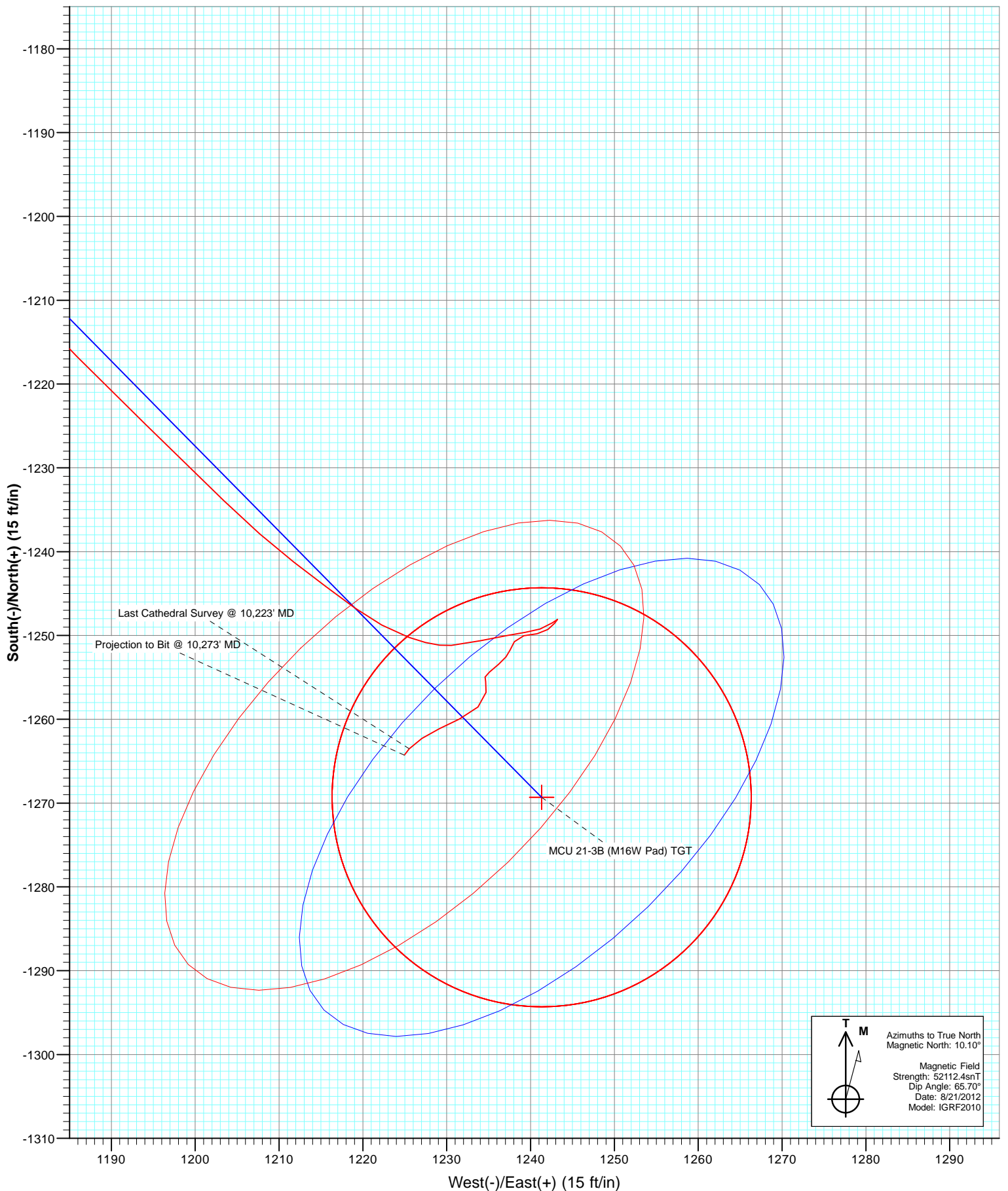


Azimuths to True North
 Magnetic North: 10.10°

Magnetic Field
 Strength: 52112.4snT
 Dip Angle: 65.70°
 Date: 8/21/2012
 Model: IGRF2010



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU 21-3B (M16W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7903.0ft (Patterson 308)
Site:	M16W Pad (SWSW S16-T7S-R93W)	MD Reference:	KBE @ 7903.0ft (Patterson 308)
Well:	MCU 21-3B (M16W Pad)	North Reference:	True
Wellbore:	DD	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	M16W Pad (SWSW S16-T7S-R93W)			
Site Position:		Northing:	1,593,196.15 ft	Latitude: 39.439834
From:	Lat/Long	Easting:	2,355,193.71 ft	Longitude: -107.783358
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence: -1.44 °

Well	MCU 21-3B (M16W Pad)			
Well Position	+N/-S	0.0 ft	Northing:	1,593,308.43 ft
	+E/-W	0.0 ft	Easting:	2,355,278.46 ft
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft
			Ground Level:	7,881.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/21/2012	10.10	65.70	52,112

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	135.64

Survey Program	Date	9/16/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
206.0	1,105.0	Survey #1 (DD)	MWD	Geolink MWD	
1,161.0	10,273.0	Survey #2 (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	
206.0	0.40	24.10	206.0	0.7	0.3	-0.3	0.19	0.19	
237.0	0.40	29.20	237.0	0.8	0.4	-0.3	0.11	0.00	
267.0	0.30	11.60	267.0	1.0	0.5	-0.4	0.49	-0.33	
298.0	0.70	112.50	298.0	1.0	0.6	-0.3	2.62	1.29	
328.0	1.90	140.10	328.0	0.6	1.1	0.4	4.40	4.00	
359.0	3.60	134.90	359.0	-0.5	2.2	1.9	5.54	5.48	
389.0	4.40	131.70	388.9	-1.9	3.7	4.0	2.77	2.67	
480.0	7.20	134.90	479.4	-8.3	10.3	13.1	3.10	3.08	
571.0	9.70	133.80	569.4	-17.6	19.9	26.5	2.75	2.75	
663.0	12.60	136.30	659.7	-30.2	32.4	44.3	3.19	3.15	
755.0	14.00	141.10	749.2	-46.2	46.4	65.4	1.94	1.52	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU 21-3B (M16W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7903.0ft (Patterson 308)
Site:	M16W Pad (SWSW S16-T7S-R93W)	MD Reference:	KBE @ 7903.0ft (Patterson 308)
Well:	MCU 21-3B (M16W Pad)	North Reference:	True
Wellbore:	DD	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
846.0	14.00	140.80	837.5	-63.3	60.2	87.3	0.08	0.00	
937.0	14.50	138.40	925.7	-80.3	74.7	109.7	0.85	0.55	
1,029.0	14.20	139.10	1,014.8	-97.4	89.8	132.4	0.38	-0.33	
1,105.0	13.70	139.10	1,088.6	-111.3	101.8	150.7	0.66	-0.66	
1,161.0	13.50	142.60	1,143.0	-121.5	110.1	163.8	1.51	-0.36	
1,253.0	13.30	142.30	1,232.5	-138.4	123.1	185.0	0.23	-0.22	
1,345.0	13.10	141.80	1,322.1	-155.0	136.0	205.9	0.25	-0.22	
1,436.0	15.10	138.00	1,410.3	-171.9	150.3	228.0	2.42	2.20	
1,528.0	16.90	134.60	1,498.8	-190.2	167.9	253.3	2.21	1.96	
1,619.0	16.20	134.10	1,586.0	-208.3	186.4	279.2	0.78	-0.77	
1,711.0	16.20	133.60	1,674.3	-226.1	204.9	304.9	0.15	0.00	
1,802.0	15.70	133.20	1,761.8	-243.3	223.1	329.9	0.56	-0.55	
1,894.0	15.40	131.80	1,850.5	-259.9	241.2	354.5	0.52	-0.33	
1,985.0	14.70	129.90	1,938.4	-275.4	259.1	378.1	0.94	-0.77	
2,077.0	14.50	130.60	2,027.4	-290.4	276.8	401.1	0.29	-0.22	
2,169.0	14.20	130.00	2,116.5	-305.1	294.2	423.8	0.36	-0.33	
2,260.0	13.30	128.60	2,204.9	-318.8	310.9	445.3	1.05	-0.99	
2,352.0	13.20	127.60	2,294.5	-331.8	327.5	466.2	0.27	-0.11	
2,443.0	13.70	130.90	2,383.0	-345.2	343.9	487.3	1.01	0.55	
2,535.0	14.60	133.50	2,472.2	-360.3	360.5	509.7	1.20	0.98	
2,626.0	15.60	141.30	2,560.0	-377.8	376.5	533.4	2.49	1.10	
2,718.0	15.60	140.90	2,648.6	-397.0	392.1	558.0	0.12	0.00	
2,809.0	15.20	140.20	2,736.4	-415.7	407.4	582.1	0.48	-0.44	
2,901.0	14.90	139.80	2,825.2	-434.0	422.8	605.9	0.35	-0.33	
2,992.0	13.80	141.10	2,913.4	-451.4	437.1	628.4	1.26	-1.21	
3,084.0	12.70	139.80	3,002.9	-467.7	450.5	649.4	1.24	-1.20	
3,175.0	12.10	141.10	3,091.8	-482.7	463.0	668.8	0.73	-0.66	
3,267.0	11.60	139.50	3,181.8	-497.3	475.1	687.7	0.65	-0.54	
3,358.0	13.20	135.00	3,270.7	-511.6	488.3	707.2	2.05	1.76	
3,450.0	15.00	135.30	3,359.9	-527.5	504.2	729.6	1.96	1.96	
3,542.0	13.80	134.30	3,449.1	-543.6	520.4	752.5	1.33	-1.30	
3,633.0	16.00	134.20	3,537.0	-559.9	537.1	775.9	2.42	2.42	
3,725.0	15.60	134.10	3,625.5	-577.4	555.1	800.9	0.44	-0.43	
3,816.0	14.90	133.90	3,713.3	-594.0	572.3	824.8	0.77	-0.77	
3,907.0	14.20	133.40	3,801.4	-609.8	588.9	847.7	0.78	-0.77	
3,998.0	13.20	134.40	3,889.8	-624.7	604.4	869.2	1.13	-1.10	
4,090.0	12.50	135.70	3,979.5	-639.2	618.9	889.7	0.82	-0.76	
4,181.0	15.10	136.20	4,067.9	-654.8	633.9	911.4	2.86	2.86	
4,273.0	14.60	136.50	4,156.8	-671.8	650.2	935.0	0.55	-0.54	
4,364.0	13.80	137.10	4,245.0	-688.1	665.5	957.3	0.89	-0.88	
4,456.0	12.60	138.00	4,334.6	-703.6	679.7	978.3	1.32	-1.30	
4,547.0	14.90	134.70	4,423.0	-719.2	694.6	999.9	2.67	2.53	
4,639.0	14.30	135.70	4,512.0	-735.7	711.0	1,023.1	0.71	-0.65	
4,730.0	13.10	135.80	4,600.4	-751.1	726.0	1,044.6	1.32	-1.32	
4,822.0	16.40	134.20	4,689.4	-767.6	742.6	1,068.0	3.61	3.59	
4,913.0	15.60	134.30	4,776.8	-785.1	760.6	1,093.1	0.88	-0.88	
5,005.0	14.90	133.00	4,865.6	-801.8	778.1	1,117.3	0.85	-0.76	
5,096.0	13.70	132.60	4,953.8	-817.1	794.6	1,139.8	1.32	-1.32	
5,188.0	13.10	132.90	5,043.3	-831.6	810.2	1,161.0	0.66	-0.65	
5,280.0	15.90	135.40	5,132.3	-847.7	826.7	1,184.1	3.12	3.04	
5,371.0	14.50	135.50	5,220.1	-864.7	843.5	1,207.9	1.54	-1.54	
5,463.0	13.30	137.30	5,309.4	-880.7	858.7	1,230.0	1.39	-1.30	
5,554.0	17.10	136.90	5,397.2	-898.1	875.0	1,253.9	4.18	4.18	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU 21-3B (M16W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7903.0ft (Patterson 308)
Site:	M16W Pad (SWSW S16-T7S-R93W)	MD Reference:	KBE @ 7903.0ft (Patterson 308)
Well:	MCU 21-3B (M16W Pad)	North Reference:	True
Wellbore:	DD	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
5,646.0	16.20	136.70	5,485.4	-917.3	893.0	1,280.2	0.98	-0.98	
5,737.0	15.20	135.20	5,573.0	-935.1	910.1	1,304.8	1.19	-1.10	
5,829.0	13.80	136.50	5,662.1	-951.6	926.2	1,327.9	1.56	-1.52	
5,920.0	16.80	134.40	5,749.8	-968.6	943.0	1,351.9	3.35	3.30	
6,012.0	16.40	134.60	5,838.0	-987.1	961.8	1,378.2	0.44	-0.43	
6,104.0	15.30	133.80	5,926.5	-1,004.6	979.8	1,403.3	1.22	-1.20	
6,195.0	14.80	134.40	6,014.4	-1,021.0	996.8	1,426.9	0.58	-0.55	
6,286.0	13.50	135.70	6,102.6	-1,036.8	1,012.5	1,449.1	1.47	-1.43	
6,378.0	12.00	135.80	6,192.3	-1,051.3	1,026.7	1,469.4	1.63	-1.63	
6,470.0	10.90	134.80	6,282.5	-1,064.3	1,039.5	1,487.7	1.21	-1.20	
6,561.0	12.30	126.60	6,371.6	-1,076.1	1,053.4	1,505.9	2.37	1.54	
6,653.0	14.30	130.60	6,461.2	-1,089.4	1,069.9	1,526.9	2.39	2.17	
6,744.0	13.50	137.70	6,549.5	-1,104.5	1,085.6	1,548.7	2.07	-0.88	
6,836.0	15.10	139.60	6,638.7	-1,121.6	1,100.6	1,571.4	1.81	1.74	
6,928.0	13.10	140.10	6,727.9	-1,138.7	1,115.0	1,593.7	2.18	-2.17	
7,020.0	11.40	137.00	6,817.8	-1,153.4	1,127.9	1,613.2	1.98	-1.85	
7,111.0	9.70	138.10	6,907.3	-1,165.7	1,139.2	1,629.9	1.88	-1.87	
7,203.0	11.60	136.80	6,997.7	-1,178.2	1,150.7	1,646.9	2.08	2.07	
7,295.0	11.00	139.60	7,087.9	-1,191.6	1,162.7	1,664.9	0.88	-0.65	
7,386.0	9.60	136.90	7,177.4	-1,203.8	1,173.5	1,681.1	1.63	-1.54	
7,478.0	9.10	135.90	7,268.2	-1,214.6	1,183.8	1,696.1	0.57	-0.54	
7,497.0	9.20	135.20	7,286.9	-1,216.8	1,185.9	1,699.1	0.79	0.53	
7,569.0	8.90	134.10	7,358.1	-1,224.7	1,194.0	1,710.4	0.48	-0.42	
7,661.0	7.60	134.40	7,449.1	-1,233.9	1,203.4	1,723.6	1.41	-1.41	
7,752.0	6.40	127.70	7,539.4	-1,241.2	1,211.7	1,734.6	1.59	-1.32	
7,844.0	5.00	126.00	7,631.0	-1,246.7	1,219.0	1,743.7	1.53	-1.52	
7,935.0	4.30	109.90	7,721.7	-1,250.2	1,225.5	1,750.7	1.62	-0.77	
8,027.0	2.30	83.50	7,813.5	-1,251.2	1,230.5	1,754.9	2.68	-2.17	
8,101.7	2.13	79.38	7,888.2	-1,250.8	1,233.4	1,756.6	0.31	-0.22	MCU 21-3B (M16W Pad) TGT
8,118.0	2.10	78.40	7,904.4	-1,250.6	1,234.0	1,756.9	0.31	-0.21	
8,210.0	1.80	79.20	7,996.4	-1,250.0	1,237.1	1,758.6	0.33	-0.33	
8,301.0	1.20	80.90	8,087.4	-1,249.6	1,239.4	1,760.0	0.66	-0.66	
8,393.0	1.00	73.00	8,179.3	-1,249.2	1,241.1	1,760.9	0.27	-0.22	
8,484.0	1.10	54.80	8,270.3	-1,248.5	1,242.6	1,761.4	0.38	0.11	
8,576.0	0.20	225.50	8,362.3	-1,248.1	1,243.2	1,761.5	1.41	-0.98	
8,667.0	0.50	211.50	8,453.3	-1,248.5	1,242.9	1,761.6	0.34	0.33	
8,759.0	0.90	236.10	8,545.3	-1,249.3	1,242.1	1,761.6	0.53	0.43	
8,850.0	0.90	261.30	8,636.3	-1,249.8	1,240.8	1,761.1	0.43	0.00	
8,942.0	1.10	261.60	8,728.3	-1,250.0	1,239.2	1,760.1	0.22	0.22	
9,033.0	0.80	203.90	8,819.3	-1,250.7	1,238.1	1,759.8	1.05	-0.33	
9,125.0	0.60	211.50	8,911.3	-1,251.7	1,237.5	1,760.2	0.24	-0.22	
9,216.0	0.60	211.60	9,002.3	-1,252.6	1,237.1	1,760.4	0.00	0.00	
9,307.0	1.00	232.10	9,093.3	-1,253.4	1,236.2	1,760.5	0.53	0.44	
9,399.0	0.80	226.40	9,185.2	-1,254.4	1,235.1	1,760.4	0.24	-0.22	
9,490.0	0.20	197.60	9,276.2	-1,255.0	1,234.6	1,760.4	0.69	-0.66	
9,582.0	0.10	56.00	9,368.2	-1,255.1	1,234.6	1,760.5	0.31	-0.11	
9,674.0	0.60	180.40	9,460.2	-1,255.5	1,234.6	1,760.9	0.72	0.54	
9,765.0	1.00	177.30	9,551.2	-1,256.8	1,234.7	1,761.8	0.44	0.44	
9,857.0	1.70	226.70	9,643.2	-1,258.5	1,233.7	1,762.4	1.41	0.76	
9,948.0	1.70	247.20	9,734.2	-1,260.0	1,231.5	1,761.9	0.66	0.00	
10,040.0	1.60	241.40	9,826.1	-1,261.1	1,229.1	1,761.0	0.21	-0.11	
10,131.0	1.40	240.50	9,917.1	-1,262.3	1,227.0	1,760.4	0.22	-0.22	
10,217.7	1.11	219.02	10,003.8	-1,263.4	1,225.6	1,760.2	0.63	-0.33	MCU 21-3B (M16W Pad) BHL

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU 21-3B (M16W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7903.0ft (Patterson 308)
Site:	M16W Pad (SWSW S16-T7S-R93W)	MD Reference:	KBE @ 7903.0ft (Patterson 308)
Well:	MCU 21-3B (M16W Pad)	North Reference:	True
Wellbore:	DD	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
10,223.0	1.10	217.40	10,009.1	-1,263.5	1,225.5	1,760.2	0.63	-0.21	Last Cathedral Survey @ 10,223' MD
10,273.0	1.10	217.40	10,059.1	-1,264.3	1,224.9	1,760.3	0.00	0.00	Projection to Bit @ 10,273' MD

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
MCU 21-3B (M16W Pad - actual wellpath misses target center by 20.2ft at 8101.7ft MD (7888.2 TVD, -1250.8 N, 1233.4 E) - Circle (radius 25.0)	0.00	0.00	7,888.0	-1,269.3	1,241.3	1,592,008.33	2,356,487.50	39.436663	-107.778673
MCU 21-3B (M16W Pad - actual wellpath misses target center by 16.8ft at 10217.8ft MD (10003.9 TVD, -1263.4 N, 1225.6 E) - Circle (radius 25.0)	0.00	0.00	10,004.0	-1,269.3	1,241.3	1,592,008.33	2,356,487.50	39.436663	-107.778673

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
10,223.0	10,009.1	-1,263.5	1,225.5	Last Cathedral Survey @ 10,223' MD
10,273.0	10,059.1	-1,264.3	1,224.9	Projection to Bit @ 10,273' MD

Checked By: _____ Approved By: _____ Date: _____