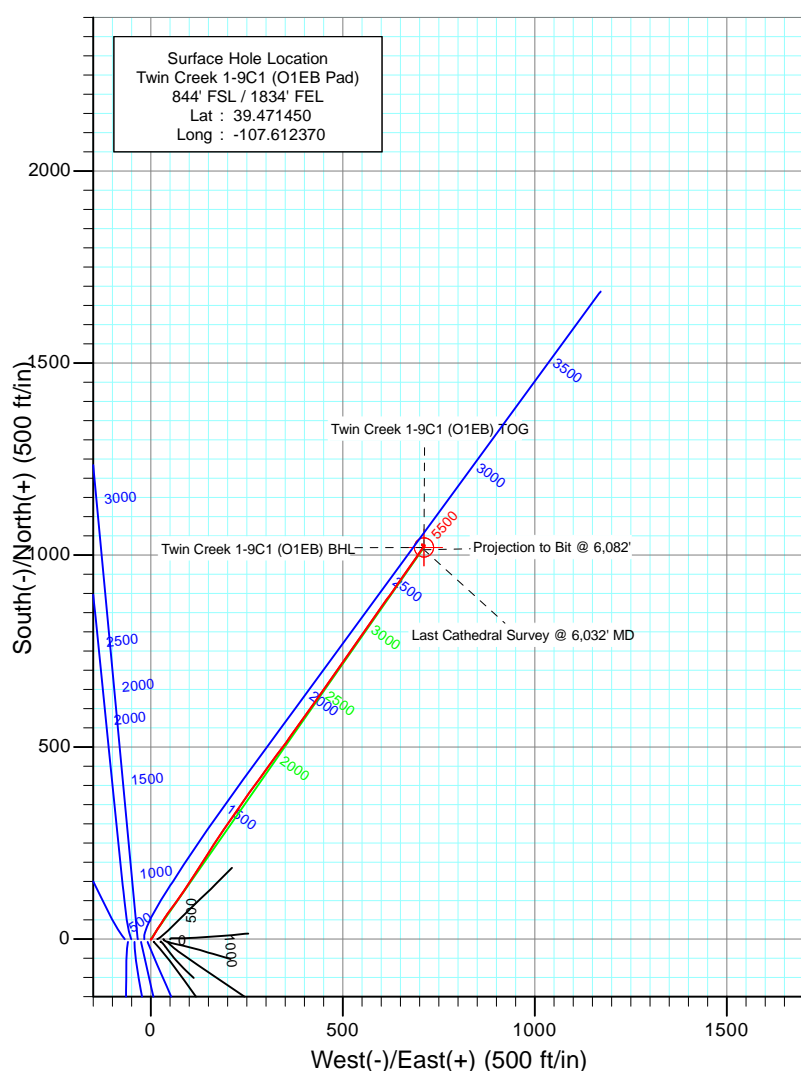
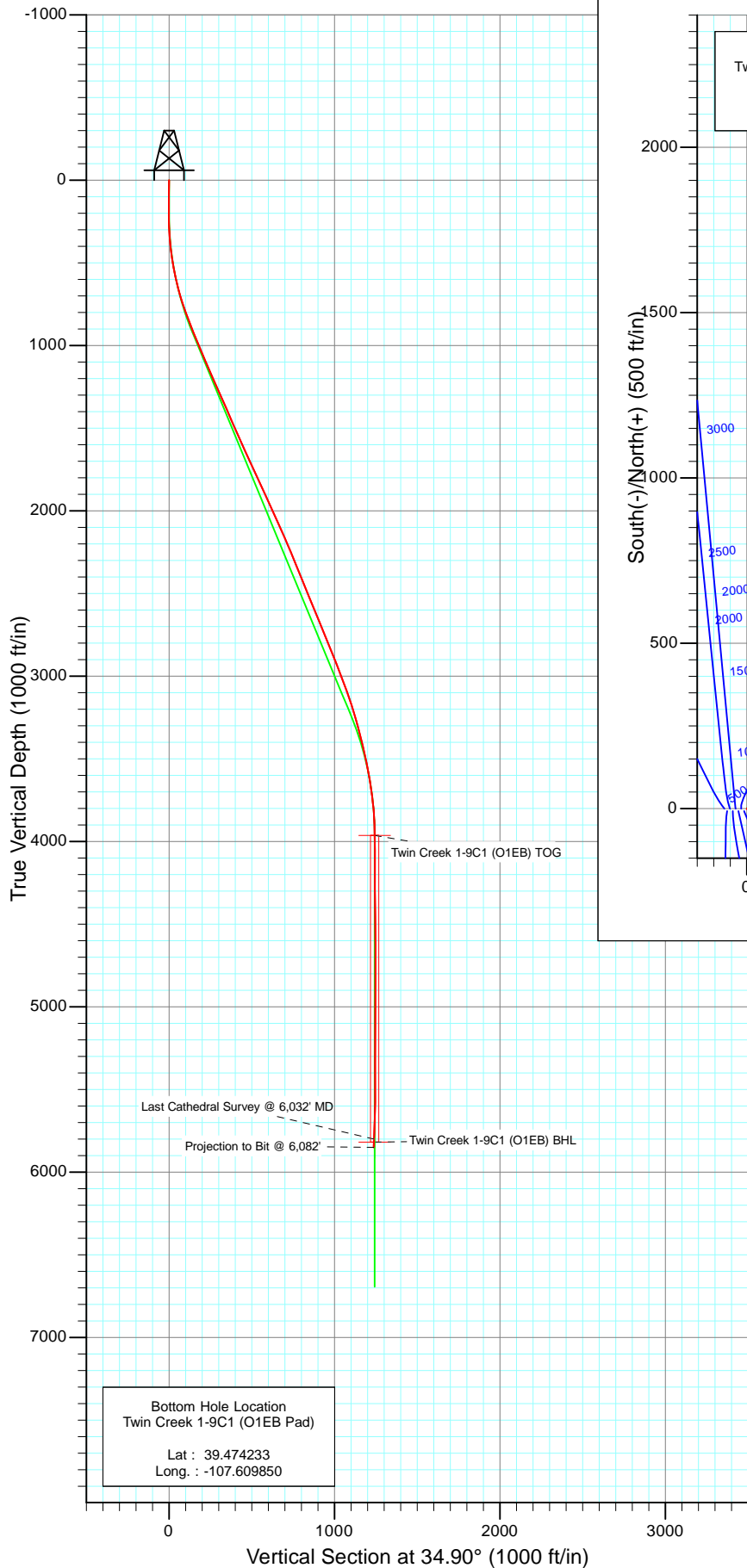




Project: Mamm Creek  
 Site: SWSE S1-T7S-R92W (O1EB Pad)  
 Well: Twin Creek 1-9C1 (O1EB Pad)  
 Wellbore: DD  
 Design: FINAL



Azimuths to True North  
 Magnetic North: 10.26°

Magnetic Field  
 Strength: 52348.6nT  
 Dip Angle: 65.81°  
 Date: 11/2/2010  
 Model: IGRF2010

DESIGN DETAILS: DD

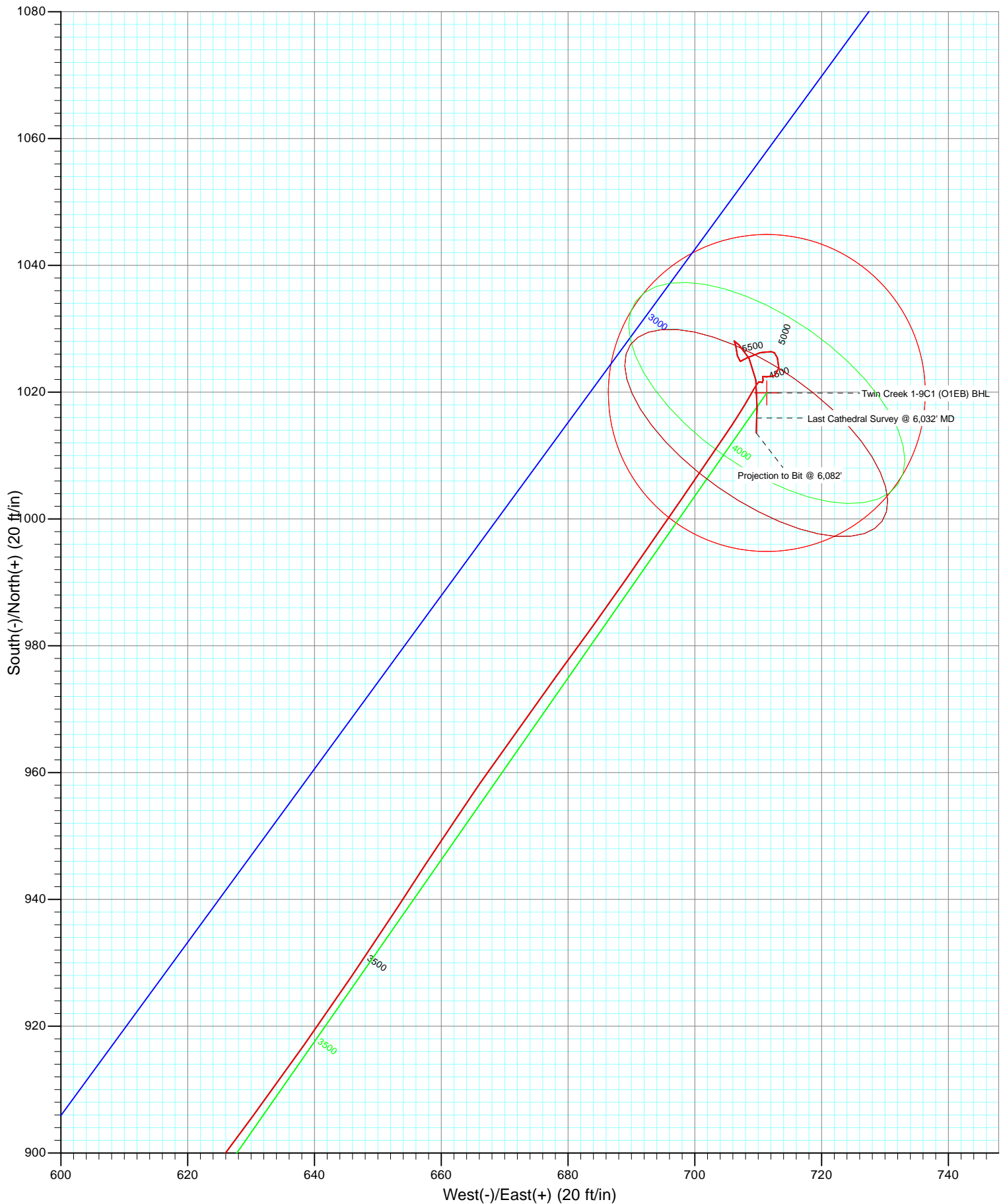
105369 (SH) 105479 (MH): KR

KBE @ 6084.0ft (Original Well Elev)

Target	Azimuth	Origin	N/S	E/W	From TVD
Twin Creek 1-9C1 (O1EB) BHL	34.90	Slot	0.0	0.0	0.0



Project: Mamm Creek  
Site: SWSE S1-T7S-R92W (O1EB Pad)  
Well: Twin Creek 1-9C1 (O1EB Pad)  
Wellbore: DD  
Design: FINAL



# Cathedral Energy

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Twin Creek 1-9C1 (O1EB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 6084.0ft (Original Well Elev)
<b>Site:</b>	SWSE S1-T7S-R92W (O1EB Pad)	<b>MD Reference:</b>	KBE @ 6084.0ft (Original Well Elev)
<b>Well:</b>	Twin Creek 1-9C1 (O1EB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB

<b>Project</b>	Mamm Creek		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		

<b>Site</b>	SWSE S1-T7S-R92W (O1EB Pad)			
<b>Site Position:</b>		<b>Northing:</b>	1,603,540.14 ft	<b>Latitude:</b> 39.471450
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,403,755.74 ft	<b>Longitude:</b> -107.612310
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b> -1.33 °

<b>Well</b>	Twin Creek 1-9C1 (O1EB Pad)			
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,603,540.53 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	2,403,738.81 ft
<b>Position Uncertainty</b>	0.0 ft		<b>Wellhead Elevation:</b>	ft
			<b>Ground Level:</b>	6,062.0 ft

<b>Wellbore</b>	DD				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	11/2/2010	10.26	65.81	52,349

<b>Design</b>	DD			
<b>Audit Notes:</b>				
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b> 0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	34.90

<b>Survey Program</b>	<b>Date</b>	11/15/2010		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
124.0	6,082.0	Survey #1 (DD)	MWD	Geolink MWD

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Formations / Comments</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
124.0	0.70	172.20	124.0	-0.8	0.1	-0.6	0.56	0.56	
154.0	0.40	155.00	154.0	-1.0	0.2	-0.7	1.13	-1.00	
185.0	0.20	100.30	185.0	-1.1	0.3	-0.8	1.06	-0.65	
216.0	0.80	78.10	216.0	-1.1	0.5	-0.6	2.00	1.94	
247.0	1.50	38.20	247.0	-0.7	1.0	0.0	3.30	2.26	
277.0	2.20	43.70	277.0	0.0	1.6	0.9	2.40	2.33	
308.0	2.70	28.90	307.9	1.1	2.4	2.2	2.59	1.61	
339.0	3.80	34.90	338.9	2.5	3.3	4.0	3.71	3.55	
370.0	4.60	35.20	369.8	4.4	4.6	6.3	2.58	2.58	
401.0	5.70	32.30	400.7	6.7	6.2	9.0	3.65	3.55	
431.0	7.00	27.60	430.5	9.6	7.8	12.3	4.66	4.33	
462.0	8.30	30.80	461.2	13.2	9.9	16.5	4.41	4.19	

# Cathedral Energy

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Twin Creek 1-9C1 (O1EB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 6084.0ft (Original Well Elev)
<b>Site:</b>	SWSE S1-T7S-R92W (O1EB Pad)	<b>MD Reference:</b>	KBE @ 6084.0ft (Original Well Elev)
<b>Well:</b>	Twin Creek 1-9C1 (O1EB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	EDM 5000.1 US 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
492.0	9.40	30.10	490.9	17.2	12.2	21.1	3.68	3.67	
523.0	10.50	30.80	521.4	21.8	14.9	26.4	3.57	3.55	
554.0	11.40	32.60	551.8	26.8	18.0	32.3	3.11	2.90	
585.0	12.30	33.00	582.2	32.1	21.5	38.6	2.92	2.90	
615.0	13.10	33.40	611.4	37.7	25.1	45.2	2.68	2.67	
646.0	14.00	33.00	641.6	43.7	29.0	52.5	2.92	2.90	
677.0	15.10	32.90	671.6	50.3	33.3	60.3	3.55	3.55	
708.0	16.50	32.90	701.4	57.4	37.9	68.7	4.52	4.52	
738.0	17.40	35.20	730.1	64.6	42.8	77.5	3.74	3.00	
768.0	18.40	36.60	758.7	72.1	48.2	86.7	3.63	3.33	
799.0	19.50	35.70	788.0	80.2	54.1	96.7	3.67	3.55	
830.0	20.30	36.00	817.1	88.8	60.3	107.3	2.60	2.58	
861.0	21.40	35.80	846.1	97.7	66.8	118.3	3.56	3.55	
953.0	22.10	33.80	931.5	125.7	86.2	152.4	1.11	0.76	
1,088.0	22.80	32.90	1,056.3	168.8	114.5	203.9	0.58	0.52	
1,253.0	24.00	32.70	1,207.7	223.8	150.0	269.4	0.73	0.73	
1,347.0	24.10	32.80	1,293.6	256.1	170.8	307.7	0.11	0.11	
1,442.0	24.00	35.00	1,380.3	288.2	192.3	346.4	0.95	-0.11	
1,537.0	23.50	35.00	1,467.3	319.5	214.3	384.7	0.53	-0.53	
1,632.0	23.40	33.40	1,554.4	350.8	235.5	422.5	0.68	-0.11	
1,727.0	24.40	36.00	1,641.3	382.4	257.5	460.9	1.53	1.05	
1,823.0	24.70	36.50	1,728.6	414.6	281.0	500.8	0.38	0.31	
1,918.0	24.60	36.10	1,815.0	446.5	304.5	540.4	0.20	-0.11	
2,013.0	24.70	36.10	1,901.3	478.5	327.8	580.0	0.11	0.11	
2,108.0	25.40	36.30	1,987.4	511.0	351.6	620.3	0.74	0.74	
2,203.0	24.00	34.90	2,073.7	543.3	374.7	659.9	1.60	-1.47	
2,298.0	23.40	35.30	2,160.7	574.5	396.7	698.1	0.65	-0.63	
2,393.0	22.30	35.00	2,248.2	604.7	417.9	735.0	1.16	-1.16	
2,488.0	22.30	35.40	2,336.1	634.1	438.7	771.1	0.16	0.00	
2,583.0	22.20	35.80	2,424.0	663.4	459.6	807.0	0.19	-0.11	
2,677.0	22.60	35.70	2,510.9	692.4	480.6	842.9	0.43	0.43	
2,772.0	22.60	35.80	2,598.6	722.1	501.9	879.4	0.04	0.00	
2,867.0	22.10	33.30	2,686.5	751.8	522.4	915.5	1.13	-0.53	
2,963.0	21.40	33.80	2,775.7	781.5	542.0	951.0	0.75	-0.73	
3,058.0	22.10	35.00	2,863.9	810.5	561.9	986.2	0.87	0.74	
3,153.0	21.80	35.10	2,952.0	839.6	582.3	1,021.7	0.32	-0.32	
3,248.0	21.20	35.70	3,040.4	867.9	602.5	1,056.6	0.67	-0.63	
3,343.0	18.50	36.80	3,129.8	894.0	621.5	1,088.8	2.87	-2.84	
3,438.0	16.60	35.30	3,220.3	917.1	638.4	1,117.4	2.06	-2.00	
3,532.0	15.60	33.00	3,310.6	938.7	653.1	1,143.5	1.26	-1.06	
3,627.0	13.00	34.40	3,402.7	958.2	666.1	1,167.0	2.76	-2.74	
3,722.0	12.30	36.50	3,495.4	975.2	678.1	1,187.8	0.88	-0.74	
3,817.0	10.50	34.90	3,588.5	990.4	689.1	1,206.5	1.92	-1.89	
3,912.0	8.00	34.50	3,682.3	1,002.9	697.8	1,221.8	2.63	-2.63	
4,007.0	6.30	34.10	3,776.5	1,012.7	704.5	1,233.6	1.79	-1.79	
4,102.0	3.00	29.20	3,871.2	1,019.2	708.6	1,241.3	3.50	-3.47	
4,196.0	0.50	48.50	3,965.1	1,021.6	710.1	1,244.2	2.70	-2.66	
4,291.0	0.40	158.90	4,060.1	1,021.6	710.5	1,244.4	0.78	-0.11	
4,386.0	0.70	15.50	4,155.1	1,021.8	710.8	1,244.7	1.10	0.32	
4,481.0	0.30	295.80	4,250.1	1,022.5	710.7	1,245.2	0.75	-0.42	
4,576.0	1.00	101.80	4,345.1	1,022.4	711.3	1,245.5	1.36	0.74	
4,671.0	0.70	55.30	4,440.1	1,022.6	712.6	1,246.4	0.76	-0.32	
4,766.0	1.10	11.50	4,535.1	1,023.8	713.3	1,247.8	0.81	0.42	

# Cathedral Energy

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Twin Creek 1-9C1 (O1EB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 6084.0ft (Original Well Elev)
<b>Site:</b>	SWSE S1-T7S-R92W (O1EB Pad)	<b>MD Reference:</b>	KBE @ 6084.0ft (Original Well Elev)
<b>Well:</b>	Twin Creek 1-9C1 (O1EB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	EDM 5000.1 US 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
4,861.0	1.00	329.40	4,630.1	1,025.4	713.0	1,249.0	0.80	-0.11	
4,956.0	0.10	340.60	4,725.1	1,026.2	712.6	1,249.4	0.95	-0.95	
5,051.0	0.60	280.30	4,820.1	1,026.4	712.1	1,249.2	0.59	0.53	
5,146.0	1.50	259.90	4,915.1	1,026.3	710.3	1,248.1	1.01	0.95	
5,241.0	1.20	233.90	5,010.1	1,025.5	708.3	1,246.3	0.71	-0.32	
5,336.0	0.40	268.70	5,105.0	1,024.9	707.2	1,245.2	0.95	-0.84	
5,431.0	1.10	352.90	5,200.0	1,025.8	706.7	1,245.6	1.19	0.74	
5,527.0	0.90	346.40	5,296.0	1,027.4	706.4	1,246.8	0.24	-0.21	
5,622.0	0.10	236.70	5,391.0	1,028.1	706.2	1,247.2	0.99	-0.84	
5,716.0	1.30	124.60	5,485.0	1,027.4	707.0	1,247.2	1.43	1.28	
5,811.0	2.00	155.30	5,580.0	1,025.3	708.6	1,246.3	1.16	0.74	
5,906.0	2.30	169.30	5,674.9	1,021.9	709.6	1,244.2	0.63	0.32	
6,001.0	3.10	183.40	5,769.8	1,017.5	709.8	1,240.6	1.09	0.84	
6,032.0	2.70	181.60	5,800.8	1,015.9	709.8	1,239.3	1.32	-1.29	Last Cathedral Survey @ 6,032' MD
6,082.0	2.70	181.60	5,850.7	1,013.6	709.7	1,237.3	0.00	0.00	Projection to Bit @ 6,082'

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									
Twin Creek 1-9C1 (O1E	0.00	0.00	3,964.0	1,019.9	711.4	1,604,543.60	2,404,473.70	39.474250	-107.609850
- survey misses target center by 2.1ft at 4194.8ft MD (3964.0 TVD, 1021.6 N, 710.1 E)									
- Point									
Twin Creek 1-9C1 (O1E	0.00	0.00	5,819.0	1,019.9	711.4	1,604,543.60	2,404,473.70	39.474250	-107.609850
- survey misses target center by 18.7ft at 6032.0ft MD (5800.8 TVD, 1015.9 N, 709.8 E)									
- Circle (radius 25.0)									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
6,032.0	5,800.8	1,015.9	709.8	Last Cathedral Survey @ 6,032' MD
6,082.0	5,850.7	1,013.6	709.7	Projection to Bit @ 6,082'

Checked By: _____	Approved By: _____	Date: _____
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