7	-1.8	1.7	0.56	0.49	
334.0	0.50	303.10	334.0	0.9	-2.1	2.0	0.66	-0.65	
364.0	0.60	313.50	364.0	1.1	-2.3	2.2	0.47	0.33	
394.0	0.60	313.20	394.0	1.3	-2.5	2.6	0.01	0.00	
486.0	2.20	316.40	486.0	2.9	-4.1	4.8	1.74	1.74	
577.0	2.80	332.00	576.9	6.2	-6.3	8.7	0.99	0.66	
668.0	4.20	328.00	667.7	11.0	-9.1	14.2	1.56	1.54	
759.0	7.00	325.90	758.3	18.4	-14.0	23.1	3.08	3.08	
851.0	10.20	325.00	849.2	29.7	-21.8	36.9	3.48	3.48	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Rose 22-6B
Project:	Mamm Creek	TVD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Site:	K22W Pad	MD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Well:	Rose 22-6B	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
941.0	12.70	322.70	937.4	44.1	-32.4	54.7	2.82	2.78	
1,031.0	15.40	325.60	1,024.7	61.8	-45.2	76.6	3.10	3.00	
1,115.0	16.40	323.40	1,105.5	80.5	-58.5	99.6	1.39	1.19	Last Cathedral Survey @ 1,115' MD Projection tyo Bit @ 1,175'
1,175.0	16.40	323.40	1,163.1	94.1	-68.6	116.5	0.00	0.00	

Targets									
Target Name									
- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- Shape									
Rose 22-6B TGT	0.00	0.00	6,999.0	1,247.9	-896.5	1,590,956.75	2,360,394.33	39.434045	-107.764752
- actual wellpath misses target center by 6006.2ft at 1175.0ft MD (1163.1 TVD, 94.1 N, -68.6 E)									
- Circle (radius 25.0)									
Rose 22-6B PBHL 1569'	0.00	0.00	10,032.0	1,247.9	-896.5	1,590,956.75	2,360,394.33	39.434045	-107.764752
- actual wellpath misses target center by 8981.9ft at 1175.0ft MD (1163.1 TVD, 94.1 N, -68.6 E)									
- Circle (radius 50.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,115.0	1,105.5	80.5	-58.5	Last Cathedral Survey @ 1,115' MD	
1,175.0	1,163.1	94.1	-68.6	Projection tyo Bit @ 1,175'	

Checked By: _____	Approved By: _____	Date: _____
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