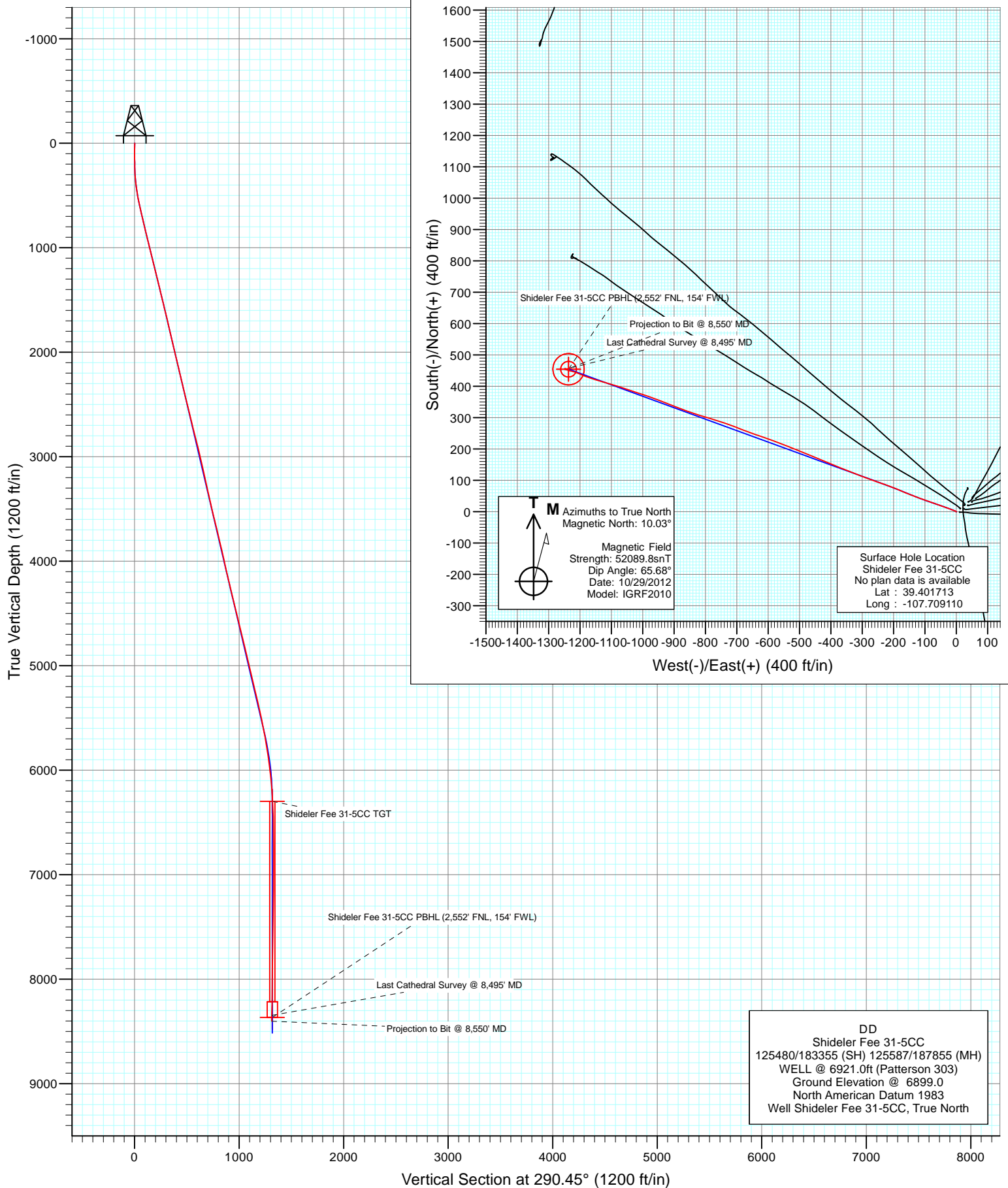


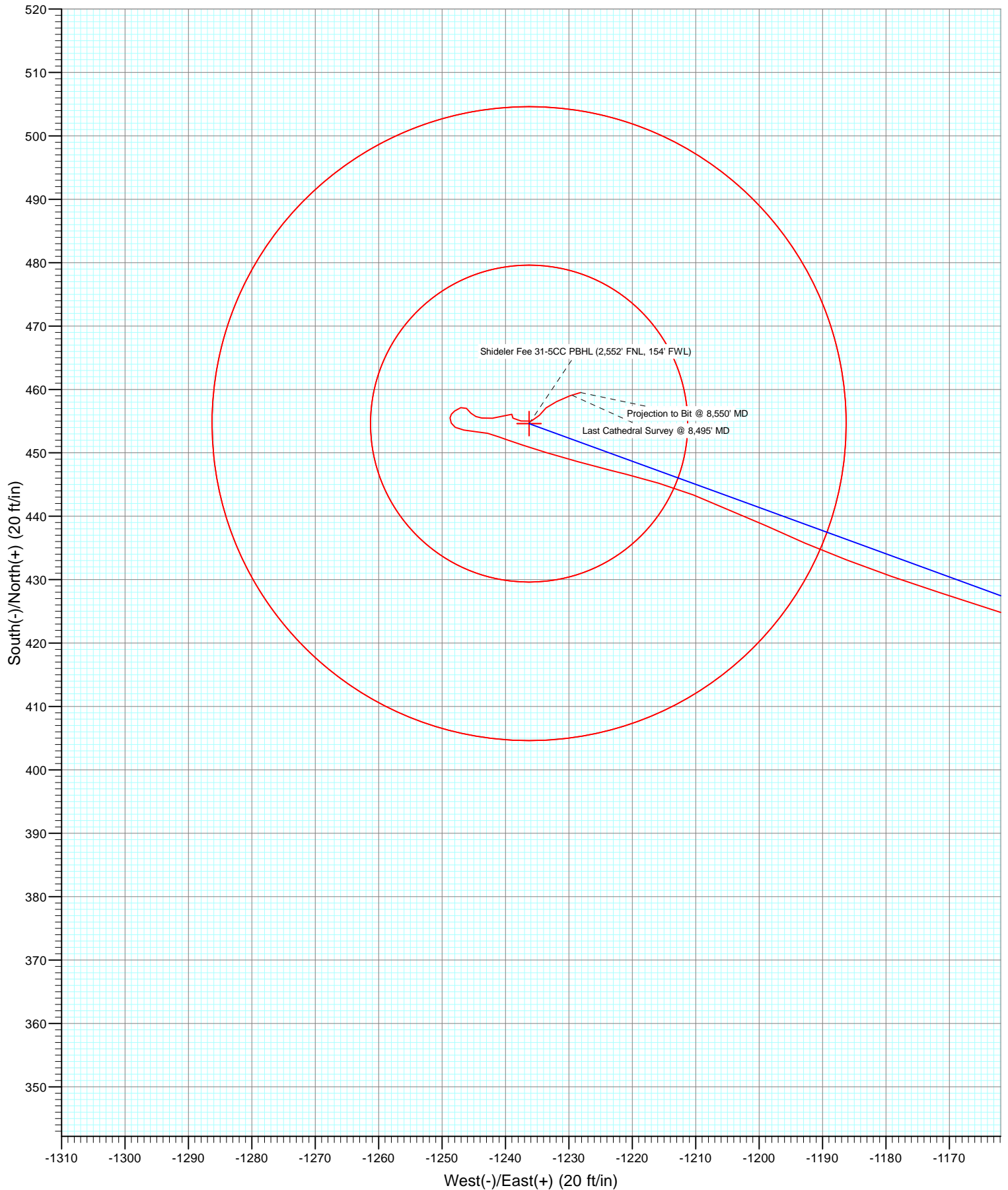


Project: Mamm Creek  
Site: K31E Pad  
Well: Shideler Fee 31-5CC  
Wellbore: DD  
Design: FINAL





Project: Mamm Creek  
Site: K31E Pad  
Well: Shideler Fee 31-5CC  
Wellbore: DD  
Design: FINAL



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 31-5CC
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Site:</b>	K31E Pad	<b>MD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Well:</b>	Shideler Fee 31-5CC	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	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 31-5CC				
Well Position	+N/-S	0.0 ft	Northing:	1,578,796.91 ft	Latitude:	39.401713
	+E/-W	0.0 ft	Easting:	2,375,819.28 ft	Longitude:	-107.709110
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	10/29/2012	10.03	65.68	52,090

Design	DD			
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	290.45

Survey Program		Date	11/21/2012		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
79.0	8,550.0	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	
79.0	0.10	100.10	79.0	0.0	0.1	-0.1	0.13	0.13	
110.0	0.40	99.60	110.0	0.0	0.2	-0.2	0.97	0.97	
140.0	0.00	100.10	140.0	-0.1	0.3	-0.3	1.33	-1.33	
232.0	1.60	305.90	232.0	0.7	-0.7	0.9	1.74	1.74	
325.0	4.10	295.30	324.9	2.9	-4.8	5.5	2.74	2.69	
417.0	8.00	290.30	416.3	6.5	-13.8	15.2	4.27	4.24	
509.0	10.10	289.10	507.2	11.4	-27.4	29.7	2.29	2.28	
601.0	12.40	290.30	597.4	17.4	-44.3	47.6	2.51	2.50	
693.0	13.00	289.00	687.2	24.2	-63.3	67.8	0.72	0.65	
786.0	13.20	288.90	777.7	31.1	-83.3	88.9	0.22	0.22	
877.0	14.20	289.50	866.2	38.2	-103.6	110.4	1.11	1.10	
970.0	13.30	291.40	956.5	45.9	-124.3	132.5	1.08	-0.97	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 31-5CC
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Site:</b>	K31E Pad	<b>MD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Well:</b>	Shideler Fee 31-5CC	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	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
1,062.0	13.50	291.90	1,046.0	53.8	-144.2	153.9	0.25	0.22	
1,154.0	14.10	292.60	1,135.3	62.1	-164.5	175.8	0.68	0.65	
1,247.0	14.40	292.50	1,225.5	70.8	-185.6	198.7	0.32	0.32	
1,339.0	13.60	290.80	1,314.7	79.1	-206.3	220.9	0.98	-0.87	
1,431.0	13.70	289.60	1,404.1	86.6	-226.7	242.6	0.33	0.11	
1,475.0	13.80	289.50	1,446.9	90.1	-236.5	253.1	0.23	0.23	
1,615.0	13.60	289.50	1,582.9	101.1	-267.8	286.2	0.14	-0.14	
1,706.0	13.10	290.40	1,671.4	108.3	-287.5	307.2	0.60	-0.55	
1,798.0	13.20	291.00	1,761.0	115.7	-307.1	328.2	0.18	0.11	
1,889.0	13.10	290.40	1,849.6	123.0	-326.5	348.9	0.19	-0.11	
1,981.0	12.90	290.80	1,939.3	130.3	-345.8	369.6	0.24	-0.22	
2,072.0	13.60	292.90	2,027.8	138.1	-365.2	390.4	0.93	0.77	
2,163.0	13.90	292.00	2,116.2	146.3	-385.2	412.0	0.40	0.33	
2,255.0	13.40	292.30	2,205.6	154.5	-405.3	433.7	0.55	-0.54	
2,347.0	12.80	292.70	2,295.2	162.5	-424.6	454.6	0.66	-0.65	
2,438.0	13.40	293.70	2,383.9	170.6	-443.5	475.2	0.70	0.66	
2,530.0	13.90	292.60	2,473.3	179.1	-463.5	496.9	0.61	0.54	
2,622.0	13.90	291.20	2,562.6	187.4	-484.0	519.0	0.37	0.00	
2,714.0	13.60	292.70	2,652.0	195.6	-504.3	540.8	0.51	-0.33	
2,805.0	14.30	290.60	2,740.3	203.6	-524.7	562.7	0.95	0.77	
2,897.0	14.10	291.40	2,829.5	211.7	-545.7	585.3	0.30	-0.22	
2,989.0	14.20	291.80	2,918.7	220.0	-566.6	607.8	0.15	0.11	
3,080.0	12.90	289.40	3,007.1	227.5	-586.6	629.1	1.56	-1.43	
3,172.0	12.10	291.00	3,096.9	234.4	-605.3	649.0	0.95	-0.87	
3,264.0	12.20	287.30	3,186.9	240.7	-623.6	668.4	0.85	0.11	
3,355.0	12.70	289.40	3,275.7	246.9	-642.2	688.0	0.74	0.55	
3,446.0	13.10	289.50	3,364.5	253.7	-661.3	708.3	0.44	0.44	
3,538.0	12.50	291.90	3,454.2	260.9	-680.4	728.7	0.87	-0.65	
3,630.0	13.80	290.20	3,543.8	268.4	-699.9	749.6	1.47	1.41	
3,721.0	13.70	290.30	3,632.1	275.9	-720.2	771.2	0.11	-0.11	
3,813.0	13.10	291.20	3,721.6	283.4	-740.2	792.5	0.69	-0.65	
3,904.0	13.70	286.10	3,810.2	290.1	-760.1	813.6	1.46	0.66	
3,996.0	13.10	285.70	3,899.7	296.0	-780.6	834.8	0.66	-0.65	
4,087.0	12.30	286.40	3,988.4	301.5	-799.9	854.8	0.90	-0.88	
4,179.0	12.50	288.10	4,078.3	307.4	-818.7	874.5	0.45	0.22	
4,270.0	13.10	288.60	4,167.0	313.7	-837.9	894.7	0.67	0.66	
4,362.0	14.00	290.00	4,256.5	320.8	-858.2	916.2	1.04	0.98	
4,453.0	13.70	290.10	4,344.8	328.3	-878.7	938.0	0.33	-0.33	
4,545.0	13.40	291.80	4,434.3	336.0	-898.8	959.5	0.54	-0.33	
4,637.0	14.10	291.50	4,523.6	344.1	-919.1	981.4	0.76	0.76	
4,728.0	13.30	292.60	4,612.0	352.2	-939.1	1,003.0	0.92	-0.88	
4,820.0	13.80	287.70	4,701.5	359.6	-959.3	1,024.5	1.36	0.54	
4,912.0	13.50	290.90	4,790.9	366.7	-979.8	1,046.2	0.88	-0.33	
5,003.0	13.60	287.70	4,879.3	373.8	-999.9	1,067.5	0.83	0.11	
5,094.0	12.80	288.50	4,967.9	380.2	-1,019.7	1,088.3	0.90	-0.88	
5,186.0	13.30	289.00	5,057.6	386.9	-1,039.3	1,109.0	0.56	0.54	
5,277.0	13.70	287.20	5,146.0	393.5	-1,059.5	1,130.2	0.64	0.44	
5,369.0	13.10	288.40	5,235.5	400.0	-1,079.8	1,151.5	0.72	-0.65	
5,460.0	12.80	285.30	5,324.2	405.9	-1,099.3	1,171.9	0.83	-0.33	
5,552.0	13.30	286.50	5,413.9	411.6	-1,119.3	1,192.6	0.62	0.54	
5,644.0	12.10	287.10	5,503.6	417.5	-1,138.7	1,212.8	1.31	-1.30	
5,735.0	10.70	287.90	5,592.8	422.9	-1,155.8	1,230.7	1.55	-1.54	
5,826.0	10.20	288.00	5,682.3	428.0	-1,171.5	1,247.2	0.55	-0.55	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 31-5CC
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Site:</b>	K31E Pad	<b>MD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Well:</b>	Shideler Fee 31-5CC	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	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
5,918.0	9.20	290.90	5,773.0	433.1	-1,186.2	1,262.7	1.21	-1.09	
6,010.0	8.10	295.30	5,863.9	438.5	-1,198.9	1,276.5	1.39	-1.20	
6,102.0	7.50	290.30	5,955.1	443.3	-1,210.4	1,289.0	0.98	-0.65	
6,194.0	6.30	283.70	6,046.4	446.6	-1,220.9	1,300.0	1.56	-1.30	
6,285.0	5.10	285.80	6,137.0	448.9	-1,229.7	1,309.0	1.34	-1.32	
6,377.0	3.50	288.00	6,228.7	450.9	-1,236.3	1,315.9	1.75	-1.74	
6,469.0	2.70	290.10	6,320.6	452.5	-1,241.0	1,320.9	0.88	-0.87	
6,560.0	1.60	272.00	6,411.5	453.3	-1,244.3	1,324.2	1.41	-1.21	
6,652.0	1.30	284.80	6,503.5	453.6	-1,246.5	1,326.5	0.48	-0.33	
6,744.0	0.50	296.00	6,595.5	454.0	-1,247.9	1,327.9	0.89	-0.87	
6,835.0	0.70	332.40	6,686.5	454.7	-1,248.5	1,328.7	0.46	0.22	
6,926.0	0.40	8.60	6,777.5	455.5	-1,248.7	1,329.2	0.49	-0.33	
7,017.0	0.40	34.30	6,868.4	456.1	-1,248.5	1,329.2	0.20	0.00	
7,109.0	0.50	52.20	6,960.4	456.6	-1,248.0	1,328.9	0.19	0.11	
7,201.0	0.90	66.30	7,052.4	457.1	-1,247.0	1,328.2	0.47	0.43	
7,292.0	0.60	148.50	7,143.4	457.0	-1,246.1	1,327.3	1.11	-0.33	
7,384.0	0.70	129.00	7,235.4	456.2	-1,245.4	1,326.4	0.26	0.11	
7,476.0	0.50	115.10	7,327.4	455.7	-1,244.6	1,325.4	0.27	-0.22	
7,567.0	0.70	96.30	7,418.4	455.5	-1,243.7	1,324.5	0.31	0.22	
7,659.0	1.40	89.40	7,510.4	455.4	-1,242.0	1,322.9	0.77	0.76	
7,750.0	1.50	67.50	7,601.4	455.9	-1,239.8	1,321.0	0.61	0.11	
7,842.0	0.50	222.90	7,693.4	456.1	-1,239.0	1,320.3	2.14	-1.09	
7,934.0	0.70	123.10	7,785.4	455.5	-1,238.8	1,319.9	1.01	0.22	
8,025.0	1.00	100.00	7,876.4	455.0	-1,237.6	1,318.5	0.49	0.33	
8,116.0	1.10	83.20	7,967.3	455.0	-1,235.9	1,317.0	0.35	0.11	
8,208.0	1.10	25.20	8,059.3	455.9	-1,234.7	1,316.1	1.16	0.00	
8,299.0	1.00	59.40	8,150.3	457.1	-1,233.6	1,315.6	0.69	-0.11	
8,391.0	1.40	60.00	8,242.3	458.1	-1,231.9	1,314.3	0.43	0.43	
8,482.0	1.50	72.10	8,333.3	459.0	-1,229.8	1,312.7	0.35	0.11	
8,495.0	1.50	73.00	8,346.3	459.1	-1,229.5	1,312.4	0.18	0.00	Last Cathedral Survey @ 8,495' MD
8,550.0	1.50	73.00	8,401.2	459.5	-1,228.1	1,311.3	0.00	0.00	Projection to Bit @ 8,550' MD

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 31-5CC
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Site:</b>	K31E Pad	<b>MD Reference:</b>	WELL @ 6921.0ft (Patterson 303)
<b>Well:</b>	Shideler Fee 31-5CC	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	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 31-5CC PE	0.00	0.00	8,365.0	454.6	-1,236.3	1,579,281.44	2,374,594.44	39.402961	-107.713485
- actual wellpath misses target center by 20.4ft at 8495.0ft MD (8346.3 TVD, 459.1 N, -1229.5 E)									
- Circle (radius 50.0)									
Shideler Fee 31-5CC TC	0.00	0.00	6,298.0	454.6	-1,236.3	1,579,281.44	2,374,594.44	39.402961	-107.713485
- actual wellpath misses target center by 4.4ft at 6446.3ft MD (6297.9 TVD, 452.1 N, -1239.9 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
8,495.0	8,346.3	459.1	-1,229.5	Last Cathedral Survey @ 8,495' MD	
8,550.0	8,401.2	459.5	-1,228.1	Projection to Bit @ 8,550' MD	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_