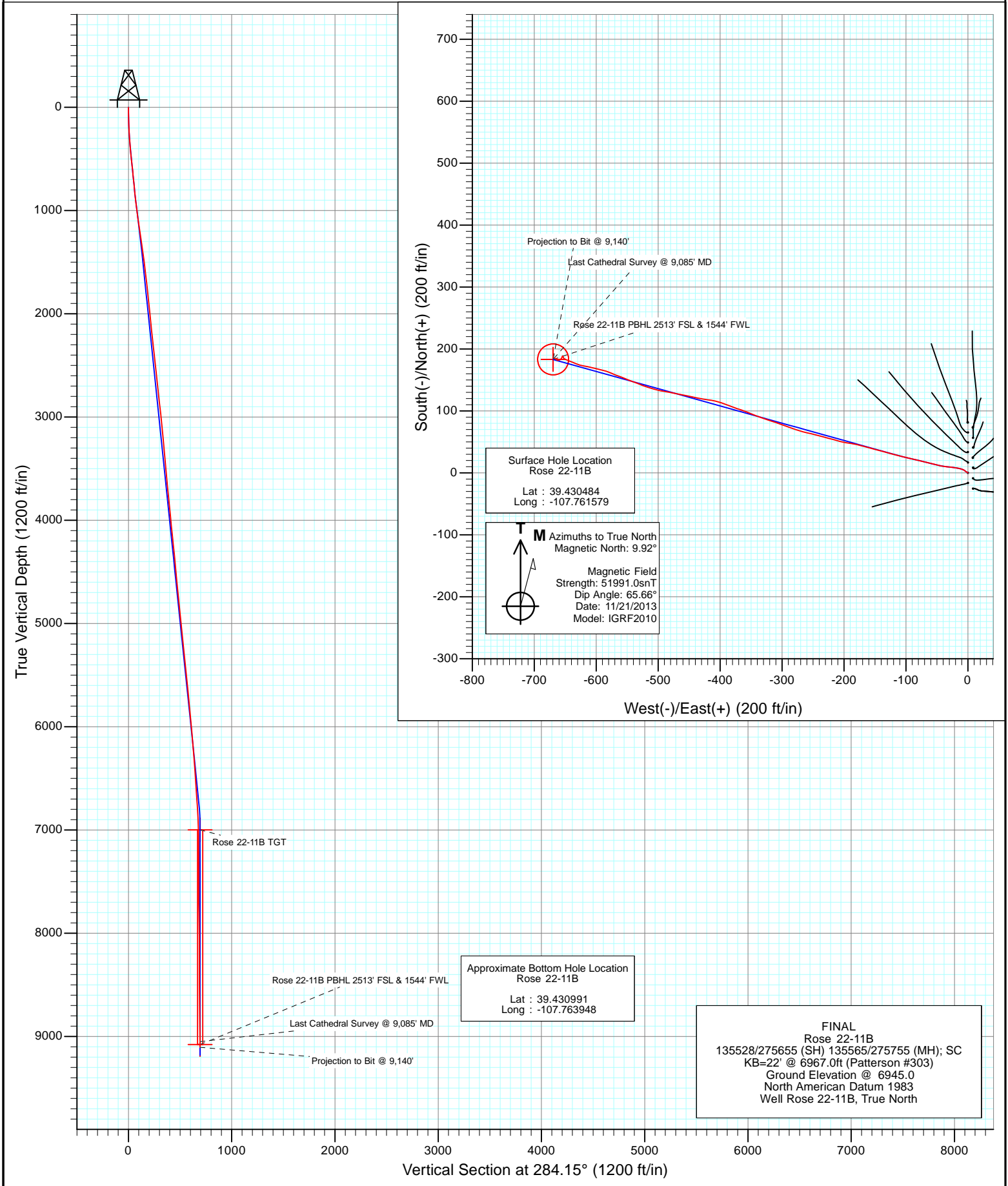


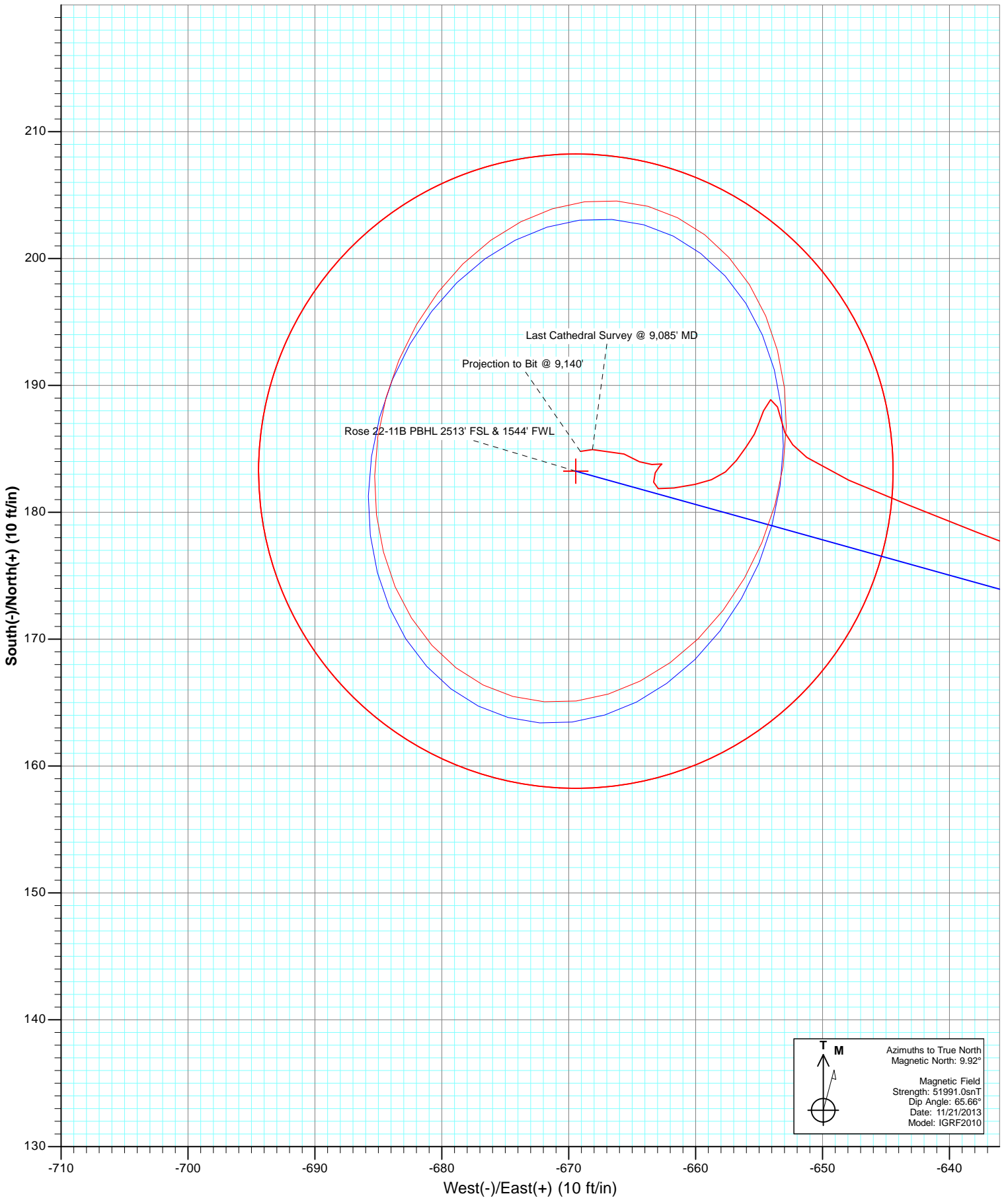


Project: Mamm Creek
Site: K22W Pad
Well: Rose 22-11B
Wellbore: OH
Design: FINAL



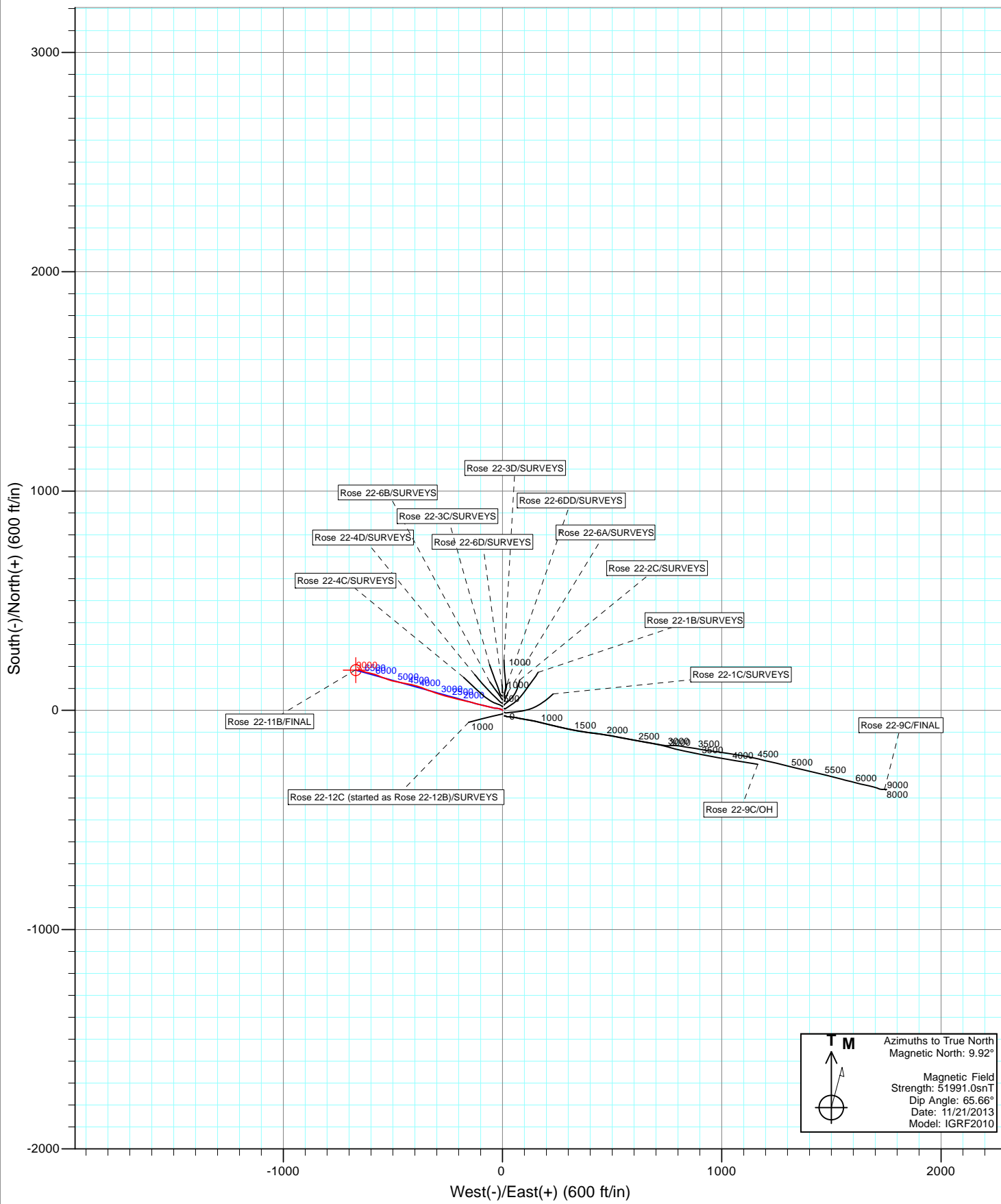


Project: Mamm Creek
Site: K22W Pad
Well: Rose 22-11B
Wellbore: OH
Plan: FINAL





Project: Mamm Creek
Site: K22W Pad
Well: Rose 22-11B
Wellbore: OH
Design: FINAL



Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well Rose 22-11B
Project: Mamm Creek	TVD Reference: KB=22' @ 6967.0ft (Patterson #303)
Site: K22W Pad	MD Reference: KB=22' @ 6967.0ft (Patterson #303)
Well: Rose 22-11B	North Reference: True
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: 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 22-11B				
Well Position	+N/-S 0.0 ft	Northing: 1,589,637.76 ft	Latitude: 39.430484	
	+E/-W 0.0 ft	Easting: 2,361,257.98 ft	Longitude: -107.761579	
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	11/21/2013	9.92	65.66	51,991

Design 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	284.15

Survey Program		Date 12/2/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
145.0	9,140.0	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	
145.0	2.30	304.70	145.0	1.7	-2.4	2.7	1.59	1.59	
175.0	2.40	308.30	174.9	2.4	-3.4	3.9	0.59	0.33	
205.0	2.50	308.10	204.9	3.2	-4.4	5.0	0.33	0.33	
235.0	2.90	306.40	234.9	4.0	-5.5	6.3	1.36	1.33	
296.0	3.80	289.90	295.8	5.6	-8.7	9.8	2.15	1.48	
327.0	4.20	284.00	326.7	6.3	-10.7	11.9	1.85	1.29	
357.0	4.70	285.50	356.6	6.9	-13.0	14.3	1.71	1.67	
387.0	5.00	281.90	386.5	7.5	-15.4	16.8	1.42	1.00	
479.0	5.80	276.60	478.1	8.8	-24.0	25.4	1.02	0.87	
570.0	6.60	276.00	568.6	9.9	-33.7	35.1	0.88	0.88	
661.0	5.50	281.40	659.0	11.3	-43.2	44.7	1.36	-1.21	
752.0	5.40	284.20	749.6	13.2	-51.7	53.3	0.31	-0.11	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Rose 22-11B
Project:	Mamm Creek	TD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Site:	K22W Pad	MVD Reference:	KB=22' @ 6967.0ft (Patterson #303)
Well:	Rose 22-11B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	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
844.0	6.10	283.70	841.2	15.4	-60.6	62.5	0.76	0.76	
934.0	6.70	284.20	930.6	17.9	-70.3	72.6	0.67	0.67	
1,026.0	7.60	283.00	1,021.9	20.5	-81.5	84.0	0.99	0.98	
1,153.0	8.20	283.40	1,147.7	24.5	-98.5	101.5	0.47	0.47	
1,245.0	8.40	284.80	1,238.7	27.8	-111.3	114.7	0.31	0.22	
1,336.0	8.50	284.70	1,328.7	31.2	-124.3	128.1	0.11	0.11	
1,428.0	8.40	284.90	1,419.7	34.6	-137.3	141.6	0.11	-0.11	
1,520.0	6.80	284.60	1,510.9	37.7	-149.1	153.8	1.74	-1.74	
1,611.0	6.60	285.10	1,601.3	40.4	-159.4	164.4	0.23	-0.22	
1,703.0	6.50	285.90	1,692.7	43.2	-169.5	174.9	0.15	-0.11	
1,794.0	6.10	283.00	1,783.2	45.7	-179.1	184.9	0.56	-0.44	
1,886.0	5.80	279.00	1,874.7	47.6	-188.5	194.4	0.56	-0.33	
1,977.0	5.70	278.30	1,965.2	48.9	-197.5	203.5	0.13	-0.11	
2,069.0	6.00	285.50	2,056.7	50.9	-206.7	212.8	0.86	0.33	
2,161.0	6.00	285.60	2,148.2	53.5	-215.9	222.4	0.01	0.00	
2,252.0	6.00	285.10	2,238.7	56.0	-225.1	232.0	0.06	0.00	
2,344.0	6.30	284.70	2,330.2	58.5	-234.6	241.8	0.33	0.33	
2,435.0	6.30	284.20	2,420.7	61.0	-244.3	251.8	0.06	0.00	
2,527.0	6.40	283.70	2,512.1	63.5	-254.2	262.0	0.12	0.11	
2,618.0	6.40	282.90	2,602.5	65.8	-264.0	272.1	0.10	0.00	
2,710.0	6.10	288.50	2,694.0	68.5	-273.7	282.1	0.74	-0.33	
2,801.0	6.10	289.70	2,784.5	71.7	-282.8	291.8	0.14	0.00	
2,893.0	6.20	290.30	2,875.9	75.0	-292.1	301.6	0.13	0.11	
2,985.0	5.90	288.60	2,967.4	78.3	-301.2	311.2	0.38	-0.33	
3,076.0	5.70	288.80	3,058.0	81.2	-309.9	320.4	0.22	-0.22	
3,167.0	5.70	289.00	3,148.5	84.1	-318.5	329.4	0.02	0.00	
3,258.0	5.40	288.40	3,239.1	87.0	-326.8	338.2	0.34	-0.33	
3,350.0	5.30	289.20	3,330.7	89.7	-334.9	346.7	0.14	-0.11	
3,441.0	5.10	290.00	3,421.3	92.5	-342.7	354.9	0.23	-0.22	
3,532.0	5.00	292.90	3,511.9	95.4	-350.2	362.9	0.30	-0.11	
3,624.0	5.00	292.50	3,603.6	98.5	-357.6	370.8	0.04	0.00	
3,715.0	5.80	289.40	3,694.2	101.6	-365.6	379.3	0.94	0.88	
3,807.0	5.80	288.50	3,785.7	104.6	-374.4	388.6	0.10	0.00	
3,898.0	5.70	290.30	3,876.3	107.6	-382.9	397.6	0.23	-0.11	
3,989.0	5.60	289.90	3,966.8	110.7	-391.4	406.5	0.12	-0.11	
4,081.0	5.40	290.80	4,058.4	113.7	-399.6	415.3	0.24	-0.22	
4,172.0	6.00	280.40	4,149.0	116.1	-408.3	424.3	1.31	0.66	
4,264.0	6.10	278.90	4,240.4	117.7	-417.9	434.0	0.20	0.11	
4,356.0	6.00	278.90	4,331.9	119.2	-427.4	443.6	0.11	-0.11	
4,447.0	5.70	281.70	4,422.5	120.9	-436.6	452.9	0.45	-0.33	
4,539.0	5.40	282.30	4,514.0	122.7	-445.3	461.8	0.33	-0.33	
4,630.0	5.40	282.00	4,604.6	124.5	-453.6	470.3	0.03	0.00	
4,721.0	5.40	281.70	4,695.2	126.3	-462.0	478.9	0.03	0.00	
4,813.0	5.40	281.20	4,786.8	128.0	-470.5	487.5	0.05	0.00	
4,905.0	5.40	279.90	4,878.4	129.6	-479.0	496.2	0.13	0.00	
4,997.0	5.60	278.20	4,970.0	131.0	-487.7	505.0	0.28	0.22	
5,088.0	6.20	282.60	5,060.5	132.7	-496.9	514.3	0.83	0.66	
5,180.0	6.20	287.40	5,152.0	135.3	-506.5	524.2	0.56	0.00	
5,271.0	6.10	286.90	5,242.4	138.1	-515.8	533.9	0.12	-0.11	
5,363.0	5.80	290.50	5,333.9	141.2	-524.9	543.5	0.52	-0.33	
5,454.0	5.70	291.00	5,424.5	144.4	-533.4	552.5	0.12	-0.11	
5,546.0	5.80	290.00	5,516.0	147.7	-542.0	561.7	0.15	0.11	
5,638.0	6.20	294.50	5,607.5	151.3	-550.9	571.2	0.67	0.43	

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well Rose 22-11B
Project: Mamm Creek	TVD Reference: KB=22' @ 6967.0ft (Patterson #303)
Site: K22W Pad	MD Reference: KB=22' @ 6967.0ft (Patterson #303)
Well: Rose 22-11B	North Reference: True
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: 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
5,730.0	5.80	289.50	5,699.0	154.9	-559.8	580.7	0.71	-0.43	
5,821.0	5.50	290.50	5,789.6	158.0	-568.2	589.6	0.35	-0.33	
5,913.0	5.30	295.50	5,881.2	161.3	-576.2	598.2	0.56	-0.22	
6,004.0	5.10	286.10	5,971.8	164.3	-583.9	606.3	0.96	-0.22	
6,096.0	5.00	284.10	6,063.4	166.4	-591.7	614.4	0.22	-0.11	
6,188.0	4.90	282.60	6,155.1	168.2	-599.4	622.4	0.18	-0.11	
6,279.0	4.80	283.30	6,245.8	169.9	-606.9	630.0	0.13	-0.11	
6,371.0	4.20	281.30	6,337.5	171.5	-614.0	637.3	0.67	-0.65	
6,463.0	3.80	279.20	6,429.3	172.6	-620.3	643.7	0.46	-0.43	
6,554.0	4.10	289.10	6,520.0	174.2	-626.3	649.9	0.82	0.33	
6,645.0	3.80	290.50	6,610.8	176.3	-632.2	656.1	0.35	-0.33	
6,737.0	3.70	290.80	6,702.6	178.4	-637.9	662.1	0.11	-0.11	
6,829.0	3.60	292.80	6,794.4	180.6	-643.3	667.9	0.18	-0.11	
6,920.0	2.70	292.20	6,885.3	182.5	-647.9	672.9	0.99	-0.99	
7,011.0	2.10	306.70	6,976.2	184.3	-651.2	676.5	0.93	-0.66	
7,103.0	1.30	338.70	7,068.2	186.3	-653.0	678.7	1.32	-0.87	
7,195.0	1.30	348.80	7,160.2	188.3	-653.5	679.7	0.25	0.00	
7,286.0	0.70	217.90	7,251.2	188.9	-654.1	680.4	2.02	-0.66	
7,378.0	0.60	205.60	7,343.1	188.0	-654.6	680.7	0.19	-0.11	
7,469.0	0.60	195.00	7,434.1	187.1	-655.0	680.8	0.12	0.00	
7,561.0	0.70	208.80	7,526.1	186.2	-655.4	681.0	0.20	0.11	
7,654.0	0.80	216.90	7,619.1	185.1	-656.0	681.4	0.16	0.11	
7,746.0	0.80	214.40	7,711.1	184.1	-656.8	681.9	0.04	0.00	
7,837.0	0.80	232.50	7,802.1	183.2	-657.6	682.5	0.28	0.00	
7,929.0	0.80	249.20	7,894.1	182.6	-658.8	683.4	0.25	0.00	
8,020.0	0.90	259.30	7,985.1	182.2	-660.0	684.6	0.20	0.11	
8,112.0	1.20	260.50	8,077.1	181.9	-661.7	686.1	0.33	0.33	
8,203.0	0.40	290.40	8,168.1	181.9	-662.9	687.3	0.96	-0.88	
8,295.0	0.50	351.80	8,260.1	182.4	-663.3	687.8	0.51	0.11	
8,386.0	0.50	27.60	8,351.0	183.1	-663.2	687.8	0.34	0.00	
8,477.0	0.30	44.80	8,442.0	183.6	-662.8	687.6	0.25	-0.22	
8,569.0	0.00	349.80	8,534.0	183.8	-662.7	687.5	0.33	-0.33	
8,661.0	0.20	268.10	8,626.0	183.8	-662.8	687.6	0.22	0.22	
8,752.0	0.60	265.40	8,717.0	183.8	-663.4	688.2	0.44	0.44	
8,843.0	0.70	298.70	8,808.0	184.0	-664.4	689.2	0.42	0.11	
8,935.0	1.00	294.40	8,900.0	184.6	-665.6	690.6	0.33	0.33	
9,085.0	1.00	261.60	9,050.0	184.9	-668.1	693.1	0.38	0.00	Last Cathedral Survey @ 9,085' MD
9,140.0	1.00	261.60	9,105.0	184.8	-669.1	693.9	0.00	0.00	Projection to Bit @ 9,140'

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well Rose 22-11B
Project: Mamm Creek	TVD Reference: KB=22' @ 6967.0ft (Patterson #303)
Site: K22W Pad	MD Reference: KB=22' @ 6967.0ft (Patterson #303)
Well: Rose 22-11B	North Reference: True
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: FINAL	Database: USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
Rose 22-11B TGT	0.00	0.00	6,999.0	183.2	-669.4	1,589,837.61	2,360,593.31	39.430987	-107.763949
- actual wellpath misses target center by 17.7ft at 7034.1ft MD (6999.3 TVD, 184.8 N, -651.9 E)									
- Point									
Rose 22-11B PBHL 251:	0.00	0.00	9,077.0	183.2	-669.4	1,589,837.61	2,360,593.31	39.430987	-107.763949
- actual wellpath misses target center by 27.1ft at 9085.0ft MD (9050.0 TVD, 184.9 N, -668.1 E)									
- Circle (radius 25.0)									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
9,085.0	9,050.0	184.9	-668.1	Last Cathedral Survey @ 9,085' MD
9,140.0	9,105.0	184.8	-669.1	Projection to Bit @ 9,140'

Checked By: _____ Approved By: _____ Date: _____