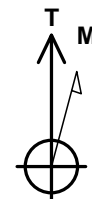
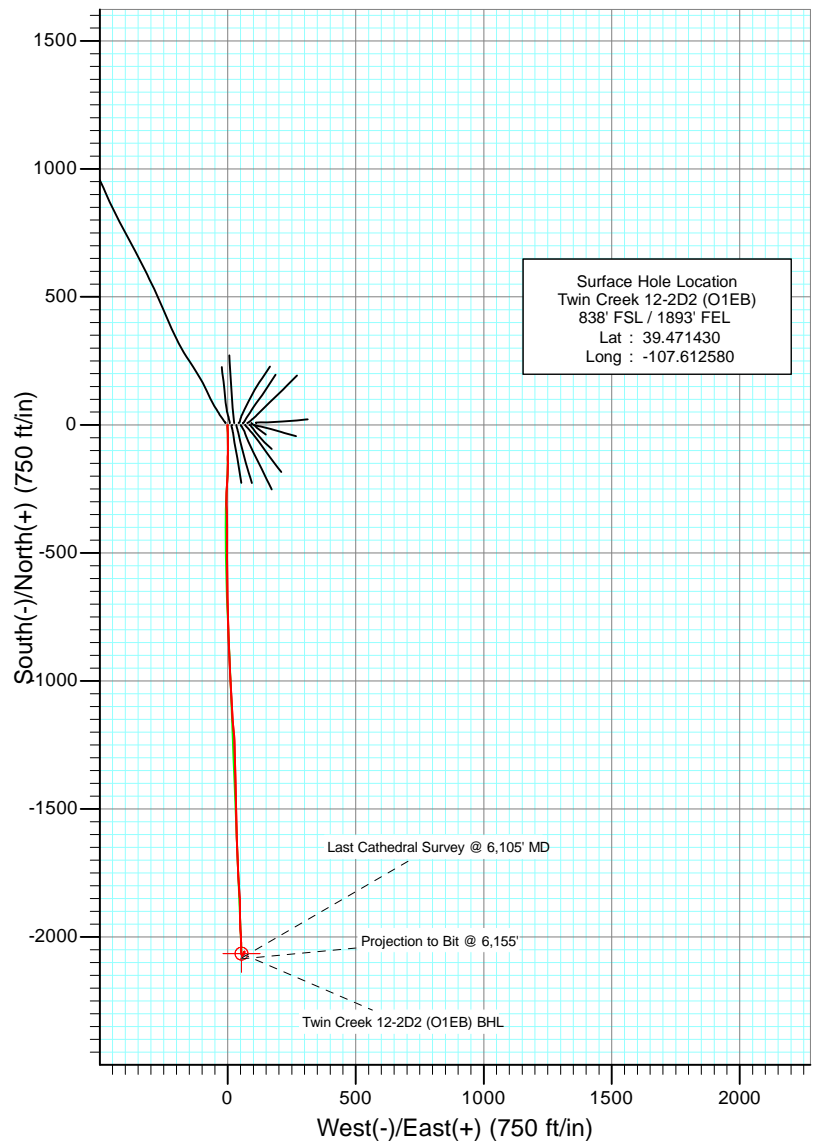
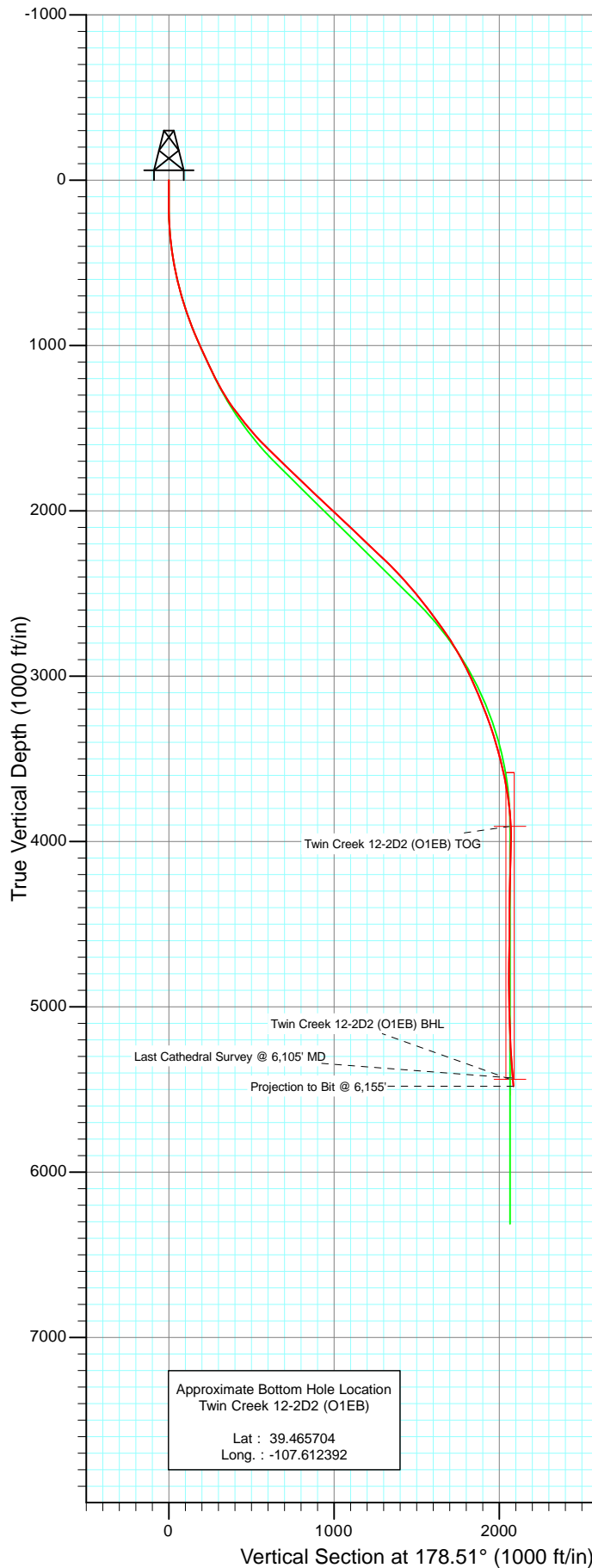




Project: Mamm Creek
 Site: SWSE S1-T7S-R92W (O1EB Pad)
 Well: Twin Creek 12-2D2 (O1EB)
 Wellbore: DD
 Design: FINAL



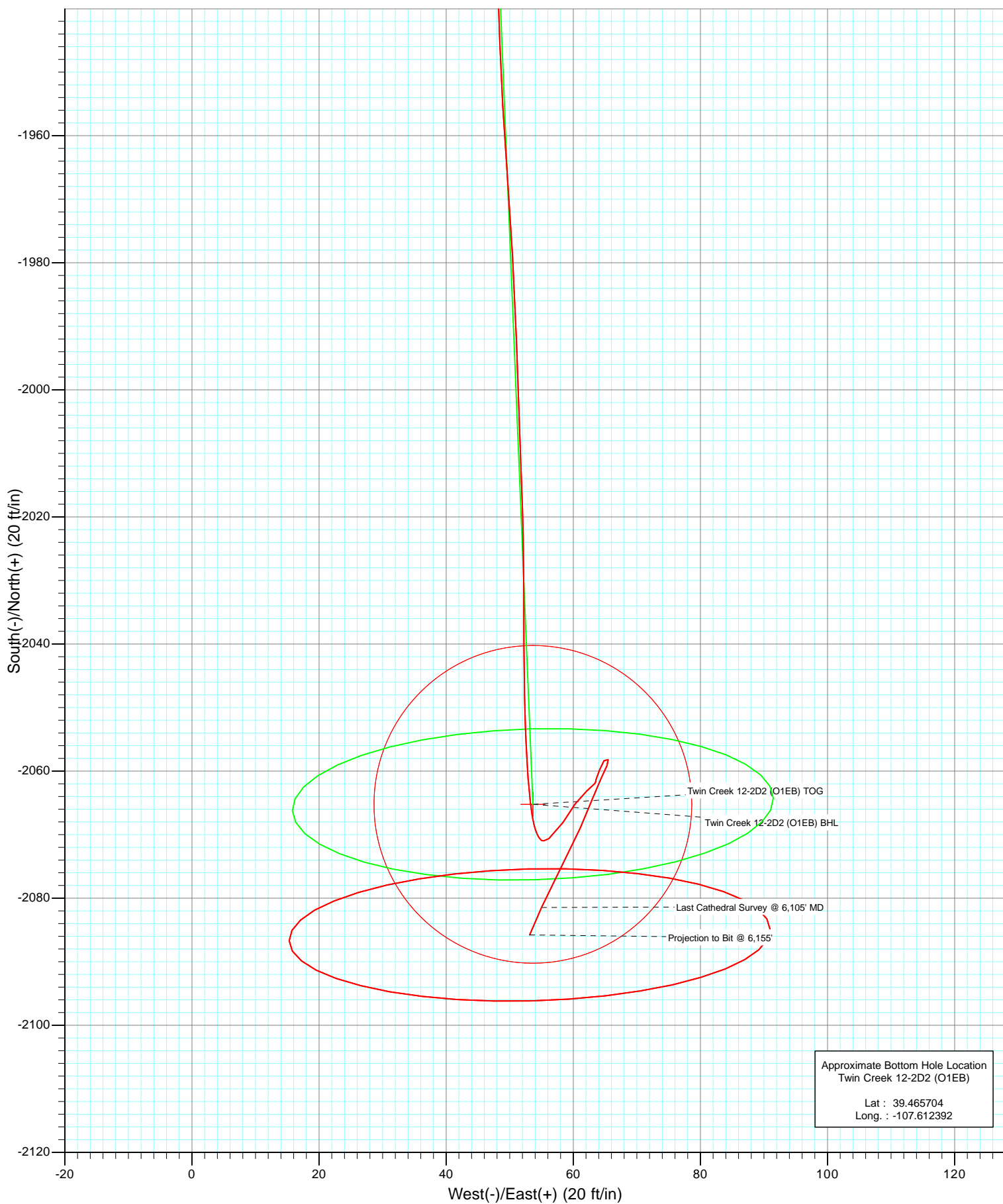
Azimuths to True North
 Magnetic North: 10.27°

Magnetic Field
 Strength: 52361.3snT
 Dip Angle: 65.81°
 Date: 9/17/2010
 Model: IGRF2010

DESIGN DETAILS: DD				
105388 (SH) 105398 (MH): KR				
KBE @ 6084.0ft (Original Well Elev)				
Target	Azimuth	Origin	N/S	E/W From TVD
Twin Creek 12-2D2 (O1EB) BHL	178.51	Slot	0.0	0.0



Project: Mamm Creek
Site: SWSE S1-T7S-R92W (O1EB Pad)
Well: Twin Creek 12-2D2 (O1EB)
Wellbore: DD
Design: FINAL



Cathedral Energy

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Twin Creek 12-2D2 (O1EB)
Project:	Mamm Creek	TVD Reference:	KBE @ 6084.0ft (Original Well Elev)
Site:	SWSE S1-T7S-R92W (O1EB Pad)	MD Reference:	KBE @ 6084.0ft (Original Well Elev)
Well:	Twin Creek 12-2D2 (O1EB)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	EDM 5000.1 US 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	SWSE S1-T7S-R92W (O1EB Pad)			
Site Position:		Northing:	1,603,540.14 ft	Latitude: 39.471450
From:	Lat/Long	Easting:	2,403,755.74 ft	Longitude: -107.612310
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence: -1.33 °

Well	Twin Creek 12-2D2 (O1EB)			
Well Position	+N/-S	0.0 ft	Northing:	1,603,534.62 ft
	+E/-W	0.0 ft	Easting:	2,403,679.37 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft	Ground Level: 6,062.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/17/2010	10.27	65.81	52,361

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	178.51

Survey Program	Date	9/27/2010		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
124.0	6,155.0	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	
124.0	0.50	265.10	124.0	0.0	-0.5	0.0	0.40	0.40	
154.0	0.70	201.60	154.0	-0.2	-0.7	0.2	2.18	0.67	
185.0	1.10	222.20	185.0	-0.6	-1.0	0.6	1.64	1.29	
216.0	1.50	199.20	216.0	-1.2	-1.3	1.2	2.10	1.29	
247.0	2.60	184.90	247.0	-2.3	-1.5	2.3	3.89	3.55	
277.0	3.60	183.70	276.9	-3.9	-1.7	3.9	3.34	3.33	
308.0	4.30	184.90	307.8	-6.1	-1.8	6.0	2.27	2.26	
339.0	4.90	176.50	338.7	-8.5	-1.8	8.5	2.91	1.94	
370.0	5.80	174.00	369.6	-11.4	-1.6	11.4	3.00	2.90	
401.0	7.30	172.20	400.4	-14.9	-1.2	14.9	4.88	4.84	
431.0	8.30	176.30	430.1	-19.0	-0.8	19.0	3.81	3.33	
462.0	9.70	175.50	460.7	-23.8	-0.4	23.8	4.53	4.52	

Cathedral Energy

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Twin Creek 12-2D2 (O1EB)
Project:	Mamm Creek	TVD Reference:	KBE @ 6084.0ft (Original Well Elev)
Site:	SWSE S1-T7S-R92W (O1EB Pad)	MD Reference:	KBE @ 6084.0ft (Original Well Elev)
Well:	Twin Creek 12-2D2 (O1EB)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	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	10.90	173.90	490.3	-29.2	0.1	29.1	4.11	4.00	
523.0	11.60	179.40	520.7	-35.2	0.4	35.2	4.13	2.26	
554.0	11.60	180.00	551.0	-41.4	0.5	41.4	0.39	0.00	
585.0	12.40	181.30	581.4	-47.9	0.4	47.9	2.72	2.58	
615.0	13.30	178.90	610.6	-54.5	0.4	54.5	3.49	3.00	
646.0	14.20	177.90	640.7	-61.9	0.6	61.9	3.00	2.90	
677.0	14.60	179.60	670.7	-69.6	0.8	69.6	1.88	1.29	
708.0	15.40	179.90	700.7	-77.6	0.8	77.6	2.59	2.58	
738.0	16.30	179.80	729.5	-85.8	0.8	85.8	3.00	3.00	
768.0	17.30	181.30	758.3	-94.5	0.7	94.5	3.63	3.33	
799.0	18.20	181.30	787.8	-103.9	0.5	103.9	2.90	2.90	
830.0	19.60	181.10	817.1	-114.0	0.3	113.9	4.52	4.52	
861.0	20.20	180.80	846.3	-124.5	0.1	124.5	1.96	1.94	
891.0	21.20	179.00	874.3	-135.1	0.2	135.1	3.95	3.33	
921.0	22.10	179.40	902.2	-146.2	0.3	146.2	3.04	3.00	
953.0	23.10	180.10	931.8	-158.5	0.4	158.5	3.24	3.12	
1,046.0	24.30	182.90	1,016.9	-195.9	-0.6	195.8	1.77	1.29	
1,114.0	25.20	183.40	1,078.7	-224.3	-2.2	224.1	1.36	1.32	
1,201.0	25.90	183.90	1,157.2	-261.7	-4.6	261.5	0.84	0.80	
1,265.0	27.00	180.60	1,214.5	-290.2	-5.7	290.0	2.87	1.72	
1,360.0	31.40	175.70	1,297.4	-336.5	-4.1	336.3	5.27	4.63	
1,455.0	36.10	179.80	1,376.4	-389.2	-2.1	389.0	5.50	4.95	
1,550.0	37.80	180.30	1,452.3	-446.3	-2.2	446.1	1.82	1.79	
1,644.0	41.10	180.00	1,524.9	-506.0	-2.3	505.8	3.52	3.51	
1,740.0	44.60	179.60	1,595.2	-571.3	-2.1	571.0	3.66	3.65	
1,835.0	45.80	179.20	1,662.2	-638.7	-1.4	638.4	1.30	1.26	
1,931.0	45.90	179.10	1,729.0	-707.5	-0.4	707.3	0.13	0.10	
2,026.0	46.50	178.10	1,794.8	-776.1	1.3	775.9	0.99	0.63	
2,121.0	46.40	177.70	1,860.2	-844.9	3.8	844.7	0.32	-0.11	
2,216.0	46.40	177.50	1,925.8	-913.6	6.7	913.5	0.15	0.00	
2,311.0	46.90	177.60	1,991.0	-982.7	9.7	982.6	0.53	0.53	
2,405.0	46.70	176.70	2,055.3	-1,051.1	13.1	1,051.1	0.73	-0.21	
2,500.0	46.80	176.40	2,120.4	-1,120.2	17.2	1,120.2	0.25	0.11	
2,596.0	46.30	174.70	2,186.4	-1,189.6	22.7	1,189.8	1.39	-0.52	
2,691.0	46.20	178.30	2,252.1	-1,258.1	26.8	1,258.4	2.74	-0.11	
2,786.0	46.30	177.80	2,317.8	-1,326.7	29.2	1,327.0	0.39	0.11	
2,881.0	43.20	180.30	2,385.3	-1,393.6	30.3	1,393.9	3.75	-3.26	
2,976.0	40.60	178.90	2,456.0	-1,457.0	30.7	1,457.3	2.91	-2.74	
3,071.0	38.10	178.80	2,529.5	-1,517.2	32.0	1,517.5	2.63	-2.63	
3,166.0	37.90	177.40	2,604.3	-1,575.7	33.9	1,576.0	0.93	-0.21	
3,261.0	36.40	179.00	2,680.0	-1,633.0	35.7	1,633.4	1.88	-1.58	
3,356.0	33.50	176.60	2,757.9	-1,687.4	37.8	1,687.8	3.38	-3.05	
3,451.0	30.80	176.30	2,838.3	-1,737.8	40.9	1,738.3	2.85	-2.84	
3,546.0	27.60	176.80	2,921.2	-1,784.1	43.7	1,784.6	3.38	-3.37	
3,641.0	25.00	177.10	3,006.4	-1,826.1	45.9	1,826.7	2.74	-2.74	
3,736.0	22.90	178.50	3,093.2	-1,864.6	47.4	1,865.2	2.29	-2.21	
3,831.0	22.40	180.30	3,180.9	-1,901.2	47.8	1,901.8	0.90	-0.53	
3,925.0	19.60	178.60	3,268.6	-1,934.9	48.1	1,935.5	3.05	-2.98	
4,020.0	17.30	175.80	3,358.8	-1,964.9	49.5	1,965.5	2.59	-2.42	
4,116.0	15.70	177.90	3,450.8	-1,992.1	51.0	1,992.8	1.78	-1.67	
4,210.0	13.30	178.00	3,541.8	-2,015.6	51.9	2,016.3	2.55	-2.55	
4,305.0	10.90	180.30	3,634.7	-2,035.5	52.2	2,036.2	2.58	-2.53	
4,400.0	9.00	178.00	3,728.2	-2,052.0	52.4	2,052.6	2.04	-2.00	

Cathedral Energy

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Twin Creek 12-2D2 (O1EB)
Project:	Mamm Creek	TVD Reference:	KBE @ 6084.0ft (Original Well Elev)
Site:	SWSE S1-T7S-R92W (O1EB Pad)	MD Reference:	KBE @ 6084.0ft (Original Well Elev)
Well:	Twin Creek 12-2D2 (O1EB)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	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
4,495.0	5.30	174.50	3,822.5	-2,063.8	53.1	2,064.4	3.92	-3.89	
4,589.0	2.30	156.90	3,916.3	-2,069.8	54.3	2,070.5	3.39	-3.19	
4,620.0	1.50	140.30	3,947.3	-2,070.7	54.8	2,071.4	3.11	-2.58	
4,652.0	1.20	79.80	3,979.3	-2,071.0	55.4	2,071.7	4.33	-0.94	
4,684.0	1.90	56.50	4,011.2	-2,070.6	56.1	2,071.4	2.90	2.19	
4,778.0	2.30	28.90	4,105.2	-2,068.1	58.4	2,068.9	1.14	0.43	
4,873.0	1.90	38.50	4,200.1	-2,065.2	60.3	2,066.1	0.56	-0.42	
4,968.0	1.40	46.30	4,295.1	-2,063.2	62.1	2,064.1	0.58	-0.53	
5,063.0	0.70	48.90	4,390.1	-2,062.0	63.4	2,062.9	0.74	-0.74	
5,158.0	0.40	241.40	4,485.1	-2,061.8	63.5	2,062.7	1.15	-0.32	
5,254.0	0.80	33.30	4,581.1	-2,061.4	63.6	2,062.3	1.22	0.42	
5,349.0	1.30	11.40	4,676.0	-2,059.7	64.2	2,060.7	0.67	0.53	
5,444.0	0.70	54.30	4,771.0	-2,058.3	64.8	2,059.3	0.97	-0.63	
5,539.0	0.30	134.70	4,866.0	-2,058.2	65.5	2,059.2	0.75	-0.42	
5,634.0	1.00	204.70	4,961.0	-2,059.1	65.3	2,060.1	0.99	0.74	
5,729.0	1.70	205.10	5,056.0	-2,061.1	64.4	2,062.1	0.74	0.74	
5,825.0	2.70	201.90	5,151.9	-2,064.5	62.9	2,065.5	1.05	1.04	
5,920.0	3.10	202.80	5,246.8	-2,069.0	61.1	2,069.9	0.42	0.42	
6,015.0	4.40	208.50	5,341.6	-2,074.5	58.4	2,075.4	1.42	1.37	
6,105.0	5.40	203.60	5,431.3	-2,081.5	55.0	2,082.2	1.20	1.11	Last Cathedral Survey @ 6,105' MD Projection to Bit @ 6,155'
6,155.0	5.40	203.60	5,481.0	-2,085.8	53.1	2,086.4	0.00	0.00	

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 12-2D2 (O1I	0.00	0.00	5,439.0	-2,065.2	53.6	1,601,468.71	2,403,684.98	39.465760	-107.612390
- survey misses target center by 18.0ft at 6105.0ft MD (5431.3 TVD, -2081.5 N, 55.0 E)									
- Circle (radius 25.0)									
Twin Creek 12-2D2 (O1I	0.00	0.00	3,909.0	-2,065.2	53.6	1,601,468.71	2,403,684.98	39.465760	-107.612390
- survey misses target center by 4.3ft at 4581.4ft MD (3908.7 TVD, -2069.5 N, 54.2 E)									
- Point									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
6,105.0	5,431.3	-2,081.5	55.0	Last Cathedral Survey @ 6,105' MD
6,155.0	5,481.0	-2,085.8	53.1	Projection to Bit @ 6,155'

Checked By: _____ Approved By: _____ Date: _____