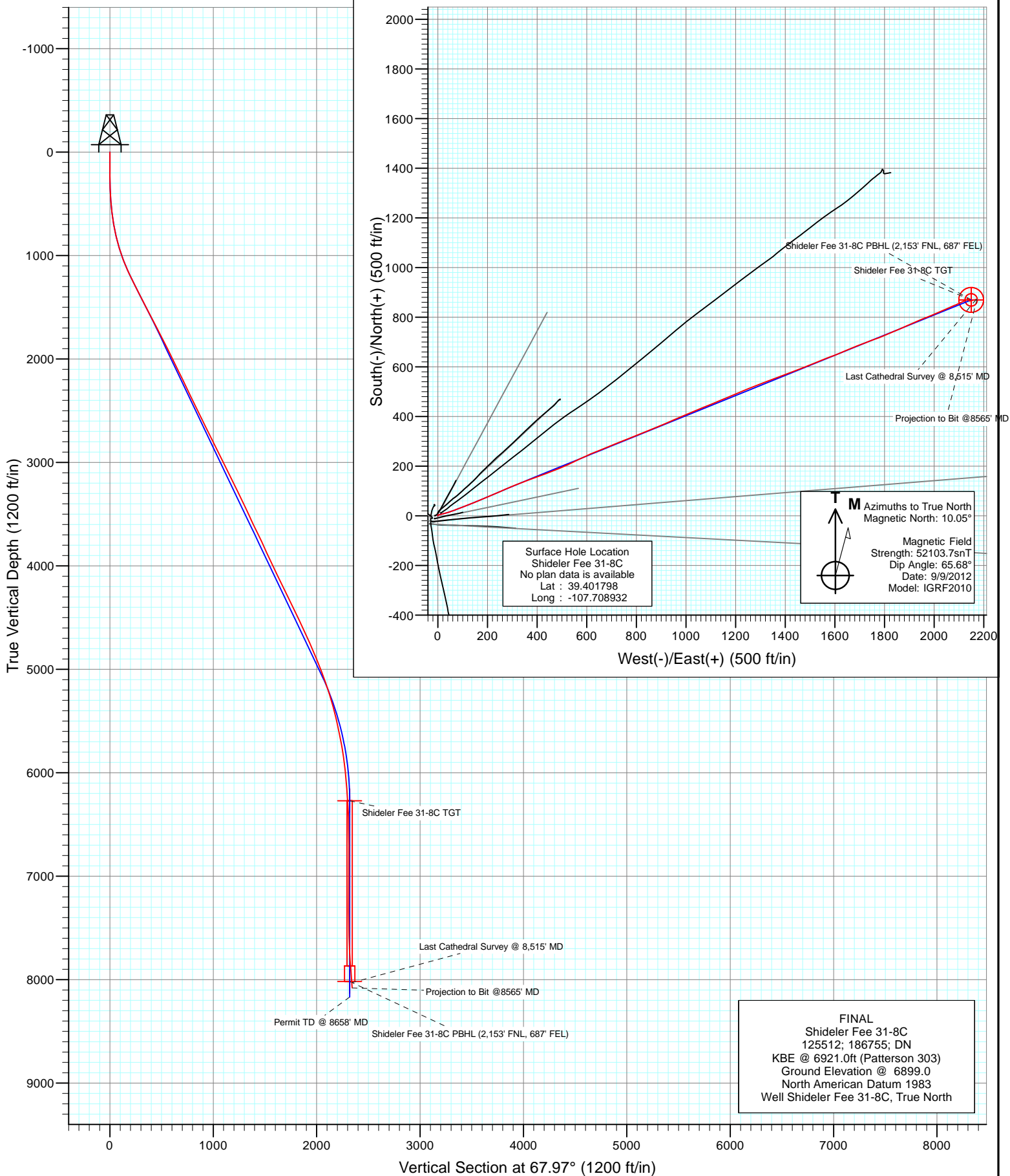
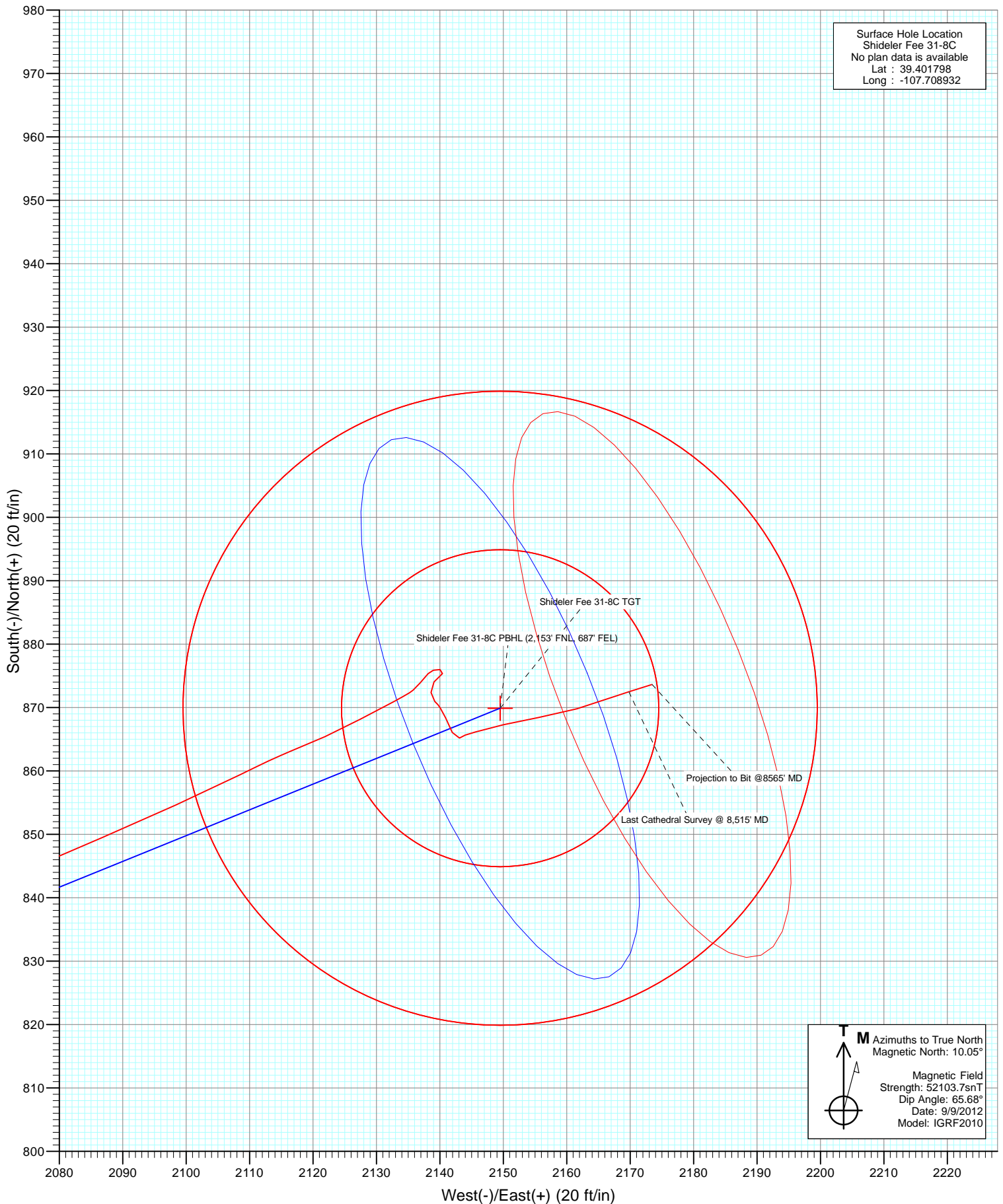




Project: Mamm Creek
 Site: K31E Pad
 Well: Shideler Fee 31-8C
 Wellbore: DD
 Design: FINAL





Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Shideler Fee 31-8C
Project:	Mamm Creek	TVD Reference:	KBE @ 6921.0ft (Patterson 303)
Site:	K31E Pad	MD Reference:	KBE @ 6921.0ft (Patterson 303)
Well:	Shideler Fee 31-8C	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		K31E Pad			
Site Position:		Northing:	1,578,791.89 ft	Latitude:	39.401699
From:	Lat/Long	Easting:	2,375,816.61 ft	Longitude:	-107.709119
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.39 °

Well	Shideler Fee 31-8C					
Well Position	+N/-S	0.0 ft	Northing:	1,578,826.63 ft	Latitude:	39.401798
	+E/-W	0.0 ft	Easting:	2,375,870.32 ft	Longitude:	-107.708932
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,899.0 ft

Wellbore		DD			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/9/2012	10.05	65.68	52,104

Design	FINAL			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	67.97

Survey Program		Date	9/16/2012		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
110.0	1,492.0	Survey #1 (DD)	MWD	Geolink MWD	
1,620.0	8,565.0	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	
110.0	0.80	341.80	110.0	0.7	-0.2	0.1	0.73	0.73	
141.0	0.70	347.60	141.0	1.1	-0.3	0.1	0.40	-0.32	
171.0	0.60	357.50	171.0	1.5	-0.4	0.2	0.50	-0.33	
202.0	0.70	20.70	202.0	1.8	-0.3	0.4	0.90	0.32	
232.0	0.40	11.20	232.0	2.1	-0.2	0.5	1.04	-1.00	
263.0	0.60	52.80	263.0	2.3	-0.1	0.8	1.29	0.65	
294.0	1.00	52.50	294.0	2.5	0.2	1.2	1.29	1.29	
325.0	1.40	58.20	325.0	2.9	0.8	1.8	1.34	1.29	
356.0	1.80	63.90	356.0	3.3	1.5	2.7	1.39	1.29	
386.0	2.40	71.00	385.9	3.7	2.6	3.8	2.18	2.00	
417.0	3.00	69.60	416.9	4.2	3.9	5.2	1.95	1.94	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Shideler Fee 31-8C
Project:	Mamm Creek	TVD Reference:	KBE @ 6921.0ft (Patterson 303)
Site:	K31E Pad	MD Reference:	KBE @ 6921.0ft (Patterson 303)
Well:	Shideler Fee 31-8C	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
448.0	3.80	75.00	447.9	4.8	5.7	7.1	2.78	2.58	
479.0	4.70	74.70	478.8	5.4	7.9	9.3	2.90	2.90	
570.0	6.50	78.30	569.3	7.4	16.5	18.1	2.01	1.98	
663.0	8.80	75.80	661.5	10.2	28.6	30.3	2.50	2.47	
755.0	11.60	71.80	752.0	14.8	44.2	46.5	3.14	3.04	
847.0	13.90	70.00	841.8	21.5	63.4	66.8	2.54	2.50	
939.0	17.00	68.60	930.4	30.2	86.3	91.3	3.39	3.37	
1,031.0	20.00	68.70	1,017.7	40.8	113.5	120.5	3.26	3.26	
1,124.0	23.10	68.10	1,104.2	53.4	145.2	154.7	3.34	3.33	
1,216.0	25.20	67.40	1,188.1	67.7	180.1	192.3	2.30	2.28	
1,308.0	26.30	67.20	1,271.0	83.1	216.9	232.3	1.20	1.20	
1,400.0	26.70	66.80	1,353.3	99.1	254.7	273.3	0.48	0.43	
1,492.0	27.70	67.20	1,435.1	115.5	293.4	315.3	1.10	1.09	
1,620.0	28.60	68.50	1,548.0	138.3	349.4	375.7	0.85	0.70	
1,712.0	26.80	69.80	1,629.4	153.5	389.3	418.5	2.06	-1.96	
1,803.0	26.60	70.30	1,710.7	167.5	427.8	459.3	0.33	-0.22	
1,895.0	26.80	69.90	1,792.9	181.6	466.6	500.7	0.29	0.22	
1,987.0	26.70	65.50	1,875.1	197.3	504.9	542.0	2.15	-0.11	
2,078.0	27.00	64.20	1,956.3	214.7	542.1	583.1	0.72	0.33	
2,169.0	26.10	64.40	2,037.7	232.4	578.8	623.7	0.99	-0.99	
2,261.0	26.50	67.40	2,120.2	249.0	616.0	664.4	1.51	0.43	
2,352.0	26.20	68.00	2,201.7	264.3	653.3	704.8	0.44	-0.33	
2,444.0	26.30	67.40	2,284.2	279.8	691.0	745.5	0.31	0.11	
2,536.0	25.90	67.90	2,366.8	295.2	728.4	785.9	0.50	-0.43	
2,628.0	25.10	68.60	2,449.9	309.8	765.2	825.5	0.93	-0.87	
2,719.0	26.00	68.20	2,532.0	324.3	801.7	864.8	1.01	0.99	
2,811.0	25.60	67.90	2,614.8	339.3	838.8	904.8	0.46	-0.43	
2,903.0	26.50	67.40	2,697.4	354.6	876.2	945.2	1.01	0.98	
2,994.0	26.70	66.90	2,778.8	370.4	913.7	986.0	0.33	0.22	
3,086.0	26.70	66.70	2,861.0	386.7	951.7	1,027.3	0.10	0.00	
3,177.0	26.00	66.70	2,942.6	402.7	988.8	1,067.7	0.77	-0.77	
3,269.0	26.80	67.40	3,025.0	418.7	1,026.5	1,108.6	0.93	0.87	
3,360.0	26.50	67.50	3,106.3	434.3	1,064.2	1,149.4	0.33	-0.33	
3,452.0	26.30	67.60	3,188.7	449.9	1,102.0	1,190.3	0.22	-0.22	
3,544.0	26.20	67.40	3,271.2	465.5	1,139.6	1,231.0	0.15	-0.11	
3,635.0	25.60	67.40	3,353.1	480.8	1,176.3	1,270.7	0.66	-0.66	
3,727.0	25.40	67.20	3,436.1	496.1	1,212.8	1,310.3	0.24	-0.22	
3,818.0	24.80	67.20	3,518.5	511.0	1,248.4	1,348.9	0.66	-0.66	
3,909.0	26.00	69.10	3,600.7	525.5	1,284.6	1,388.0	1.59	1.32	
4,001.0	25.80	69.30	3,683.5	539.8	1,322.2	1,428.1	0.24	-0.22	
4,092.0	25.30	69.30	3,765.6	553.7	1,358.9	1,467.4	0.55	-0.55	
4,184.0	25.10	68.90	3,848.8	567.7	1,395.5	1,506.6	0.29	-0.22	
4,276.0	24.00	69.70	3,932.5	581.2	1,431.3	1,544.8	1.25	-1.20	
4,367.0	25.20	68.50	4,015.2	594.7	1,466.7	1,582.6	1.43	1.32	
4,459.0	26.20	68.50	4,098.1	609.3	1,503.8	1,622.5	1.09	1.09	
4,550.0	25.70	67.10	4,180.0	624.4	1,540.6	1,662.3	0.87	-0.55	
4,642.0	26.60	69.90	4,262.5	639.2	1,578.4	1,702.9	1.66	0.98	
4,734.0	25.40	67.60	4,345.2	653.8	1,616.0	1,743.2	1.70	-1.30	
4,825.0	26.70	67.20	4,427.0	669.2	1,652.8	1,783.2	1.44	1.43	
4,917.0	25.80	67.90	4,509.5	684.7	1,690.4	1,823.8	1.03	-0.98	
5,008.0	25.10	69.50	4,591.7	698.9	1,726.9	1,862.9	1.08	-0.77	
5,100.0	23.80	70.20	4,675.4	712.0	1,762.6	1,901.0	1.45	-1.41	
5,191.0	23.50	67.80	4,758.8	725.1	1,796.7	1,937.5	1.11	-0.33	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Shideler Fee 31-8C
Project:	Mamm Creek	TVD Reference:	KBE @ 6921.0ft (Patterson 303)
Site:	K31E Pad	MD Reference:	KBE @ 6921.0ft (Patterson 303)
Well:	Shideler Fee 31-8C	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
5,282.0	23.20	66.60	4,842.3	739.1	1,829.9	1,973.6	0.62	-0.33	
5,374.0	22.20	66.10	4,927.2	753.3	1,862.5	2,009.0	1.11	-1.09	
5,466.0	20.60	66.50	5,012.9	766.8	1,893.2	2,042.6	1.75	-1.74	
5,557.0	19.70	66.80	5,098.3	779.2	1,922.0	2,073.9	1.00	-0.99	
5,649.0	19.30	66.10	5,185.0	791.5	1,950.1	2,104.6	0.50	-0.43	
5,740.0	16.60	68.90	5,271.6	802.3	1,976.0	2,132.7	3.11	-2.97	
5,832.0	14.70	67.40	5,360.2	811.5	1,999.1	2,157.5	2.11	-2.07	
5,923.0	14.20	66.50	5,448.3	820.4	2,019.9	2,180.2	0.60	-0.55	
6,015.0	11.90	65.60	5,537.9	828.8	2,038.9	2,200.9	2.51	-2.50	
6,107.0	11.80	65.80	5,627.9	836.6	2,056.2	2,219.8	0.12	-0.11	
6,199.0	10.50	68.20	5,718.2	843.5	2,072.5	2,237.6	1.50	-1.41	
6,291.0	8.70	66.30	5,808.9	849.5	2,086.7	2,252.9	1.99	-1.96	
6,383.0	7.30	66.10	5,900.0	854.6	2,098.4	2,265.7	1.52	-1.52	
6,474.0	6.90	63.30	5,990.3	859.4	2,108.6	2,277.0	0.58	-0.44	
6,566.0	3.80	68.00	6,081.9	863.0	2,116.3	2,285.5	3.40	-3.37	
6,658.0	3.70	65.80	6,173.7	865.4	2,121.9	2,291.5	0.19	-0.11	
6,749.0	4.10	62.10	6,264.5	868.1	2,127.4	2,297.7	0.52	0.44	
6,757.3	4.05	62.12	6,272.8	868.4	2,127.9	2,298.3	0.65	-0.65	Shideler Fee 31-8C TGT
6,841.0	3.50	62.30	6,356.3	871.0	2,132.8	2,303.8	0.65	-0.65	
6,932.0	0.90	48.10	6,447.2	872.7	2,135.8	2,307.2	2.90	-2.86	
7,023.0	1.10	39.40	6,538.2	873.9	2,136.9	2,308.7	0.28	0.22	
7,115.0	1.30	42.30	6,630.2	875.4	2,138.1	2,310.4	0.23	0.22	
7,206.0	1.50	95.80	6,721.2	876.0	2,140.0	2,312.4	1.40	0.22	
7,298.0	1.20	237.30	6,813.1	875.4	2,140.4	2,312.5	2.77	-0.33	
7,390.0	1.20	213.70	6,905.1	874.0	2,139.1	2,310.7	0.53	0.00	
7,481.0	1.10	175.60	6,996.1	872.4	2,138.6	2,309.7	0.83	-0.11	
7,573.0	0.90	135.70	7,088.1	871.0	2,139.2	2,309.7	0.77	-0.22	
7,665.0	0.00	59.40	7,180.1	870.5	2,139.7	2,310.0	0.98	-0.98	
7,756.0	0.80	145.80	7,271.1	869.9	2,140.0	2,310.1	0.88	0.88	
7,847.0	1.40	154.00	7,362.1	868.4	2,140.9	2,310.3	0.68	0.66	
7,939.0	1.80	156.60	7,454.0	866.1	2,142.0	2,310.4	0.44	0.43	
8,031.0	0.90	50.70	7,546.0	865.2	2,143.1	2,311.1	2.42	-0.98	
8,122.0	2.50	75.70	7,637.0	866.1	2,145.6	2,313.8	1.90	1.76	
8,213.0	3.30	75.20	7,727.9	867.3	2,150.0	2,318.4	0.88	0.88	
8,305.0	3.80	81.50	7,819.7	868.4	2,155.6	2,323.9	0.69	0.54	
8,396.0	4.00	72.80	7,910.5	869.8	2,161.6	2,330.0	0.69	0.22	
8,488.0	4.20	71.10	8,002.2	871.9	2,167.9	2,336.6	0.25	0.22	
8,502.4	4.31	71.86	8,016.6	872.2	2,168.9	2,337.7	0.84	0.74	Shideler Fee 31-8C PBHL (2,153' FNL, 687' FEL)
8,515.0	4.40	72.50	8,029.2	872.5	2,169.8	2,338.6	0.84	0.74	Last Cathedral Survey @ 8,515' MD
8,565.0	4.40	72.50	8,079.0	873.6	2,173.4	2,342.4	0.00	0.00	Projection to Bit @8565' MD

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Shideler Fee 31-8C
Project:	Mamm Creek	TVD Reference:	KBE @ 6921.0ft (Patterson 303)
Site:	K31E Pad	MD Reference:	KBE @ 6921.0ft (Patterson 303)
Well:	Shideler Fee 31-8C	North Reference:	True
Wellbore:	DD	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									
Shideler Fee 31-8C PBI-	0.00	0.00	8,018.0	869.9	2,149.5	1,579,644.01	2,378,040.33	39.404186	-107.701325
- actual wellpath misses target center by 19.6ft at 8502.4ft MD (8016.6 TVD, 872.2 N, 2168.9 E)									
- Circle (radius 50.0)									
Shideler Fee 31-8C TGT	0.00	0.00	6,271.5	869.9	2,149.5	1,579,644.01	2,378,040.33	39.404186	-107.701325
- actual wellpath misses target center by 21.7ft at 6757.3ft MD (6272.8 TVD, 868.4 N, 2127.9 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
8,515.0	8,029.2	872.5	2,169.8	Last Cathedral Survey @ 8,515' MD	
8,565.0	8,079.0	873.6	2,173.4	Projection to Bit @8565' MD	

Checked By: _____ Approved By: _____ Date: _____