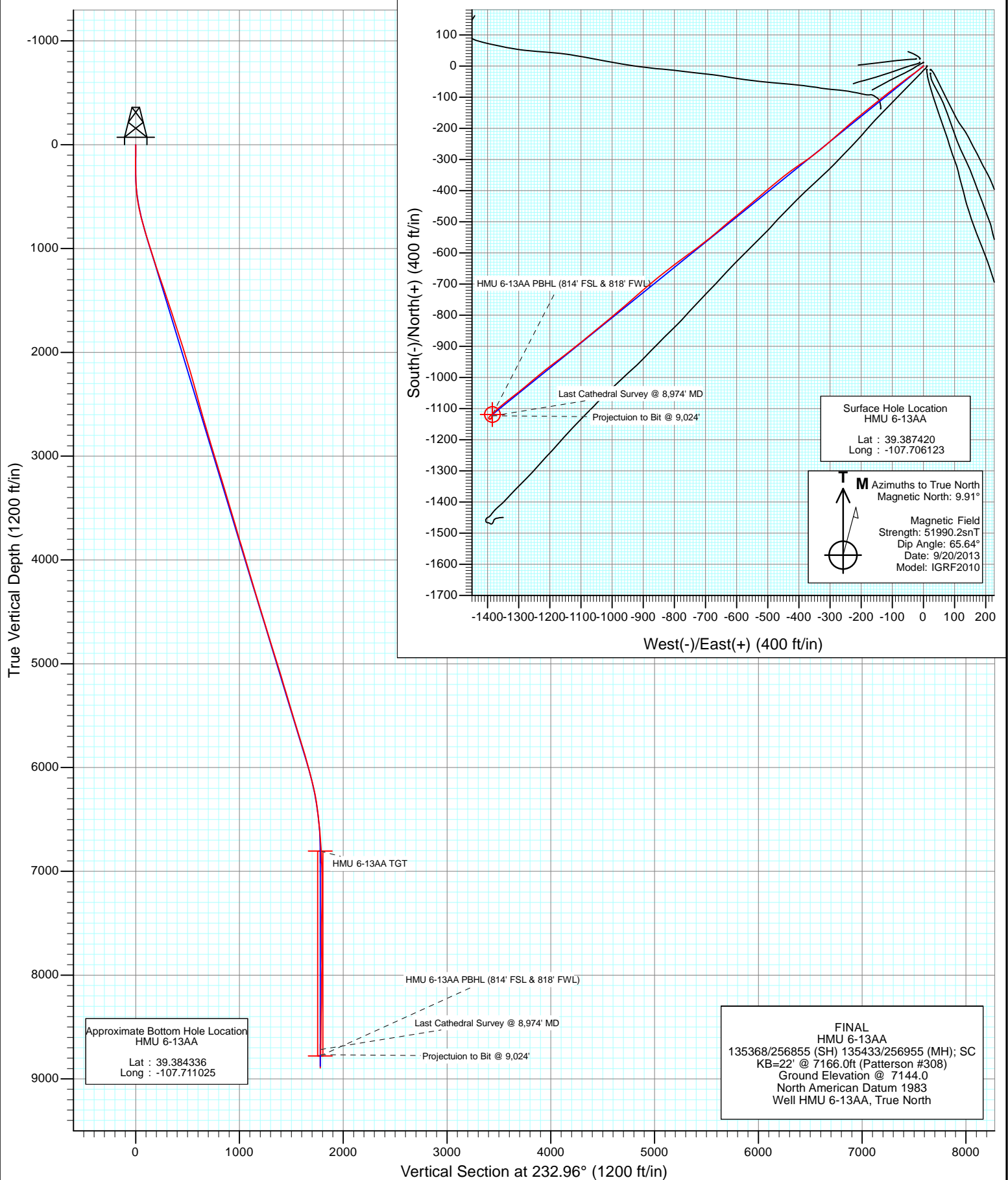


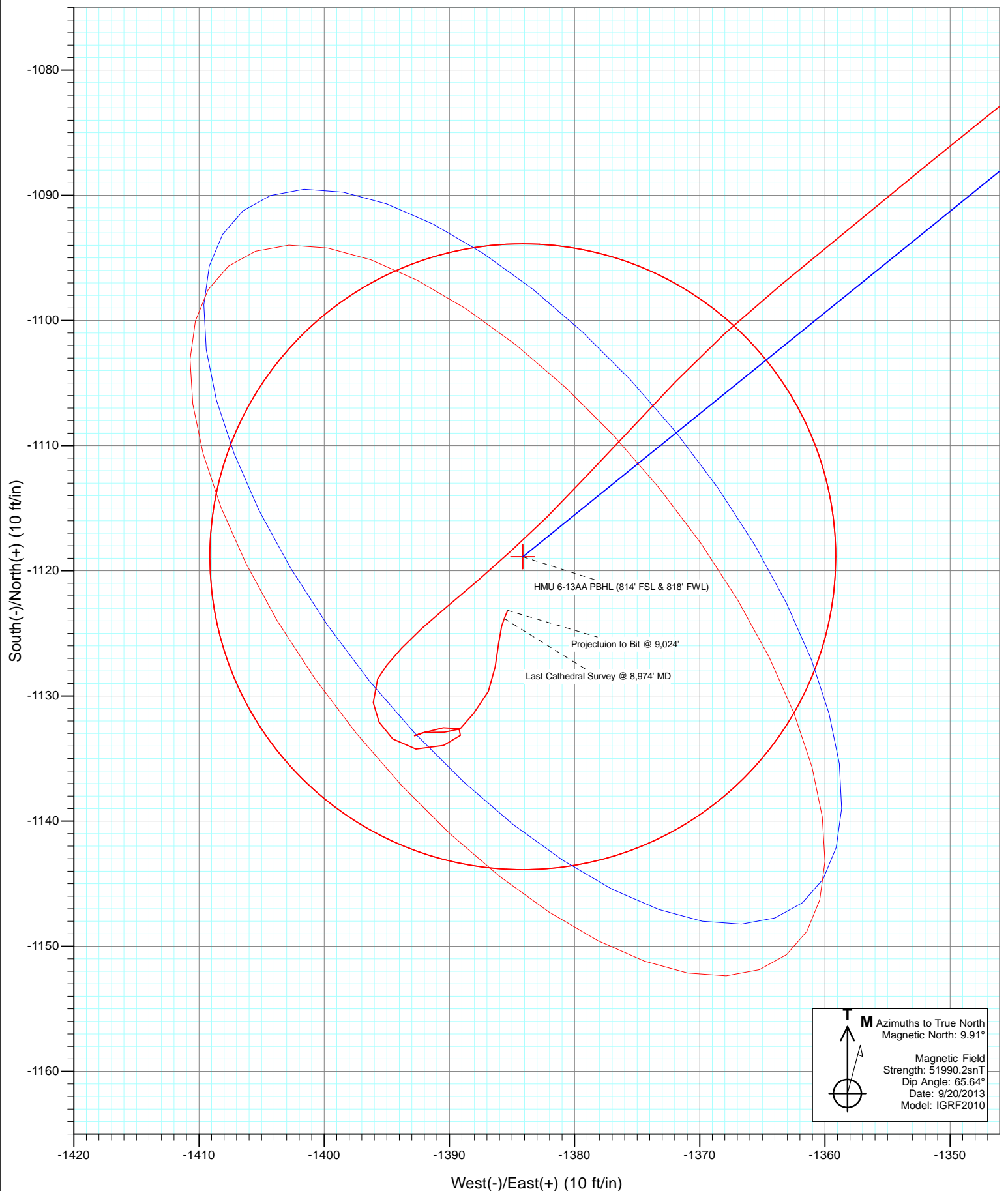


Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-13AA
Wellbore: OH
Design: FINAL



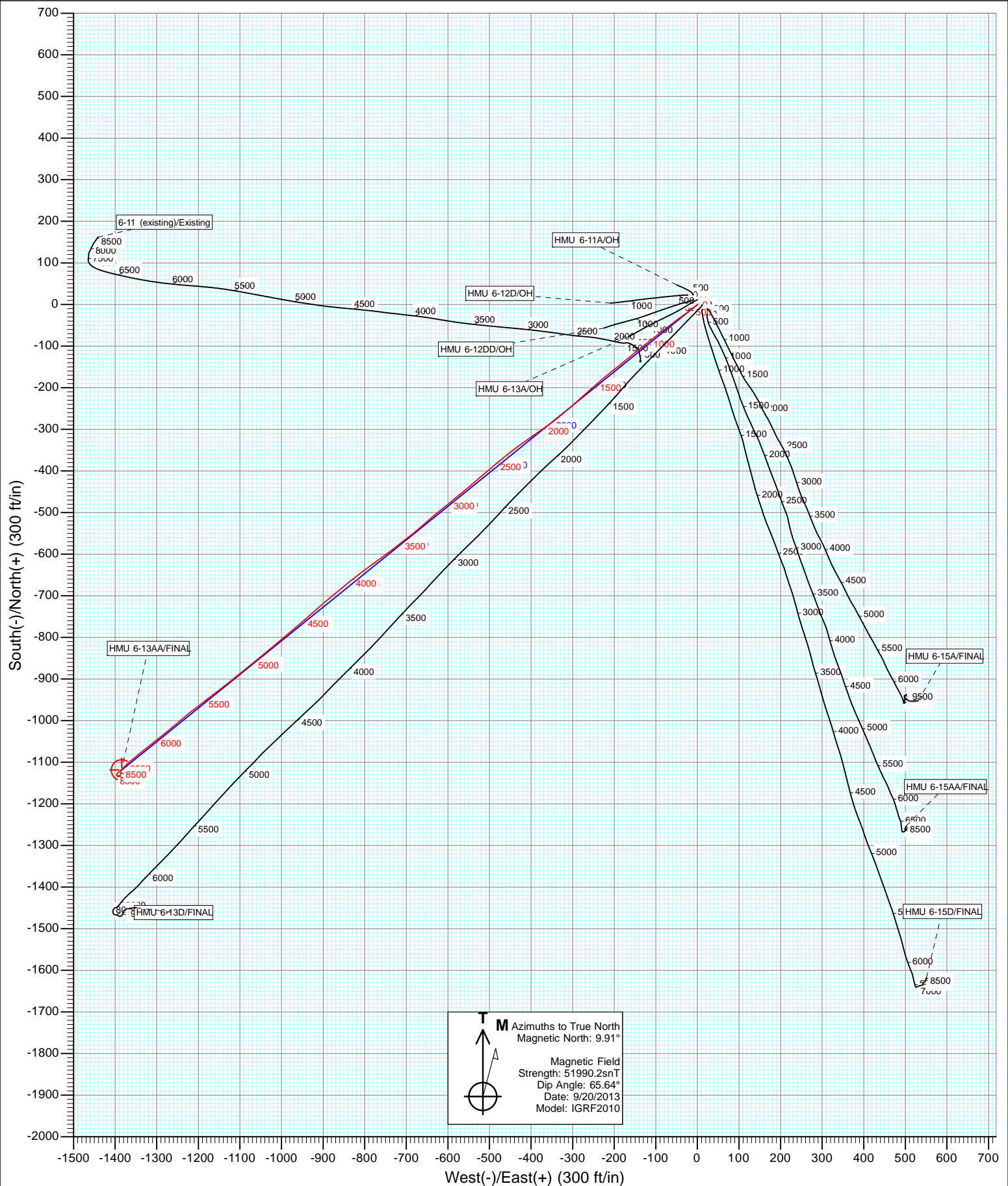


Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-13AA
Wellbore: OH
Design: FINAL





Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-13AA
Wellbore: OH
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-13AA
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-13AA	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		J6SEB Pad			
Site Position:		Northing:	1,573,595.87 ft	Latitude:	39.387484
From:	Lat/Long	Easting:	2,376,514.08 ft	Longitude:	-107.706205
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.39 °

Well	HMU 6-13AA					
Well Position	+N/-S	0.0 ft	Northing:	1,573,572.00 ft	Latitude:	39.387420
	+E/-W	0.0 ft	Easting:	2,376,536.68 ft	Longitude:	-107.706123
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,144.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/20/2013	9.91	65.64	51,990

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	232.96	

Survey Program	Date	10/13/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
110.0	9,024.0	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		
110.0	0.00	222.00	110.0	0.0	0.0	0.0	0.00	0.00		
140.0	0.10	134.10	140.0	0.0	0.0	0.0	0.33	0.33		
170.0	0.10	113.80	170.0	0.0	0.1	0.0	0.12	0.00		
201.0	0.10	138.00	201.0	-0.1	0.1	0.0	0.14	0.00		
231.0	0.30	169.40	231.0	-0.2	0.1	0.0	0.74	0.67		
262.0	0.60	201.20	262.0	-0.4	0.1	0.2	1.22	0.97		
292.0	1.10	216.70	292.0	-0.8	-0.1	0.6	1.82	1.67		
323.0	1.90	222.10	323.0	-1.4	-0.7	1.4	2.62	2.58		
353.0	2.50	229.50	353.0	-2.2	-1.5	2.5	2.21	2.00		
384.0	3.20	238.20	383.9	-3.1	-2.7	4.0	2.65	2.26		
414.0	4.20	236.80	413.9	-4.1	-4.4	6.0	3.35	3.33		
445.0	5.40	238.50	444.8	-5.5	-6.6	8.6	3.90	3.87		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-13AA
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-13AA	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
476.0	6.30	233.20	475.6	-7.3	-9.2	11.7	3.38	2.90	
506.0	7.50	227.80	505.4	-9.6	-11.9	15.3	4.54	4.00	
536.0	8.60	231.90	535.1	-12.3	-15.2	19.5	4.13	3.67	
567.0	9.50	229.70	565.7	-15.4	-18.9	24.4	3.11	2.90	
598.0	10.70	233.20	596.2	-18.8	-23.2	29.8	4.35	3.87	
629.0	11.80	237.00	626.6	-22.2	-28.1	35.8	4.28	3.55	
659.0	12.80	235.20	655.9	-25.8	-33.4	42.2	3.57	3.33	
751.0	15.60	233.10	745.1	-39.0	-51.7	64.8	3.09	3.04	
843.0	16.50	232.20	833.5	-54.5	-71.9	90.2	1.01	0.98	
935.0	17.50	232.90	921.5	-70.8	-93.3	117.1	1.11	1.09	
1,027.0	17.60	231.20	1,009.2	-87.9	-115.2	144.9	0.57	0.11	
1,119.0	18.00	231.40	1,096.8	-105.5	-137.1	173.0	0.44	0.43	
1,218.0	18.40	230.50	1,190.9	-124.9	-161.1	203.9	0.49	0.40	
1,338.0	18.80	231.20	1,304.6	-149.1	-190.8	242.1	0.38	0.33	
1,433.0	18.60	231.00	1,394.6	-168.2	-214.5	272.6	0.22	-0.21	
1,528.0	18.40	229.90	1,484.7	-187.4	-237.7	302.7	0.42	-0.21	
1,623.0	18.30	228.60	1,574.8	-206.9	-260.4	332.5	0.44	-0.11	
1,718.0	18.50	227.10	1,665.0	-227.1	-282.6	362.4	0.54	0.21	
1,813.0	18.10	229.70	1,755.2	-246.9	-304.9	392.1	0.96	-0.42	
1,908.0	18.40	230.60	1,845.4	-265.9	-327.8	421.8	0.43	0.32	
2,003.0	16.20	233.90	1,936.1	-283.3	-350.1	450.1	2.53	-2.32	
2,097.0	16.70	234.60	2,026.3	-298.8	-371.7	476.7	0.57	0.53	
2,192.0	16.80	235.00	2,117.2	-314.6	-394.0	504.0	0.16	0.11	
2,287.0	17.00	235.20	2,208.1	-330.4	-416.7	531.6	0.22	0.21	
2,383.0	15.60	232.00	2,300.3	-346.3	-438.4	558.6	1.73	-1.46	
2,477.0	15.10	232.60	2,390.9	-361.6	-458.1	583.4	0.56	-0.53	
2,572.0	15.60	229.60	2,482.5	-377.4	-477.6	608.6	0.99	0.53	
2,668.0	15.50	229.00	2,575.0	-394.1	-497.1	634.3	0.20	-0.10	
2,762.0	15.80	229.60	2,665.5	-410.7	-516.4	659.6	0.36	0.32	
2,858.0	16.80	230.80	2,757.7	-427.9	-537.1	686.5	1.10	1.04	
2,953.0	17.00	230.50	2,848.6	-445.4	-558.4	714.1	0.23	0.21	
3,048.0	16.80	229.50	2,939.5	-463.2	-579.6	741.6	0.37	-0.21	
3,143.0	16.80	230.60	3,030.4	-480.8	-600.6	769.1	0.33	0.00	
3,236.0	16.60	231.80	3,119.5	-497.6	-621.5	795.8	0.43	-0.22	
3,332.0	16.90	228.80	3,211.4	-515.2	-642.7	823.4	0.95	0.31	
3,427.0	16.70	228.70	3,302.4	-533.3	-663.4	850.8	0.21	-0.21	
3,523.0	17.30	231.40	3,394.2	-551.3	-684.9	878.8	1.03	0.62	
3,618.0	17.00	232.40	3,484.9	-568.6	-706.9	906.8	0.44	-0.32	
3,714.0	16.20	232.60	3,576.9	-585.3	-728.7	934.2	0.84	-0.83	
3,808.0	16.40	233.40	3,667.2	-601.2	-749.8	960.6	0.32	0.21	
3,903.0	16.10	234.30	3,758.4	-616.9	-771.2	987.2	0.41	-0.32	
3,998.0	17.10	232.90	3,849.4	-633.0	-793.1	1,014.3	1.13	1.05	
4,093.0	16.30	233.00	3,940.4	-649.4	-814.9	1,041.6	0.84	-0.84	
4,188.0	16.90	231.10	4,031.4	-666.1	-836.3	1,068.8	0.85	0.63	
4,284.0	16.70	230.00	4,123.3	-683.8	-857.7	1,096.5	0.39	-0.21	
4,379.0	16.70	231.30	4,214.3	-701.1	-878.8	1,123.8	0.39	0.00	
4,463.0	17.10	228.80	4,294.7	-716.8	-897.5	1,148.2	0.99	0.48	
4,558.0	16.60	228.30	4,385.6	-735.0	-918.1	1,175.6	0.55	-0.53	
4,653.0	17.10	229.00	4,476.5	-753.2	-938.8	1,203.1	0.57	0.53	
4,748.0	16.50	230.00	4,567.5	-771.0	-959.7	1,230.5	0.70	-0.63	
4,844.0	17.10	229.40	4,659.4	-789.0	-980.8	1,258.2	0.65	0.62	
4,937.0	17.90	230.20	4,748.1	-807.0	-1,002.2	1,286.1	0.90	0.86	
5,032.0	17.60	230.90	4,838.6	-825.4	-1,024.6	1,315.0	0.39	-0.32	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-13AA
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-13AA	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
5,127.0	17.20	230.10	4,929.2	-843.5	-1,046.5	1,343.4	0.49	-0.42	
5,222.0	17.10	231.00	5,020.0	-861.3	-1,068.1	1,371.4	0.30	-0.11	
5,316.0	16.60	230.30	5,110.0	-878.5	-1,089.2	1,398.6	0.57	-0.53	
5,410.0	16.70	231.50	5,200.0	-895.5	-1,110.1	1,425.5	0.38	0.11	
5,505.0	16.70	231.70	5,291.0	-912.5	-1,131.5	1,452.8	0.06	0.00	
5,599.0	17.10	233.00	5,381.0	-929.2	-1,153.1	1,480.2	0.59	0.43	
5,695.0	16.60	232.50	5,472.8	-946.0	-1,175.3	1,508.0	0.54	-0.52	
5,790.0	16.80	232.60	5,563.8	-962.6	-1,197.0	1,535.3	0.21	0.21	
5,885.0	16.90	231.30	5,654.8	-979.6	-1,218.6	1,562.8	0.41	0.11	
5,980.0	16.60	230.30	5,745.7	-996.9	-1,239.9	1,590.2	0.44	-0.32	
6,075.0	16.70	229.80	5,836.7	-1,014.4	-1,260.7	1,617.4	0.18	0.11	
6,170.0	16.20	231.20	5,927.9	-1,031.5	-1,281.5	1,644.2	0.67	-0.53	
6,265.0	15.90	230.50	6,019.1	-1,048.1	-1,301.8	1,670.5	0.38	-0.32	
6,360.0	14.00	232.10	6,110.9	-1,063.4	-1,321.0	1,695.0	2.05	-2.00	
6,455.0	12.30	232.40	6,203.4	-1,076.6	-1,338.0	1,716.6	1.79	-1.79	
6,550.0	9.90	230.60	6,296.7	-1,088.0	-1,352.4	1,734.9	2.55	-2.53	
6,645.0	7.50	230.60	6,390.6	-1,097.1	-1,363.5	1,749.2	2.53	-2.53	
6,740.0	6.40	223.70	6,484.9	-1,104.9	-1,371.9	1,760.6	1.45	-1.16	
6,835.0	6.00	223.00	6,579.3	-1,112.3	-1,379.0	1,770.8	0.43	-0.42	
6,930.0	4.50	228.00	6,673.9	-1,118.5	-1,385.1	1,779.4	1.65	-1.58	
7,026.0	3.50	230.40	6,769.6	-1,122.9	-1,390.2	1,786.0	1.06	-1.04	
7,120.0	2.50	223.50	6,863.5	-1,126.2	-1,393.8	1,790.9	1.13	-1.06	
7,215.0	1.30	207.30	6,958.5	-1,128.6	-1,395.7	1,793.9	1.37	-1.26	
7,312.0	1.10	170.60	7,055.4	-1,130.5	-1,396.1	1,795.4	0.80	-0.21	
7,406.0	0.90	154.00	7,149.4	-1,132.1	-1,395.6	1,795.9	0.37	-0.21	
7,502.0	1.20	131.30	7,245.4	-1,133.4	-1,394.5	1,795.9	0.53	0.31	
7,595.0	1.40	98.70	7,338.4	-1,134.2	-1,392.7	1,794.9	0.81	0.22	
7,690.0	1.40	66.30	7,433.4	-1,133.9	-1,390.5	1,792.9	0.82	0.00	
7,786.0	0.50	38.70	7,529.4	-1,133.1	-1,389.1	1,791.4	1.03	-0.94	
7,882.0	0.50	300.10	7,625.3	-1,132.6	-1,389.2	1,791.2	0.79	0.00	
7,977.0	1.10	261.50	7,720.3	-1,132.5	-1,390.5	1,792.1	0.82	0.63	
8,072.0	1.00	250.30	7,815.3	-1,133.0	-1,392.2	1,793.7	0.24	-0.11	
8,167.0	0.20	68.00	7,910.3	-1,133.2	-1,392.8	1,794.3	1.26	-0.84	
8,261.0	0.80	72.60	8,004.3	-1,132.9	-1,392.0	1,793.6	0.64	0.64	
8,356.0	1.20	99.80	8,099.3	-1,132.9	-1,390.4	1,792.3	0.64	0.42	
8,452.0	0.60	31.90	8,195.3	-1,132.6	-1,389.1	1,791.1	1.17	-0.62	
8,546.0	1.40	45.40	8,289.3	-1,131.4	-1,388.1	1,789.5	0.88	0.85	
8,642.0	1.20	20.00	8,385.3	-1,129.6	-1,386.9	1,787.5	0.63	-0.21	
8,736.0	1.30	11.60	8,479.2	-1,127.7	-1,386.3	1,785.9	0.22	0.11	
8,831.0	1.00	4.50	8,574.2	-1,125.8	-1,386.1	1,784.5	0.35	-0.32	
8,926.0	0.70	17.40	8,669.2	-1,124.4	-1,385.8	1,783.5	0.37	-0.32	
8,974.0	0.80	21.40	8,717.2	-1,123.8	-1,385.6	1,783.0	0.24	0.21	Last Cathedral Survey @ 8,974' MD Projectuion to Bit @ 9,024'
9,024.0	0.80	21.40	8,767.2	-1,123.2	-1,385.3	1,782.4	0.00	0.00	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-13AA
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-13AA	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									
HMU 6-13AA TGT	0.00	0.00	6,805.0	-1,118.9	-1,384.1	1,572,487.07	2,375,125.79	39.384348	-107.711020
- actual wellpath misses target center by 9.3ft at 7060.9ft MD (6804.5 TVD, -1124.2 N, -1391.7 E)									
- Point									
HMU 6-13AA PBHL (814	0.00	0.00	8,779.0	-1,118.9	-1,384.1	1,572,487.07	2,375,125.79	39.384348	-107.711020
- actual wellpath misses target center by 12.6ft at 9024.0ft MD (8767.2 TVD, -1123.2 N, -1385.3 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
8,974.0	8,717.2	-1,123.8	-1,385.6	Last Cathedral Survey @ 8,974' MD	
9,024.0	8,767.2	-1,123.2	-1,385.3	Projectuion to Bit @ 9,024'	

Checked By: _____ Approved By: _____ Date: _____