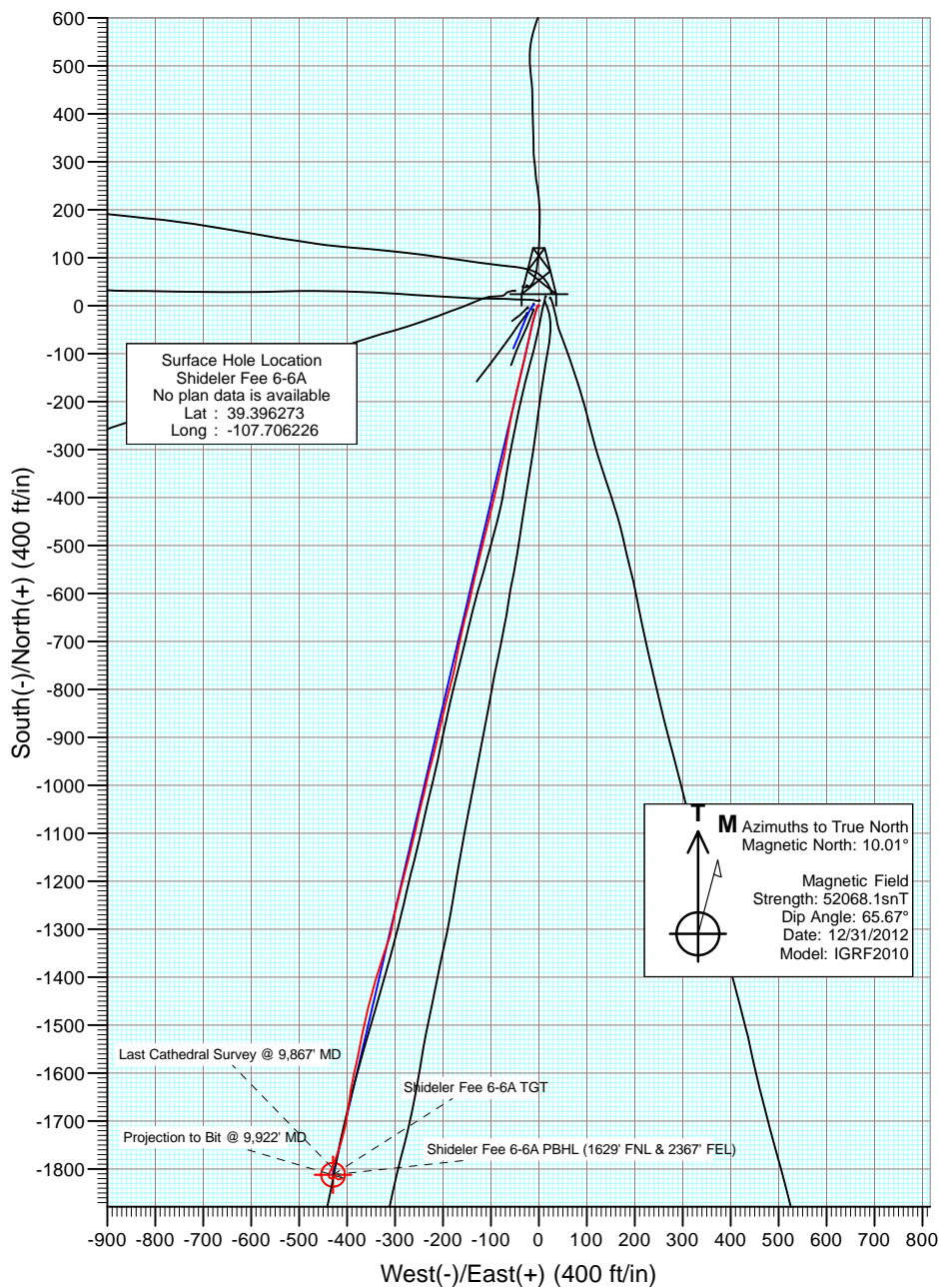
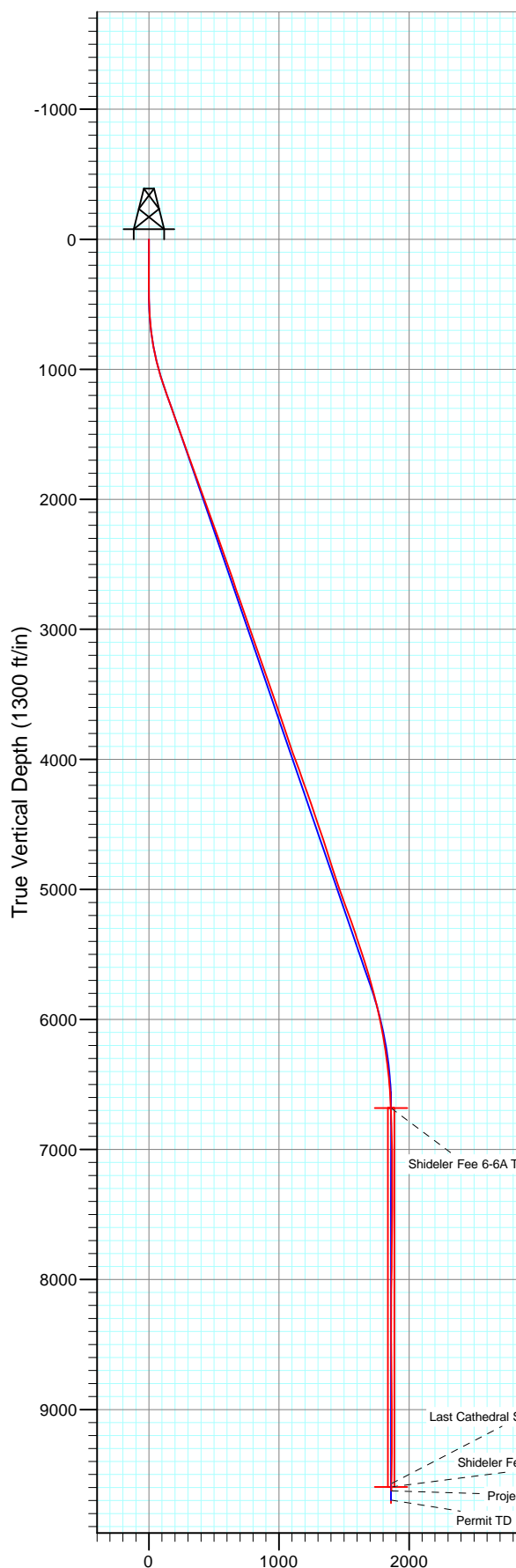




Project: Mamm Creek  
Site: O31E Pad  
Well: Shideler Fee 6-6A  
Wellbore: DD  
Design: FINAL



#### DESIGN TARGET DETAILS

No target data is available.

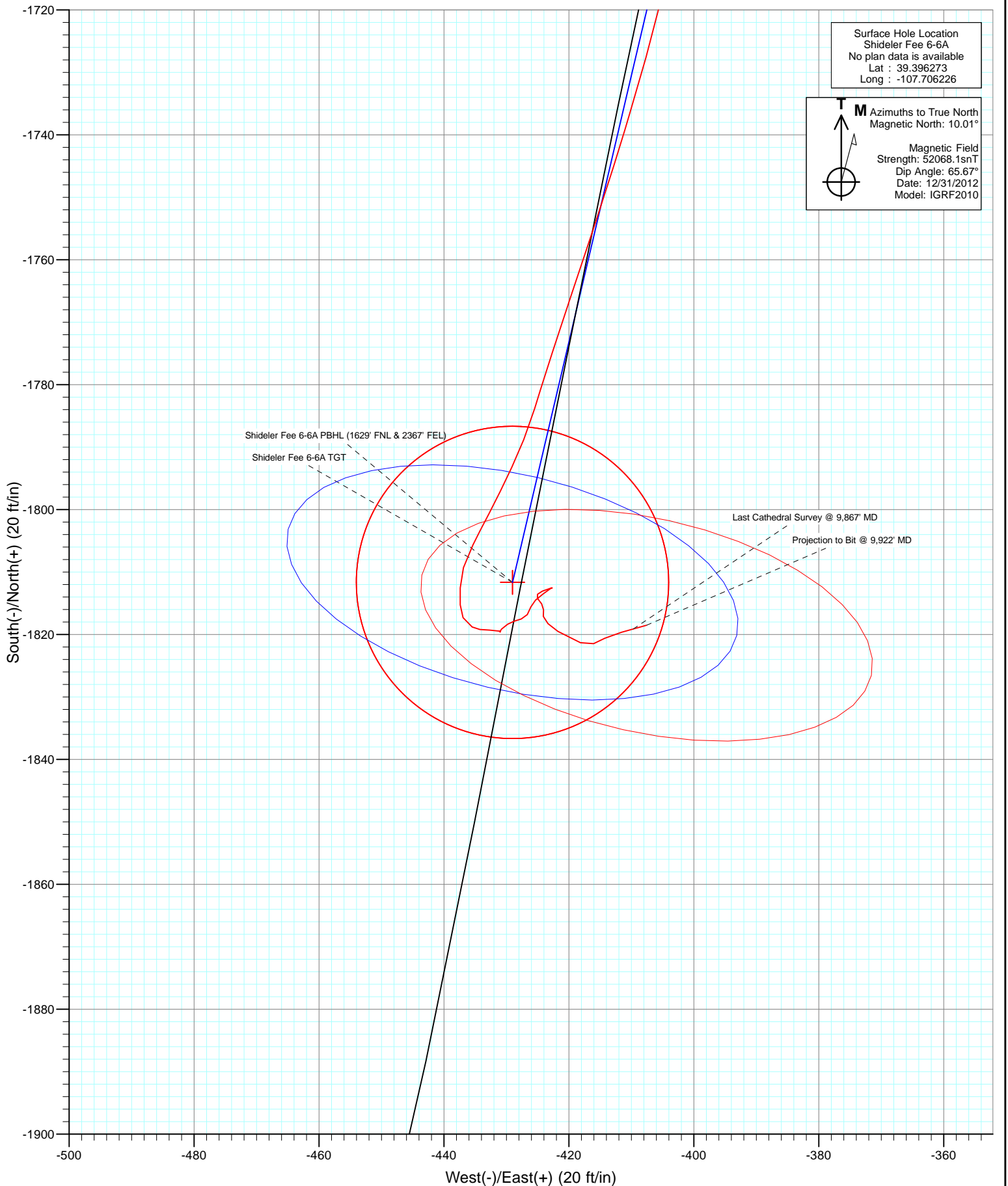
#### FORMATION TOP DETAILS

No formation data is available

FINAL  
Shideler Fee 6-6A  
125627; 205855, 208055 135001 AT  
KB = 22' @ 7129.0ft  
Ground Elevation @ 7107.0  
North American Datum 1983  
Well Shideler Fee 6-6A, True North



Project: Mamm Creek  
Site: O31E Pad  
Well: Shideler Fee 6-6A  
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 6-6A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-6A	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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		O31E Pad			
Site Position:		Northing:	1,577,012.73 ft	Latitude:	39.396873
From:	Lat/Long	Easting:	2,376,675.10 ft	Longitude:	-107.705929
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.39 °

Well	Shideler Fee 6-6A					
Well Position	+N/-S	0.0 ft	Northing:	1,576,796.27 ft	Latitude:	39.396273
	+E/-W	0.0 ft	Easting:	2,376,585.88 ft	Longitude:	-107.706226
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,107.0 ft

Wellbore		DD			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/31/2012	10.01	65.67	52,068

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	193.32

Survey Program		Date	1/9/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
111.0	9,922.0	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	
111.0	0.20	300.50	111.0	0.1	-0.2	-0.1	0.18	0.18	
141.0	0.30	304.10	141.0	0.2	-0.3	-0.1	0.34	0.33	
172.0	0.40	310.00	172.0	0.3	-0.4	-0.2	0.34	0.32	
203.0	0.20	319.20	203.0	0.4	-0.5	-0.3	0.66	-0.65	
234.0	0.30	318.00	234.0	0.5	-0.6	-0.3	0.32	0.32	
265.0	0.40	349.60	265.0	0.7	-0.7	-0.5	0.69	0.32	
295.0	0.40	341.40	295.0	0.9	-0.8	-0.7	0.19	0.00	
326.0	0.40	324.80	326.0	1.1	-0.9	-0.8	0.37	0.00	
356.0	0.50	280.00	356.0	1.2	-1.0	-0.9	1.18	0.33	
387.0	0.50	257.50	387.0	1.2	-1.3	-0.8	0.63	0.00	
418.0	0.50	240.60	418.0	1.1	-1.6	-0.7	0.47	0.00	
449.0	1.10	218.60	449.0	0.8	-1.9	-0.3	2.14	1.94	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-6A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-6A	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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
479.0	1.50	204.50	479.0	0.2	-2.2	0.3	1.70	1.33	
510.0	2.00	200.80	510.0	-0.7	-2.6	1.3	1.65	1.61	
541.0	2.50	195.60	540.9	-1.9	-2.9	2.5	1.74	1.61	
571.0	3.50	199.30	570.9	-3.3	-3.4	4.0	3.39	3.33	
662.0	5.70	196.30	661.6	-10.3	-5.6	11.3	2.43	2.42	
753.0	8.20	197.10	751.9	-20.8	-8.8	22.3	2.75	2.75	
844.0	11.00	193.90	841.6	-35.5	-12.8	37.5	3.13	3.08	
937.0	13.40	192.40	932.5	-54.6	-17.2	57.1	2.60	2.58	
1,029.0	16.10	192.40	1,021.5	-77.5	-22.3	80.5	2.93	2.93	
1,121.0	18.50	193.40	1,109.3	-104.2	-28.4	107.9	2.63	2.61	
1,213.0	19.30	193.40	1,196.4	-133.1	-35.3	137.7	0.87	0.87	
1,305.0	19.80	193.10	1,283.1	-163.1	-42.3	168.5	0.55	0.54	
1,410.0	19.40	193.00	1,382.0	-197.4	-50.3	203.7	0.38	-0.38	
1,525.0	19.40	190.90	1,490.5	-234.8	-58.2	241.9	0.61	0.00	
1,616.0	19.60	189.60	1,576.2	-264.7	-63.6	272.2	0.53	0.22	
1,707.0	20.00	190.10	1,661.9	-295.1	-68.9	303.0	0.48	0.44	
1,799.0	19.60	193.30	1,748.4	-325.6	-75.2	334.1	1.26	-0.43	
1,890.0	19.90	194.00	1,834.1	-355.4	-82.4	364.9	0.42	0.33	
1,981.0	20.70	192.30	1,919.4	-386.2	-89.6	396.4	1.09	0.88	
2,073.0	20.00	194.40	2,005.7	-417.3	-97.0	428.4	1.10	-0.76	
2,164.0	19.20	194.50	2,091.4	-446.9	-104.6	458.9	0.88	-0.88	
2,256.0	19.50	193.60	2,178.2	-476.4	-112.0	489.4	0.46	0.33	
2,348.0	19.80	193.10	2,264.8	-506.5	-119.2	520.4	0.37	0.33	
2,439.0	19.00	193.30	2,350.7	-536.0	-126.1	550.6	0.88	-0.88	
2,531.0	19.50	193.20	2,437.5	-565.5	-133.0	580.9	0.54	0.54	
2,623.0	19.60	192.60	2,524.2	-595.5	-139.9	611.7	0.24	0.11	
2,714.0	18.70	194.00	2,610.2	-624.5	-146.7	641.6	1.11	-0.99	
2,806.0	18.90	194.40	2,697.3	-653.3	-154.0	671.2	0.26	0.22	
2,898.0	19.10	193.10	2,784.3	-682.4	-161.1	701.1	0.51	0.22	
2,989.0	19.40	191.10	2,870.2	-711.7	-167.4	731.1	0.80	0.33	
3,080.0	19.30	189.80	2,956.0	-741.4	-172.9	761.3	0.49	-0.11	
3,172.0	19.10	193.30	3,042.9	-771.0	-178.9	791.5	1.27	-0.22	
3,263.0	19.60	195.70	3,128.8	-800.2	-186.5	821.6	1.03	0.55	
3,355.0	19.50	194.00	3,215.5	-829.9	-194.4	852.4	0.63	-0.11	
3,447.0	19.60	192.00	3,302.2	-859.9	-201.3	883.2	0.74	0.11	
3,538.0	19.10	193.90	3,388.1	-889.3	-208.1	913.3	0.88	-0.55	
3,629.0	19.10	192.80	3,474.0	-918.3	-214.9	943.1	0.40	0.00	
3,721.0	19.20	195.60	3,561.0	-947.5	-222.3	973.3	1.00	0.11	
3,813.0	18.80	194.10	3,647.9	-976.5	-230.0	1,003.2	0.69	-0.43	
3,904.0	18.10	192.60	3,734.3	-1,004.5	-236.7	1,032.0	0.93	-0.77	
3,996.0	19.50	194.40	3,821.4	-1,033.3	-243.6	1,061.6	1.65	1.52	
4,087.0	18.80	192.00	3,907.3	-1,062.4	-250.4	1,091.5	1.16	-0.77	
4,179.0	20.00	193.80	3,994.1	-1,092.2	-257.3	1,122.0	1.46	1.30	
4,271.0	20.20	191.80	4,080.5	-1,123.0	-264.3	1,153.7	0.78	0.22	
4,362.0	19.40	196.20	4,166.1	-1,152.9	-271.7	1,184.5	1.86	-0.88	
4,454.0	19.00	195.00	4,253.0	-1,182.0	-279.8	1,214.7	0.61	-0.43	
4,545.0	19.40	193.60	4,338.9	-1,211.0	-287.2	1,244.6	0.67	0.44	
4,637.0	18.70	191.70	4,425.9	-1,240.3	-293.8	1,274.6	1.02	-0.76	
4,729.0	18.90	193.40	4,513.0	-1,269.2	-300.2	1,304.3	0.63	0.22	
4,820.0	18.70	191.00	4,599.1	-1,297.9	-306.4	1,333.6	0.88	-0.22	
4,912.0	18.20	199.40	4,686.4	-1,325.9	-314.0	1,362.6	2.94	-0.54	
5,003.0	17.30	199.00	4,773.1	-1,352.1	-323.2	1,390.2	1.00	-0.99	
5,095.0	17.90	197.30	4,860.8	-1,378.6	-331.8	1,417.9	0.86	0.65	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-6A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-6A	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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
5,186.0	18.80	197.40	4,947.2	-1,405.9	-340.4	1,446.5	0.99	0.99	
5,278.0	20.40	194.40	5,033.8	-1,435.6	-348.8	1,477.3	2.05	1.74	
5,370.0	20.50	193.30	5,120.0	-1,466.8	-356.5	1,509.5	0.43	0.11	
5,461.0	19.70	192.70	5,205.5	-1,497.3	-363.5	1,540.7	0.91	-0.88	
5,553.0	18.60	191.40	5,292.4	-1,526.8	-369.8	1,570.9	1.28	-1.20	
5,645.0	18.50	190.80	5,379.6	-1,555.5	-375.5	1,600.2	0.23	-0.11	
5,737.0	18.40	193.30	5,466.9	-1,584.0	-381.5	1,629.3	0.87	-0.11	
5,828.0	17.00	191.40	5,553.6	-1,611.0	-387.5	1,656.9	1.66	-1.54	
5,920.0	16.60	189.80	5,641.6	-1,637.1	-392.4	1,683.5	0.66	-0.43	
6,011.0	15.70	186.80	5,729.1	-1,662.2	-396.0	1,708.7	1.35	-0.99	
6,103.0	14.90	188.20	5,817.8	-1,686.2	-399.2	1,732.8	0.96	-0.87	
6,195.0	13.40	191.60	5,907.0	-1,708.4	-403.0	1,755.3	1.86	-1.63	
6,286.0	11.70	195.80	5,995.8	-1,727.6	-407.7	1,775.0	2.12	-1.87	
6,378.0	10.00	197.20	6,086.2	-1,744.2	-412.6	1,792.3	1.87	-1.85	
6,470.0	9.70	198.90	6,176.8	-1,759.2	-417.4	1,808.0	0.45	-0.33	
6,561.0	8.00	197.70	6,266.7	-1,772.4	-421.8	1,821.9	1.88	-1.87	
6,653.0	6.90	197.70	6,358.0	-1,783.8	-425.5	1,833.8	1.20	-1.20	
6,745.0	5.70	205.30	6,449.4	-1,793.2	-429.1	1,843.8	1.59	-1.30	
6,836.0	4.60	207.50	6,540.0	-1,800.5	-432.7	1,851.8	1.23	-1.21	
6,927.0	2.70	206.40	6,630.8	-1,805.7	-435.4	1,857.4	2.09	-2.09	
6,977.2	2.42	202.29	6,681.0	-1,807.7	-436.3	1,859.6	0.67	-0.56	Shideler Fee 6-6A TGT
7,019.0	2.20	198.10	6,722.8	-1,809.3	-436.9	1,861.3	0.67	-0.53	
7,110.0	2.00	179.50	6,813.7	-1,812.5	-437.4	1,864.6	0.78	-0.22	
7,201.0	1.40	180.50	6,904.7	-1,815.2	-437.4	1,867.2	0.66	-0.66	
7,293.0	1.30	152.50	6,996.6	-1,817.3	-436.9	1,869.1	0.72	-0.11	
7,385.0	1.40	120.80	7,088.6	-1,818.8	-435.5	1,870.2	0.81	0.11	
7,431.0	1.90	97.70	7,134.6	-1,819.2	-434.2	1,870.3	1.79	1.09	
7,477.0	2.00	90.50	7,180.6	-1,819.3	-432.7	1,870.0	0.57	0.22	
7,568.0	0.20	162.90	7,271.5	-1,819.5	-431.0	1,869.8	2.14	-1.98	
7,660.0	0.00	96.80	7,363.5	-1,819.6	-431.0	1,870.0	0.22	-0.22	
7,752.0	0.10	348.60	7,455.5	-1,819.5	-431.0	1,869.9	0.11	0.11	
7,843.0	0.50	38.00	7,546.5	-1,819.1	-430.8	1,869.5	0.49	0.44	
7,935.0	1.10	56.90	7,638.5	-1,818.3	-429.8	1,868.5	0.70	0.65	
8,027.0	0.40	89.10	7,730.5	-1,817.9	-428.7	1,867.7	0.86	-0.76	
8,119.0	1.10	67.00	7,822.5	-1,817.5	-427.6	1,867.1	0.81	0.76	
8,210.0	0.50	23.20	7,913.5	-1,816.8	-426.6	1,866.2	0.90	-0.66	
8,302.0	1.20	25.70	8,005.5	-1,815.6	-426.1	1,864.9	0.76	0.76	
8,393.0	0.50	55.60	8,096.5	-1,814.5	-425.3	1,863.7	0.89	-0.77	
8,485.0	1.50	49.30	8,188.5	-1,813.5	-424.1	1,862.4	1.09	1.09	
8,576.0	0.50	71.40	8,279.5	-1,812.6	-422.8	1,861.2	1.16	-1.10	
8,668.0	0.80	252.50	8,371.5	-1,812.6	-423.0	1,861.3	1.41	0.33	
8,760.0	0.80	248.60	8,463.4	-1,813.1	-424.2	1,862.0	0.06	0.00	
8,852.0	0.40	210.60	8,555.4	-1,813.6	-425.0	1,862.7	0.59	-0.43	
8,944.0	0.50	156.50	8,647.4	-1,814.2	-425.0	1,863.3	0.46	0.11	
9,035.0	0.90	136.00	8,738.4	-1,815.1	-424.4	1,864.0	0.51	0.44	
9,127.0	0.60	205.20	8,830.4	-1,816.1	-424.1	1,864.9	0.96	-0.33	
9,218.0	0.80	164.40	8,921.4	-1,817.1	-424.1	1,865.9	0.57	0.22	
9,310.0	1.00	133.50	9,013.4	-1,818.3	-423.3	1,866.9	0.56	0.22	
9,402.0	1.50	123.50	9,105.4	-1,819.5	-421.7	1,867.7	0.59	0.54	
9,539.0	1.90	111.40	9,242.3	-1,821.3	-418.1	1,868.6	0.39	0.29	
9,630.0	1.00	61.70	9,333.3	-1,821.5	-416.0	1,868.3	1.61	-0.99	
9,722.0	1.50	64.80	9,425.3	-1,820.6	-414.2	1,867.0	0.55	0.54	
9,814.0	2.00	74.60	9,517.2	-1,819.6	-411.6	1,865.5	0.63	0.54	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-6A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-6A	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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
9,867.0	2.30	74.40	9,570.2	-1,819.1	-409.7	1,864.6	0.57	0.57	Last Cathedral Survey @ 9,867' MD - Shideler F
9,922.0	2.30	74.40	9,625.2	-1,818.5	-407.6	1,863.5	0.00	0.00	Projection to Bit @ 9,922' MD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Shideler Fee 6-6A TGT	0.00	0.00	6,681.0	-1,811.7	-429.0	1,574,995.57	2,376,113.00	39.391299	-107.707744
- hit/miss target									
- Shape									
- actual wellpath misses target center by 8.3ft at 6977.3ft MD (6681.0 TVD, -1807.7 N, -436.3 E)									
- Point									
Shideler Fee 6-6A PBHL	0.00	0.00	9,596.0	-1,811.7	-429.0	1,574,995.57	2,376,113.00	39.391299	-107.707744
- actual wellpath misses target center by 33.1ft at 9867.0ft MD (9570.2 TVD, -1819.1 N, -409.7 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
9,867.0	9,570.2	-1,819.1	-409.7	Last Cathedral Survey @ 9,867' MD	
9,922.0	9,625.2	-1,818.5	-407.6	Projection to Bit @ 9,922' MD	

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