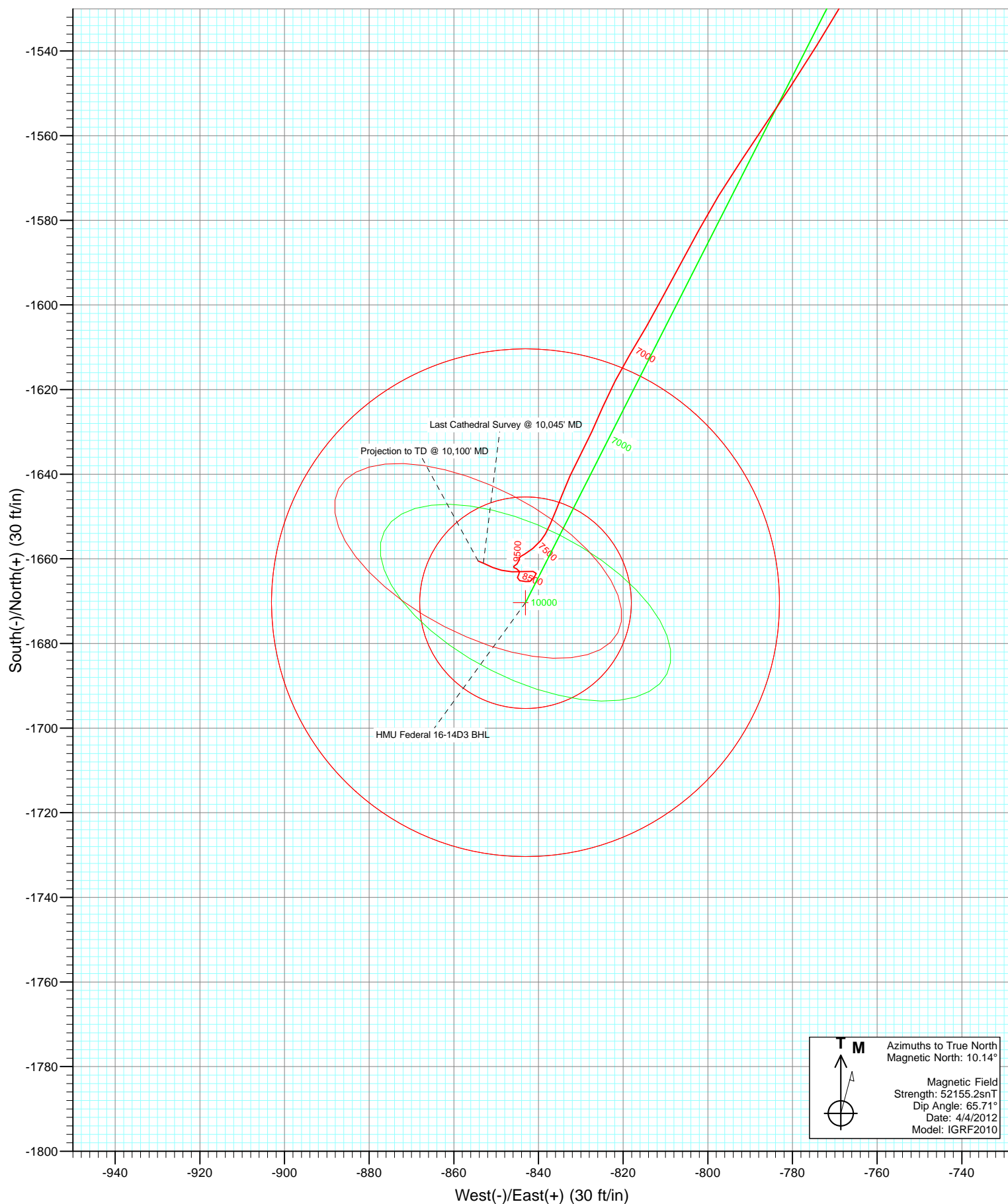


Azimuths to True North
 Magnetic North: 10.14°

Magnetic Field
 Strength: 52155.2snT
 Dip Angle: 65.71°
 Date: 4/4/2012
 Model: IGRF2010



Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D3
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Nabors M11)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Nabors M11)
Well:	HMU Federal 16-14D3	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 16-14D3					
Well Position	+N/-S	0.0 ft	Northing:	1,594,301.70 ft	Latitude:	39.443019
	+E/-W	0.0 ft	Easting:	2,357,381.52 ft	Longitude:	-107.775712
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)
	IGRF2010	4/4/2012	10.14	65.71	52,155

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	206.78	

Survey Program	Date	4/16/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
81.0	10,100.0	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		
81.0	0.40	159.80	81.0	-0.3	0.1	0.2	0.49	0.49		
112.0	0.40	174.00	112.0	-0.5	0.1	0.4	0.32	0.00		
204.0	0.60	26.80	204.0	-0.4	0.4	0.1	1.04	0.22		
295.0	0.80	341.90	295.0	0.7	0.4	-0.8	0.62	0.22		
388.0	0.60	316.00	388.0	1.6	-0.1	-1.4	0.40	-0.22		
419.0	0.70	294.20	419.0	1.8	-0.4	-1.4	0.85	0.32		
450.0	1.00	254.70	450.0	1.8	-0.8	-1.3	2.06	0.97		
480.0	1.50	220.40	480.0	1.5	-1.4	-0.7	2.93	1.67		
511.0	2.40	219.20	511.0	0.7	-2.0	0.3	2.91	2.90		
542.0	2.70	213.10	541.9	-0.5	-2.8	1.7	1.30	0.97		
572.0	3.30	207.60	571.9	-1.8	-3.6	3.3	2.22	2.00		
603.0	4.40	211.40	602.8	-3.6	-4.7	5.3	3.64	3.55		

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D3
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Nabors M11)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Nabors M11)
Well:	HMU Federal 16-14D3	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
634.0	4.80	210.30	633.7	-5.8	-5.9	7.8	1.32	1.29	
664.0	5.60	209.90	663.6	-8.1	-7.3	10.5	2.67	2.67	
695.0	6.50	209.20	694.4	-11.0	-8.9	13.8	2.91	2.90	
725.0	7.90	207.80	724.2	-14.3	-10.7	17.5	4.70	4.67	
755.0	8.80	206.80	753.9	-18.1	-12.7	21.9	3.04	3.00	
786.0	9.60	207.40	784.5	-22.5	-14.9	26.9	2.60	2.58	
817.0	10.70	206.80	815.0	-27.4	-17.4	32.3	3.56	3.55	
848.0	12.20	204.10	845.4	-33.0	-20.1	38.5	5.14	4.84	
878.0	13.50	202.60	874.6	-39.1	-22.7	45.1	4.47	4.33	
908.0	14.10	201.60	903.7	-45.7	-25.4	52.3	2.15	2.00	
939.0	14.50	201.00	933.8	-52.9	-28.2	59.9	1.38	1.29	
970.0	14.90	199.20	963.8	-60.2	-30.9	67.7	1.96	1.29	
1,000.0	15.30	203.10	992.7	-67.5	-33.7	75.5	3.64	1.33	
1,031.0	16.00	205.20	1,022.6	-75.2	-37.1	83.8	2.90	2.26	
1,123.0	16.50	208.00	1,110.9	-98.2	-48.7	109.6	1.01	0.54	
1,214.0	17.70	204.10	1,197.9	-122.2	-60.4	136.3	1.82	1.32	
1,306.0	18.60	203.70	1,285.3	-148.4	-72.0	164.9	0.99	0.98	
1,398.0	17.40	206.80	1,372.8	-174.1	-84.1	193.3	1.67	-1.30	
1,490.0	16.60	207.40	1,460.8	-198.1	-96.3	220.2	0.89	-0.87	
1,565.0	17.00	207.80	1,532.6	-217.3	-106.4	241.9	0.56	0.53	
1,647.0	17.00	208.30	1,611.0	-238.4	-117.7	265.9	0.18	0.00	
1,742.0	16.80	205.90	1,701.9	-263.0	-130.2	293.5	0.76	-0.21	
1,835.0	16.80	206.20	1,790.9	-287.2	-142.0	320.4	0.09	0.00	
1,930.0	16.30	203.90	1,882.0	-311.7	-153.5	347.4	0.87	-0.53	
2,025.0	16.30	203.80	1,973.2	-336.1	-164.3	374.0	0.03	0.00	
2,121.0	15.80	202.40	2,065.4	-360.5	-174.7	400.5	0.66	-0.52	
2,216.0	16.60	204.90	2,156.7	-384.7	-185.3	427.0	1.12	0.84	
2,311.0	16.40	206.90	2,247.8	-409.0	-197.1	454.0	0.63	-0.21	
2,407.0	16.40	205.00	2,339.8	-433.4	-209.0	481.1	0.56	0.00	
2,502.0	16.20	206.40	2,431.0	-457.4	-220.5	507.7	0.46	-0.21	
2,598.0	17.20	208.30	2,523.0	-481.9	-233.2	535.3	1.19	1.04	
2,693.0	17.10	207.10	2,613.8	-506.7	-246.2	563.3	0.39	-0.11	
2,788.0	16.20	208.00	2,704.8	-530.8	-258.8	590.5	0.99	-0.95	
2,884.0	17.30	207.10	2,796.7	-555.4	-271.6	618.2	1.18	1.15	
2,979.0	17.30	206.70	2,887.4	-580.6	-284.4	646.4	0.13	0.00	
3,075.0	16.50	205.90	2,979.3	-605.6	-296.8	674.3	0.87	-0.83	
3,170.0	16.60	204.80	3,070.3	-630.0	-308.4	701.4	0.35	0.11	
3,266.0	16.50	204.60	3,162.3	-654.9	-319.8	728.7	0.12	-0.10	
3,361.0	17.20	209.70	3,253.3	-679.3	-332.4	756.2	1.72	0.74	
3,456.0	16.80	209.50	3,344.1	-703.5	-346.1	784.0	0.43	-0.42	
3,552.0	16.60	208.90	3,436.1	-727.6	-359.5	811.5	0.28	-0.21	
3,647.0	15.80	209.20	3,527.3	-750.7	-372.4	838.0	0.85	-0.84	
3,742.0	14.20	209.30	3,619.0	-772.2	-384.4	862.6	1.68	-1.68	
3,838.0	14.70	210.60	3,712.0	-792.9	-396.4	886.5	0.62	0.52	
3,934.0	15.80	206.80	3,804.6	-815.1	-408.5	911.7	1.55	1.15	
4,028.0	16.40	206.60	3,894.9	-838.4	-420.2	937.8	0.64	0.64	
4,124.0	15.40	207.40	3,987.3	-861.8	-432.1	964.1	1.07	-1.04	
4,219.0	17.10	206.80	4,078.5	-885.5	-444.2	990.7	1.80	1.79	
4,315.0	16.50	207.50	4,170.4	-910.2	-456.9	1,018.4	0.66	-0.62	
4,410.0	15.50	206.70	4,261.7	-933.5	-468.8	1,044.6	1.08	-1.05	
4,506.0	15.60	205.30	4,354.2	-956.6	-480.1	1,070.3	0.40	0.10	
4,601.0	15.50	206.90	4,445.7	-979.5	-491.3	1,095.8	0.46	-0.11	
4,696.0	14.80	207.20	4,537.4	-1,001.6	-502.6	1,120.6	0.74	-0.74	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D3
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Nabors M11)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Nabors M11)
Well:	HMU Federal 16-14D3	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
4,791.0	14.30	204.70	4,629.4	-1,023.0	-513.0	1,144.5	0.84	-0.53	
4,887.0	16.00	205.00	4,722.0	-1,045.8	-523.6	1,169.5	1.77	1.77	
4,982.0	17.00	207.50	4,813.1	-1,070.0	-535.5	1,196.5	1.29	1.05	
5,077.0	16.00	208.30	4,904.2	-1,093.8	-548.1	1,223.5	1.08	-1.05	
5,172.0	17.30	210.20	4,995.2	-1,117.6	-561.5	1,250.7	1.48	1.37	
5,267.0	17.00	209.00	5,086.0	-1,141.9	-575.3	1,278.7	0.49	-0.32	
5,363.0	16.40	209.10	5,177.9	-1,166.0	-588.7	1,306.2	0.63	-0.62	
5,458.0	16.10	209.00	5,269.1	-1,189.3	-601.6	1,332.8	0.32	-0.32	
5,553.0	17.10	206.20	5,360.2	-1,213.3	-614.2	1,359.9	1.35	1.05	
5,649.0	16.70	204.50	5,452.0	-1,238.6	-626.1	1,387.8	0.66	-0.42	
5,742.0	16.30	205.20	5,541.2	-1,262.5	-637.2	1,414.2	0.48	-0.43	
5,838.0	16.20	206.10	5,633.4	-1,286.7	-648.8	1,441.1	0.28	-0.10	
5,933.0	17.50	204.40	5,724.3	-1,311.6	-660.6	1,468.6	1.46	1.37	
6,029.0	17.00	204.00	5,816.0	-1,337.6	-672.2	1,497.0	0.54	-0.52	
6,124.0	15.50	204.40	5,907.2	-1,361.9	-683.1	1,523.6	1.58	-1.58	
6,219.0	17.10	205.30	5,998.4	-1,386.1	-694.3	1,550.2	1.71	1.68	
6,314.0	16.30	205.70	6,089.3	-1,410.7	-706.1	1,577.5	0.85	-0.84	
6,410.0	17.60	207.40	6,181.2	-1,435.7	-718.6	1,605.5	1.45	1.35	
6,504.0	16.50	207.50	6,271.0	-1,460.2	-731.3	1,633.1	1.17	-1.17	
6,600.0	16.30	207.50	6,363.1	-1,484.2	-743.8	1,660.2	0.21	-0.21	
6,695.0	15.60	208.60	6,454.5	-1,507.3	-756.1	1,686.3	0.80	-0.74	
6,790.0	14.60	210.50	6,546.2	-1,528.8	-768.3	1,711.0	1.17	-1.05	
6,885.0	13.50	213.30	6,638.4	-1,548.4	-780.5	1,734.0	1.36	-1.16	
6,981.0	11.90	214.10	6,732.0	-1,565.9	-792.2	1,754.9	1.68	-1.67	
7,077.0	11.30	208.40	6,826.0	-1,582.4	-802.2	1,774.1	1.35	-0.62	
7,172.0	10.20	208.30	6,919.4	-1,598.0	-810.6	1,791.8	1.16	-1.16	
7,267.0	8.90	211.20	7,013.1	-1,611.7	-818.4	1,807.6	1.46	-1.37	
7,362.0	8.00	203.00	7,107.0	-1,624.1	-824.8	1,821.5	1.58	-0.95	
7,458.0	7.10	207.40	7,202.2	-1,635.5	-830.1	1,834.1	1.11	-0.94	
7,553.0	5.40	200.90	7,296.6	-1,644.9	-834.4	1,844.4	1.94	-1.79	
7,648.0	3.60	203.70	7,391.3	-1,651.8	-837.2	1,851.8	1.91	-1.89	
7,743.0	1.90	222.10	7,486.2	-1,655.7	-839.5	1,856.3	1.99	-1.79	
7,757.1	1.81	222.88	7,500.3	-1,656.0	-839.8	1,856.8	0.67	-0.64	HMU Federal 16-14D3 TOG
7,838.0	1.30	229.40	7,581.2	-1,657.6	-841.3	1,858.9	0.67	-0.63	
7,933.0	1.50	241.30	7,676.2	-1,658.9	-843.3	1,860.9	0.37	0.21	
8,029.0	0.40	209.90	7,772.1	-1,659.7	-844.5	1,862.2	1.23	-1.15	
8,124.0	0.50	179.40	7,867.2	-1,660.4	-844.7	1,862.9	0.27	0.11	
8,219.0	0.60	229.10	7,962.1	-1,661.2	-845.1	1,863.8	0.50	0.11	
8,314.0	0.60	238.40	8,057.1	-1,661.8	-845.9	1,864.7	0.10	0.00	
8,409.0	0.60	93.60	8,152.1	-1,662.1	-845.8	1,864.9	1.20	0.00	
8,504.0	0.30	157.20	8,247.1	-1,662.3	-845.2	1,864.8	0.57	-0.32	
8,599.0	0.30	105.90	8,342.1	-1,662.6	-844.9	1,865.0	0.27	0.00	
8,694.0	0.40	162.20	8,437.1	-1,663.0	-844.5	1,865.1	0.36	0.11	
8,789.0	0.40	217.80	8,532.1	-1,663.6	-844.6	1,865.7	0.39	0.00	
8,885.0	0.70	196.20	8,628.1	-1,664.4	-845.0	1,866.6	0.37	0.31	
8,980.0	0.90	103.20	8,723.1	-1,665.1	-844.4	1,867.0	1.23	0.21	
9,075.0	0.80	92.90	8,818.1	-1,665.3	-843.0	1,866.6	0.19	-0.11	
9,171.0	0.40	79.30	8,914.1	-1,665.3	-842.0	1,866.1	0.44	-0.42	
9,266.0	0.60	28.80	9,009.1	-1,664.8	-841.5	1,865.4	0.49	0.21	
9,361.0	0.50	52.00	9,104.1	-1,664.1	-840.9	1,864.5	0.25	-0.11	
9,457.0	0.50	8.40	9,200.1	-1,663.5	-840.5	1,863.7	0.39	0.00	
9,552.0	1.00	275.00	9,295.1	-1,663.0	-841.3	1,863.7	1.20	0.53	
9,647.0	1.70	266.30	9,390.1	-1,663.0	-843.5	1,864.7	0.77	0.74	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-14D3
Project:	Mamm Creek	TVD Reference:	KBE @ 7667.0ft (Nabors M11)
Site:	J16W Pad	MD Reference:	KBE @ 7667.0ft (Nabors M11)
Well:	HMU Federal 16-14D3	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
9,742.0	1.60	272.20	9,485.0	-1,663.0	-846.2	1,865.9	0.21	-0.11	
9,838.0	1.40	284.30	9,581.0	-1,662.7	-848.7	1,866.8	0.39	-0.21	
9,933.0	1.20	291.00	9,676.0	-1,662.0	-850.8	1,867.1	0.26	-0.21	
10,029.0	1.30	297.50	9,771.9	-1,661.2	-852.7	1,867.2	0.18	0.10	
10,045.0	1.40	293.90	9,787.9	-1,661.0	-853.0	1,867.2	0.82	0.62	Last Cathedral Survey @ 10,045' MD - HMU Fed Projection to TD @ 10,100' MD
10,100.0	1.40	293.90	9,842.9	-1,660.5	-854.2	1,867.3	0.00	0.00	

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
HMU Federal 16-14D3 T	0.00	0.00	7,500.0	-1,670.4	-843.1	1,592,652.99	2,356,496.89	39.438433	-107.778697
- actual wellpath misses target center by 14.7ft at 7757.1ft MD (7500.3 TVD, -1656.0 N, -839.8 E)									
- Circle (radius 25.0)									
HMU Federal 16-14D3 E	0.00	0.00	9,807.0	-1,670.4	-843.1	1,592,652.99	2,356,496.89	39.438433	-107.778697
- actual wellpath misses target center by 23.5ft at 10045.0ft MD (9787.9 TVD, -1661.0 N, -853.0 E)									
- Circle (radius 60.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
10,045.0	9,787.9	-1,661.0	-853.0	Last Cathedral Survey @ 10,045' MD	
10,100.0	9,842.9	-1,660.5	-854.2	Projection to TD @ 10,100' MD	

Checked By: _____	Approved By: _____	Date: _____
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