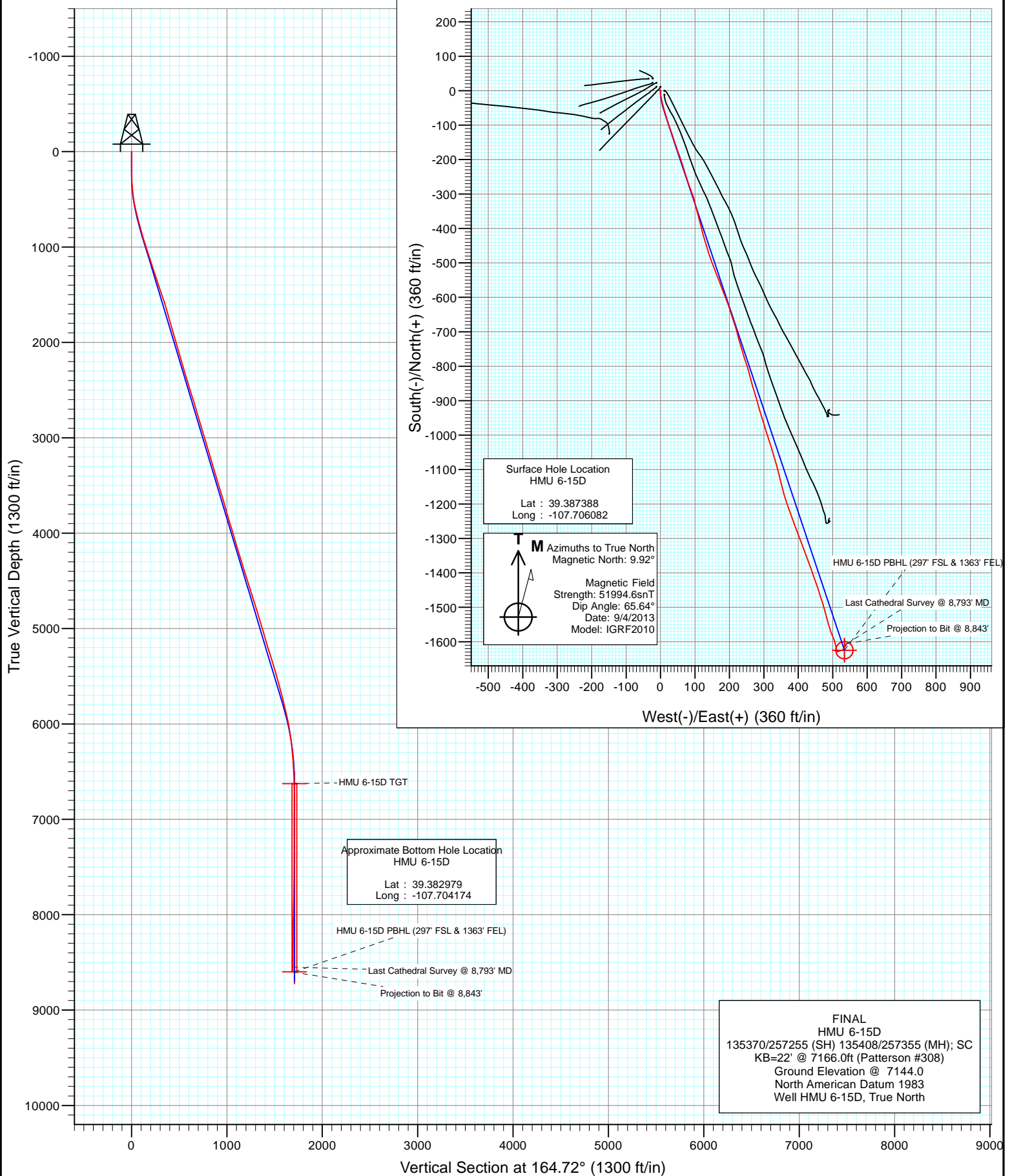


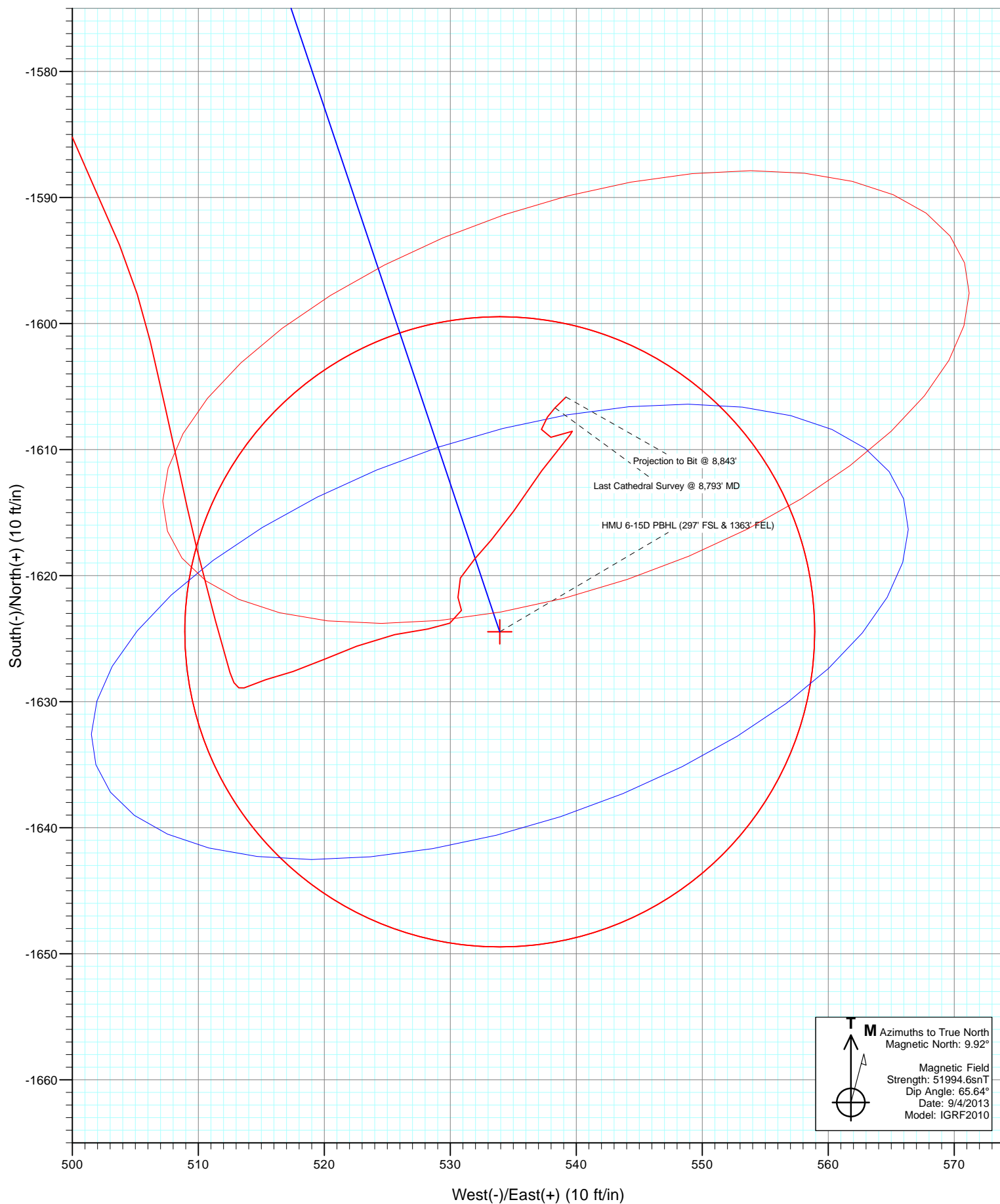


Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-15D
Wellbore: OH
Design: FINAL



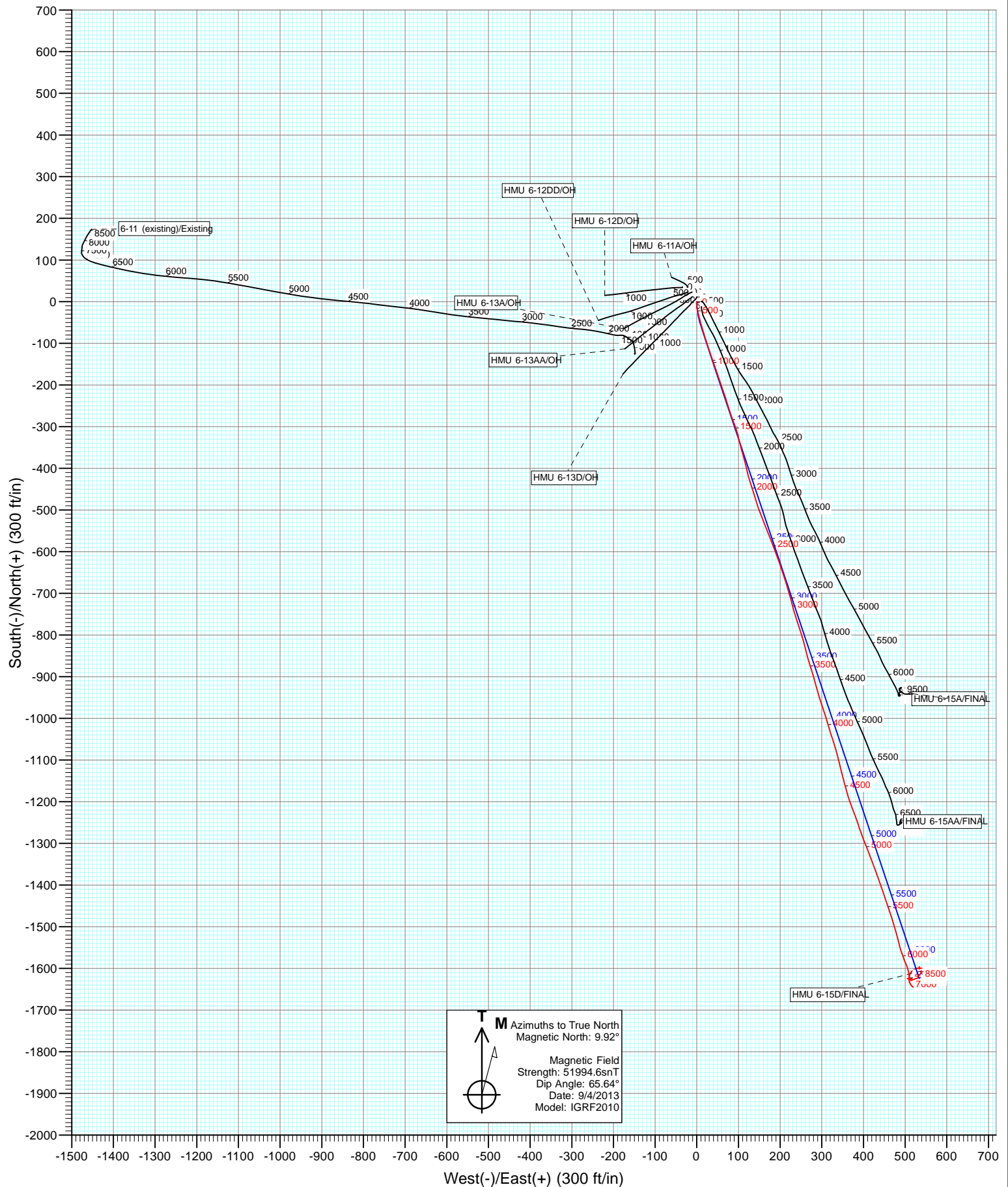


Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-15D
Wellbore: OH
Design: FINAL





Project: Mamm Creek
Site: J6SEB Pad
Well: HMU 6-15D
Wellbore: OH
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-15D
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-15D	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 6-15D					
Well Position	+N/-S	0.0 ft	Northing:	1,573,560.07 ft	Latitude:	39.387388
	+E/-W	0.0 ft	Easting:	2,376,547.99 ft	Longitude:	-107.706082
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	9/4/2013	9.92	65.64	51,995

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	164.72	

Survey Program	Date	9/15/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
110.0	8,843.0	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	0.20	235.90	110.0	-0.1	-0.2	0.1	0.18	0.18		
140.0	0.30	214.50	140.0	-0.2	-0.2	0.1	0.45	0.33		
170.0	0.40	185.50	170.0	-0.4	-0.3	0.3	0.67	0.33		
200.0	0.80	197.40	200.0	-0.7	-0.4	0.6	1.39	1.33		
231.0	1.30	194.40	231.0	-1.2	-0.5	1.0	1.62	1.61		
261.0	1.60	188.40	261.0	-2.0	-0.7	1.7	1.12	1.00		
292.0	2.20	183.40	292.0	-3.0	-0.8	2.7	2.01	1.94		
322.0	3.00	169.70	321.9	-4.3	-0.7	4.0	3.36	2.67		
353.0	4.00	171.60	352.9	-6.2	-0.4	5.9	3.25	3.23		
383.0	4.60	173.30	382.8	-8.4	-0.1	8.1	2.04	2.00		
475.0	8.00	171.10	474.2	-18.4	1.4	18.1	3.70	3.70		
567.0	11.10	165.70	564.9	-33.3	4.5	33.4	3.50	3.37		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-15D
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-15D	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
659.0	14.10	164.30	654.7	-52.7	9.8	53.4	3.28	3.26	
751.0	15.10	162.50	743.7	-74.9	16.4	76.6	1.19	1.09	
843.0	15.90	162.30	832.4	-98.4	23.8	101.2	0.87	0.87	
934.0	16.80	161.50	919.7	-122.7	31.8	126.7	1.02	0.99	
1,026.0	17.70	160.90	1,007.6	-148.5	40.6	154.0	1.00	0.98	
1,119.0	18.30	160.50	1,096.0	-175.7	50.1	182.6	0.66	0.65	
1,231.0	17.60	161.10	1,202.6	-208.3	61.4	217.1	0.65	-0.62	
1,345.0	18.60	163.80	1,310.9	-242.0	72.1	252.5	1.14	0.88	
1,438.0	19.40	160.20	1,398.9	-270.8	81.5	282.7	1.53	0.86	
1,533.0	18.40	159.60	1,488.7	-299.7	92.0	313.4	1.07	-1.05	
1,628.0	17.80	167.30	1,579.1	-327.9	100.5	342.8	2.59	-0.63	
1,723.0	16.30	164.70	1,669.9	-354.9	107.2	370.6	1.77	-1.58	
1,818.0	15.70	164.80	1,761.2	-380.2	114.1	396.8	0.63	-0.63	
1,912.0	16.90	166.80	1,851.4	-405.8	120.5	423.2	1.41	1.28	
2,008.0	16.00	162.90	1,943.5	-432.0	127.6	450.4	1.48	-0.94	
2,103.0	15.30	161.60	2,035.0	-456.4	135.4	476.0	0.82	-0.74	
2,196.0	16.10	163.50	2,124.5	-480.4	142.9	501.1	1.02	0.86	
2,291.0	16.70	158.30	2,215.6	-505.7	151.7	527.8	1.67	0.63	
2,386.0	17.20	158.80	2,306.5	-531.5	161.8	555.4	0.55	0.53	
2,481.0	16.30	158.20	2,397.5	-557.0	171.9	582.6	0.96	-0.95	
2,576.0	17.70	160.00	2,488.3	-582.9	181.8	610.2	1.57	1.47	
2,670.0	17.80	157.80	2,577.9	-609.7	192.1	638.7	0.72	0.11	
2,765.0	16.00	163.60	2,668.8	-635.7	201.3	666.3	2.59	-1.89	
2,860.0	16.40	161.00	2,760.0	-660.9	209.3	692.7	0.87	0.42	
2,955.0	17.80	162.80	2,850.8	-687.5	218.0	720.6	1.58	1.47	
3,050.0	16.20	165.60	2,941.6	-714.2	225.6	748.4	1.89	-1.68	
3,145.0	16.20	164.30	3,032.9	-739.8	232.5	774.9	0.38	0.00	
3,240.0	16.50	162.30	3,124.0	-765.4	240.1	801.6	0.67	0.32	
3,335.0	16.00	161.00	3,215.2	-790.6	248.5	828.2	0.65	-0.53	
3,429.0	16.50	164.90	3,305.5	-815.8	256.2	854.4	1.28	0.53	
3,525.0	17.50	166.00	3,397.3	-842.9	263.2	882.5	1.09	1.04	
3,620.0	17.90	162.10	3,487.8	-870.7	271.2	911.4	1.32	0.42	
3,713.0	16.40	164.30	3,576.6	-896.9	279.1	938.8	1.76	-1.61	
3,808.0	16.00	164.30	3,667.9	-922.4	286.3	965.3	0.42	-0.42	
3,903.0	16.40	163.70	3,759.1	-947.9	293.6	991.8	0.46	0.42	
3,998.0	15.80	160.70	3,850.4	-973.0	301.7	1,018.1	1.08	-0.63	
4,093.0	16.80	162.50	3,941.6	-998.3	310.1	1,044.7	1.18	1.05	
4,188.0	16.50	164.70	4,032.6	-1,024.4	317.7	1,071.9	0.73	-0.32	
4,282.0	16.00	160.70	4,122.8	-1,049.5	325.6	1,098.2	1.30	-0.53	
4,378.0	16.90	164.60	4,214.9	-1,075.4	333.6	1,125.4	1.48	0.94	
4,473.0	17.10	165.90	4,305.7	-1,102.3	340.7	1,153.1	0.45	0.21	
4,567.0	17.90	166.00	4,395.4	-1,129.7	347.6	1,181.4	0.85	0.85	
4,662.0	17.60	165.30	4,485.9	-1,157.8	354.7	1,210.3	0.39	-0.32	
4,757.0	18.50	163.30	4,576.2	-1,186.1	362.7	1,239.8	1.15	0.95	
4,852.0	17.10	158.80	4,666.7	-1,213.6	372.1	1,268.7	2.07	-1.47	
4,947.0	17.40	159.00	4,757.4	-1,239.9	382.2	1,296.8	0.32	0.32	
5,041.0	16.70	163.20	4,847.3	-1,265.9	391.2	1,324.3	1.51	-0.74	
5,136.0	16.20	156.80	4,938.4	-1,291.2	400.3	1,351.0	1.98	-0.53	
5,231.0	16.70	159.50	5,029.5	-1,316.1	410.3	1,377.7	0.96	0.53	
5,326.0	16.40	159.30	5,120.5	-1,341.5	419.9	1,404.7	0.32	-0.32	
5,420.0	17.50	160.20	5,210.5	-1,367.2	429.3	1,432.0	1.20	1.17	
5,515.0	17.60	161.00	5,301.0	-1,394.2	438.9	1,460.6	0.27	0.11	
5,610.0	17.50	159.80	5,391.6	-1,421.2	448.5	1,489.1	0.40	-0.11	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-15D
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-15D	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
5,704.0	16.00	161.70	5,481.6	-1,446.7	457.4	1,516.1	1.70	-1.60	
5,799.0	14.80	162.90	5,573.2	-1,470.8	465.1	1,541.3	1.31	-1.26	
5,894.0	14.50	162.90	5,665.1	-1,493.7	472.2	1,565.4	0.32	-0.32	
5,988.0	15.00	164.20	5,756.0	-1,516.7	478.9	1,589.3	0.64	0.53	
6,084.0	12.80	166.70	5,849.2	-1,539.0	484.8	1,612.3	2.37	-2.29	
6,179.0	12.30	161.60	5,941.9	-1,558.8	490.4	1,633.0	1.28	-0.53	
6,273.0	10.00	160.00	6,034.2	-1,576.0	496.3	1,651.1	2.47	-2.45	
6,367.0	8.20	154.70	6,127.0	-1,589.7	502.0	1,665.8	2.11	-1.91	
6,463.0	6.70	166.90	6,222.2	-1,601.4	506.2	1,678.2	2.26	-1.56	
6,559.0	4.90	168.00	6,317.7	-1,610.8	508.3	1,687.9	1.88	-1.87	
6,654.0	3.80	166.40	6,412.4	-1,617.9	509.9	1,695.1	1.16	-1.16	
6,749.0	3.30	164.50	6,507.2	-1,623.6	511.4	1,700.9	0.54	-0.53	
6,843.0	1.90	163.80	6,601.1	-1,627.7	512.5	1,705.2	1.49	-1.49	
6,938.0	0.90	67.70	6,696.1	-1,628.9	513.6	1,706.7	2.30	-1.05	
7,033.0	1.30	70.30	6,791.1	-1,628.3	515.4	1,706.5	0.42	0.42	
7,126.0	1.50	75.80	6,884.1	-1,627.6	517.5	1,706.5	0.26	0.22	
7,221.0	1.70	62.40	6,979.0	-1,626.6	520.0	1,706.2	0.45	0.21	
7,316.0	1.70	73.60	7,074.0	-1,625.6	522.6	1,705.9	0.35	0.00	
7,411.0	2.10	72.30	7,168.9	-1,624.7	525.6	1,705.8	0.42	0.42	
7,506.0	1.20	95.00	7,263.9	-1,624.2	528.2	1,706.0	1.15	-0.95	
7,601.0	1.10	53.30	7,358.9	-1,623.8	530.0	1,706.0	0.87	-0.11	
7,697.0	0.60	23.10	7,454.9	-1,622.8	530.9	1,705.3	0.68	-0.52	
7,792.0	0.90	320.50	7,549.9	-1,621.7	530.6	1,704.2	0.86	0.32	
7,887.0	1.40	34.40	7,644.8	-1,620.2	530.8	1,702.8	1.51	0.53	
7,981.0	0.90	41.00	7,738.8	-1,618.7	531.9	1,701.6	0.55	-0.53	
8,077.0	1.50	41.00	7,834.8	-1,617.2	533.3	1,700.5	0.62	0.62	
8,172.0	2.00	35.70	7,929.8	-1,614.9	535.0	1,698.8	0.55	0.53	
8,267.0	2.70	34.00	8,024.7	-1,611.7	537.3	1,696.3	0.74	0.74	
8,362.0	1.70	45.30	8,119.6	-1,608.8	539.5	1,694.1	1.14	-1.05	
8,457.0	1.30	229.20	8,214.6	-1,608.5	539.7	1,693.9	3.16	-0.42	
8,552.0	1.10	284.80	8,309.6	-1,609.0	538.0	1,693.9	1.19	-0.21	
8,647.0	0.50	18.90	8,404.6	-1,608.4	537.2	1,693.1	1.31	-0.63	
8,743.0	0.80	29.20	8,500.5	-1,607.4	537.7	1,692.3	0.33	0.31	
8,793.0	1.40	45.60	8,550.5	-1,606.7	538.3	1,691.8	1.34	1.20	Last Cathedral Survey @ 8,793' MD
8,843.0	1.40	45.60	8,600.5	-1,605.8	539.2	1,691.2	0.00	0.00	Projection to Bit @ 8,843'

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU 6-15D
Project:	Mamm Creek	TVD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Site:	J6SEB Pad	MD Reference:	KB=22' @ 7166.0ft (Patterson #308)
Well:	HMU 6-15D	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 6-15D PBHL (297"	0.00	0.00	8,599.0	-1,624.5	533.9	1,571,923.13	2,377,042.32	39.382928	-107.704193
- actual wellpath misses target center by 19.3ft at 8841.1ft MD (8598.6 TVD, -1605.9 N, 539.2 E)									
- Circle (radius 25.0)									
HMU 6-15D TGT	0.00	0.00	6,625.0	-1,624.5	533.9	1,571,923.13	2,377,042.32	39.382928	-107.704193
- actual wellpath misses target center by 21.5ft at 6867.1ft MD (6625.2 TVD, -1628.3 N, 512.8 E)									
- Point									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
8,793.0	8,550.5	-1,606.7	538.3	Last Cathedral Survey @ 8,793' MD	
8,843.0	8,600.5	-1,605.8	539.2	Projection to Bit @ 8,843'	

Checked By: _____ Approved By: _____ Date: _____