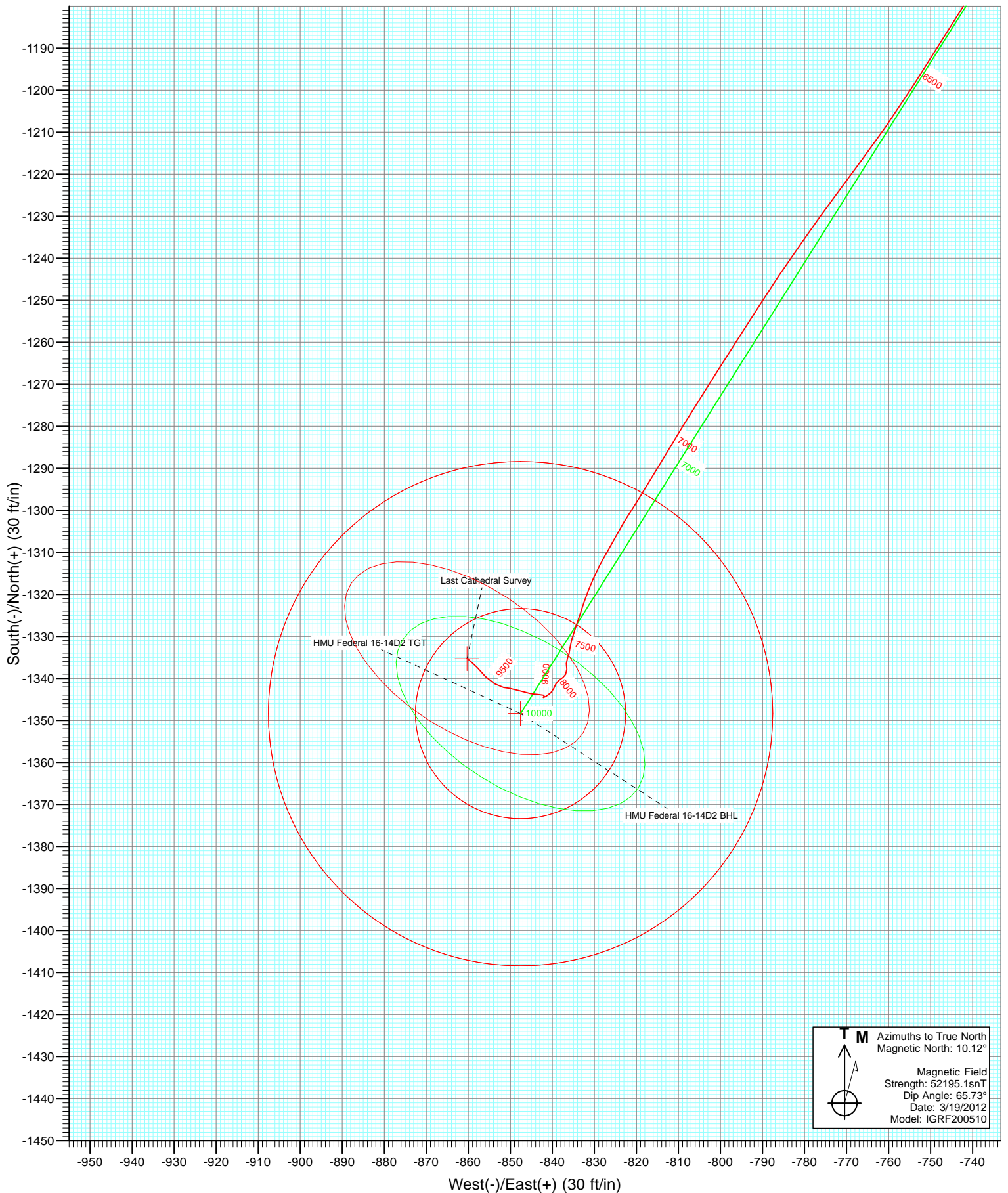


Azimuths to True North
 Magnetic North: 10.12°

Magnetic Field
 Strength: 52195.1snT
 Dip Angle: 65.73°
 Date: 3/19/2012
 Model: IGRF200510



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D2
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Original Well Elev)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Original Well Elev)
Well:	HMU Federal 16-14D2	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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		J16W Pad			
Site Position:		Northing:	1,594,381.52 ft	Latitude:	39.443239
From:	Lat/Long	Easting:	2,357,395.39 ft	Longitude:	-107.775670
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.44 °

Well	HMU Federal 16-14D2					
Well Position	+N/-S	0.0 ft	Northing:	1,594,319.50 ft	Latitude:	39.443068
	+E/-W	0.0 ft	Easting:	2,357,383.66 ft	Longitude:	-107.775706
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,645.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	3/19/2012	10.12	65.73	52,195

Design	DD				
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	212.15	

Survey Program	Date	3/30/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
81.0	10,000.0	Survey #1 (DD)	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		
100.0	0.66	219.01	100.0	-0.3	-0.3	0.4	0.66	0.66		
200.0	0.27	107.61	200.0	-1.0	-0.6	1.2	0.80	-0.39		
300.0	1.22	50.52	300.0	-0.3	0.6	0.0	1.10	0.95		
400.0	0.21	224.93	400.0	0.1	1.1	-0.7	1.43	-1.01		
500.0	0.41	211.30	500.0	-0.2	0.9	-0.2	0.21	0.20		
600.0	0.83	212.50	600.0	-1.2	0.2	0.9	0.42	0.42		
700.0	0.94	216.08	700.0	-2.5	-0.6	2.5	0.12	0.11		
800.0	0.92	232.55	799.9	-3.8	-1.7	4.1	0.27	-0.01		
900.0	1.29	229.35	899.9	-4.6	-3.4	5.7	0.37	0.37		
1,000.0	1.50	220.10	999.9	-6.2	-5.1	8.0	0.31	0.21		
1,100.0	2.59	202.93	1,099.8	-9.4	-6.6	11.5	1.24	1.09		
1,200.0	3.88	212.84	1,199.7	-14.4	-9.4	17.2	1.40	1.28		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D2
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Original Well Elev)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Original Well Elev)
Well:	HMU Federal 16-14D2	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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
1,300.0	5.74	214.02	1,299.3	-21.3	-14.2	25.6	1.86	1.86	
1,400.0	8.16	216.15	1,398.5	-31.4	-21.3	37.9	2.43	2.42	
1,500.0	11.02	210.72	1,497.2	-45.4	-30.1	54.5	3.00	2.86	
1,600.0	12.23	210.91	1,595.0	-63.2	-40.3	74.9	1.22	1.21	
1,700.0	13.01	212.01	1,692.6	-81.6	-51.8	96.7	0.81	0.78	
1,800.0	14.45	210.43	1,789.8	-101.8	-64.1	120.3	1.49	1.44	
1,900.0	14.83	210.26	1,886.4	-124.0	-77.0	145.9	0.38	0.38	
2,000.0	15.06	210.07	1,983.1	-146.1	-89.9	171.6	0.23	0.22	
2,100.0	16.05	209.35	2,079.5	-169.3	-103.1	198.2	1.01	0.99	
2,200.0	16.14	209.69	2,175.5	-193.6	-116.8	226.1	0.13	0.09	
2,300.0	15.84	210.75	2,271.6	-217.4	-130.7	253.7	0.41	-0.30	
2,400.0	15.98	209.89	2,367.8	-241.0	-144.6	281.0	0.27	0.14	
2,500.0	16.00	209.61	2,463.9	-265.0	-158.2	308.5	0.08	0.02	
2,600.0	15.51	211.42	2,560.2	-288.4	-172.0	335.7	0.70	-0.49	
2,700.0	15.91	216.75	2,656.4	-310.7	-187.2	362.7	1.50	0.40	
2,800.0	16.02	215.79	2,752.6	-332.9	-203.5	390.1	0.29	0.11	
2,900.0	16.20	213.71	2,848.7	-355.8	-219.3	417.9	0.60	0.18	
3,000.0	16.15	214.22	2,944.7	-378.8	-235.0	445.8	0.15	-0.05	
3,100.0	16.03	212.72	3,040.8	-402.0	-250.1	473.4	0.43	-0.13	
3,200.0	16.10	213.40	3,136.9	-425.2	-265.2	501.1	0.20	0.07	
3,300.0	15.88	213.28	3,233.0	-448.2	-280.5	528.8	0.22	-0.22	
3,400.0	15.50	212.53	3,329.3	-470.9	-295.1	555.7	0.43	-0.38	
3,500.0	15.26	212.11	3,425.7	-493.4	-309.3	582.3	0.26	-0.24	
3,600.0	14.95	212.37	3,522.2	-515.4	-323.1	608.3	0.32	-0.32	
3,700.0	14.62	212.35	3,618.9	-536.9	-336.9	633.9	0.33	-0.33	
3,800.0	14.27	212.06	3,715.8	-558.0	-350.1	658.8	0.35	-0.34	
3,900.0	15.50	212.81	3,812.5	-579.4	-363.6	684.0	1.24	1.22	
4,000.0	15.80	212.29	3,908.7	-602.4	-378.5	711.4	0.34	0.31	
4,100.0	15.46	210.06	4,005.0	-625.4	-392.5	738.4	0.69	-0.34	
4,200.0	15.32	209.17	4,101.4	-648.5	-405.5	764.8	0.28	-0.15	
4,300.0	14.68	209.98	4,198.0	-671.1	-418.2	790.8	0.67	-0.64	
4,400.0	14.32	208.53	4,294.8	-692.9	-430.5	815.7	0.51	-0.36	
4,500.0	15.57	210.85	4,391.5	-715.2	-443.2	841.4	1.39	1.25	
4,600.0	14.89	211.27	4,487.9	-737.7	-456.8	867.7	0.69	-0.68	
4,700.0	14.80	210.40	4,584.6	-759.7	-469.9	893.2	0.24	-0.10	
4,800.0	15.94	211.56	4,681.0	-782.5	-483.6	919.9	1.18	1.14	
4,900.0	15.48	211.85	4,777.3	-805.5	-497.8	946.9	0.46	-0.45	
5,000.0	15.31	211.06	4,873.7	-828.2	-511.7	973.5	0.27	-0.17	
5,100.0	14.89	210.72	4,970.2	-850.6	-525.1	999.5	0.43	-0.42	
5,200.0	14.75	211.33	5,066.9	-872.4	-538.0	1,025.0	0.21	-0.14	
5,300.0	15.06	213.66	5,163.5	-894.1	-552.1	1,050.8	0.68	0.31	
5,400.0	14.96	213.15	5,260.1	-915.7	-566.4	1,076.7	0.17	-0.10	
5,500.0	14.81	212.41	5,356.8	-937.4	-580.3	1,102.4	0.24	-0.15	
5,600.0	14.80	214.00	5,453.5	-958.8	-594.0	1,127.9	0.41	-0.01	
5,700.0	14.73	215.66	5,550.1	-979.7	-608.8	1,153.4	0.43	-0.07	
5,800.0	14.91	215.95	5,646.9	-1,000.3	-623.6	1,178.8	0.19	0.17	
5,900.0	14.96	214.21	5,743.4	-1,021.4	-638.7	1,204.6	0.45	0.06	
6,000.0	14.62	213.76	5,840.1	-1,042.7	-652.8	1,230.2	0.37	-0.35	
6,100.0	15.47	213.54	5,936.8	-1,064.0	-667.1	1,255.9	0.86	0.86	
6,200.0	15.40	214.11	6,033.1	-1,086.4	-682.0	1,282.8	0.17	-0.07	
6,300.0	15.47	213.88	6,129.5	-1,108.4	-696.9	1,309.3	0.09	0.06	
6,400.0	15.68	213.45	6,225.8	-1,130.7	-711.8	1,336.1	0.24	0.21	
6,500.0	15.51	210.78	6,322.1	-1,153.5	-726.1	1,363.0	0.74	-0.17	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D2
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Original Well Elev)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Original Well Elev)
Well:	HMU Federal 16-14D2	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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
6,600.0	15.50	211.69	6,418.5	-1,176.4	-739.9	1,389.7	0.24	-0.01	
6,700.0	15.55	212.82	6,514.8	-1,199.0	-754.2	1,416.5	0.31	0.05	
6,800.0	14.02	216.86	6,611.5	-1,220.0	-768.9	1,442.1	1.84	-1.53	
6,900.0	11.99	214.70	6,709.0	-1,238.1	-782.0	1,464.4	2.10	-2.04	
7,000.0	10.90	212.55	6,807.0	-1,254.8	-793.0	1,484.3	1.17	-1.09	
7,100.0	9.34	212.51	6,905.4	-1,269.4	-802.4	1,501.7	1.55	-1.55	
7,200.0	8.75	211.35	7,004.2	-1,282.7	-810.6	1,517.4	0.63	-0.60	
7,300.0	8.16	211.53	7,103.1	-1,295.5	-818.4	1,532.3	0.58	-0.58	
7,400.0	7.05	210.33	7,202.2	-1,306.6	-825.2	1,545.3	1.13	-1.11	
7,500.0	6.05	203.49	7,301.5	-1,317.0	-830.6	1,557.0	1.27	-1.00	
7,600.0	4.20	198.42	7,401.1	-1,325.4	-833.6	1,565.7	1.89	-1.84	
7,700.0	2.61	194.66	7,500.9	-1,330.9	-835.4	1,571.4	1.61	-1.60	
7,800.0	1.41	195.26	7,600.9	-1,334.3	-836.1	1,574.6	1.20	-1.20	
7,835.4	1.20	193.21	7,636.3	-1,335.1	-836.3	1,575.4	0.59	-0.58	HMU Federal 16-14D2 TGT
7,900.0	0.83	186.89	7,700.9	-1,336.0	-836.7	1,576.3	0.59	-0.57	
8,000.0	0.80	176.97	7,800.9	-1,337.4	-836.6	1,577.5	0.15	-0.04	
8,100.0	0.78	200.08	7,900.9	-1,338.7	-836.7	1,578.7	0.32	-0.02	
8,200.0	0.46	232.62	8,000.8	-1,339.7	-837.3	1,579.8	0.46	-0.32	
8,300.0	0.48	229.99	8,100.8	-1,340.1	-838.0	1,580.5	0.03	0.02	
8,400.0	0.41	236.16	8,200.8	-1,340.6	-838.6	1,581.3	0.08	-0.07	
8,500.0	0.68	205.47	8,300.8	-1,341.3	-839.2	1,582.2	0.39	0.27	
8,600.0	0.70	204.50	8,400.8	-1,342.4	-839.7	1,583.4	0.02	0.02	
8,700.0	0.72	225.23	8,500.8	-1,343.4	-840.3	1,584.6	0.26	0.02	
8,800.0	0.97	238.33	8,600.8	-1,344.3	-841.6	1,586.1	0.32	0.26	
8,900.0	0.28	25.98	8,700.8	-1,344.5	-842.1	1,586.4	1.22	-0.69	
9,000.0	0.14	28.20	8,800.8	-1,344.2	-841.9	1,586.1	0.15	-0.15	
9,100.0	0.51	283.36	8,900.8	-1,343.9	-842.3	1,586.1	0.56	0.37	
9,200.0	1.04	274.29	9,000.8	-1,343.8	-843.6	1,586.7	0.54	0.53	
9,300.0	1.66	283.60	9,100.8	-1,343.4	-845.9	1,587.6	0.66	0.62	
9,400.0	1.55	284.06	9,200.7	-1,342.6	-849.1	1,588.5	0.11	-0.11	
9,500.0	0.84	278.84	9,300.7	-1,342.3	-850.6	1,589.1	0.72	-0.71	
9,600.0	1.38	291.64	9,400.7	-1,341.8	-852.6	1,589.7	0.60	0.55	
9,700.0	1.69	308.38	9,500.6	-1,340.5	-854.9	1,589.8	0.54	0.31	
9,800.0	1.67	318.33	9,600.6	-1,338.3	-857.1	1,589.2	0.29	-0.03	
9,900.0	1.23	310.77	9,700.6	-1,336.4	-858.8	1,588.5	0.47	-0.43	
9,951.1	1.16	314.60	9,751.7	-1,335.7	-859.6	1,588.3	0.21	-0.14	HMU Federal 16-14D2 BHL
10,000.0	1.10	318.69	9,800.5	-1,335.2	-860.3	1,588.3	0.21	-0.13	Last Cathedral Survey @ 10000' MD

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D2
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Original Well Elev)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Original Well Elev)
Well:	HMU Federal 16-14D2	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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 Federal 16-14D2 T	0.00	0.00	7,636.0	-1,348.4	-847.6	1,592,992.78	2,356,502.59	39.439366	-107.778707
- actual wellpath misses target center by 17.4ft at 7835.4ft MD (7636.3 TVD, -1335.1 N, -836.3 E)									
- Circle (radius 25.0)									
HMU Federal 16-14D2 E	0.00	0.00	9,752.0	-1,348.4	-847.6	1,592,992.78	2,356,502.59	39.439366	-107.778707
- actual wellpath misses target center by 17.5ft at 9951.1ft MD (9751.6 TVD, -1335.7 N, -859.6 E)									
- Circle (radius 60.0)									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
(ft)	(ft)	(ft)	(ft)	Comment	
10,000.0	9,800.5	-1,335.2	-860.3	Last Cathedral Survey @ 10000' MD	

Checked By: _____ Approved By: _____ Date: _____