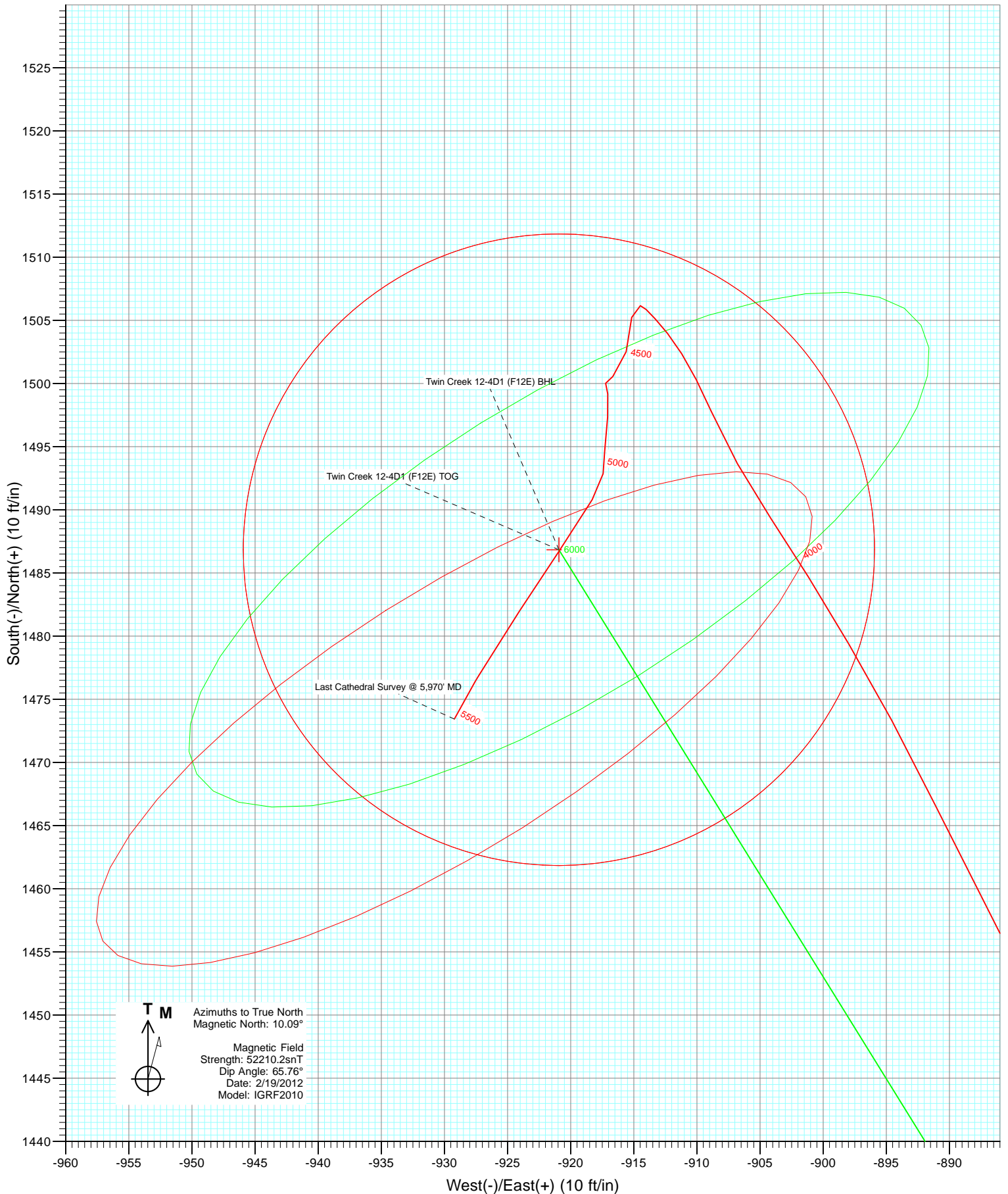
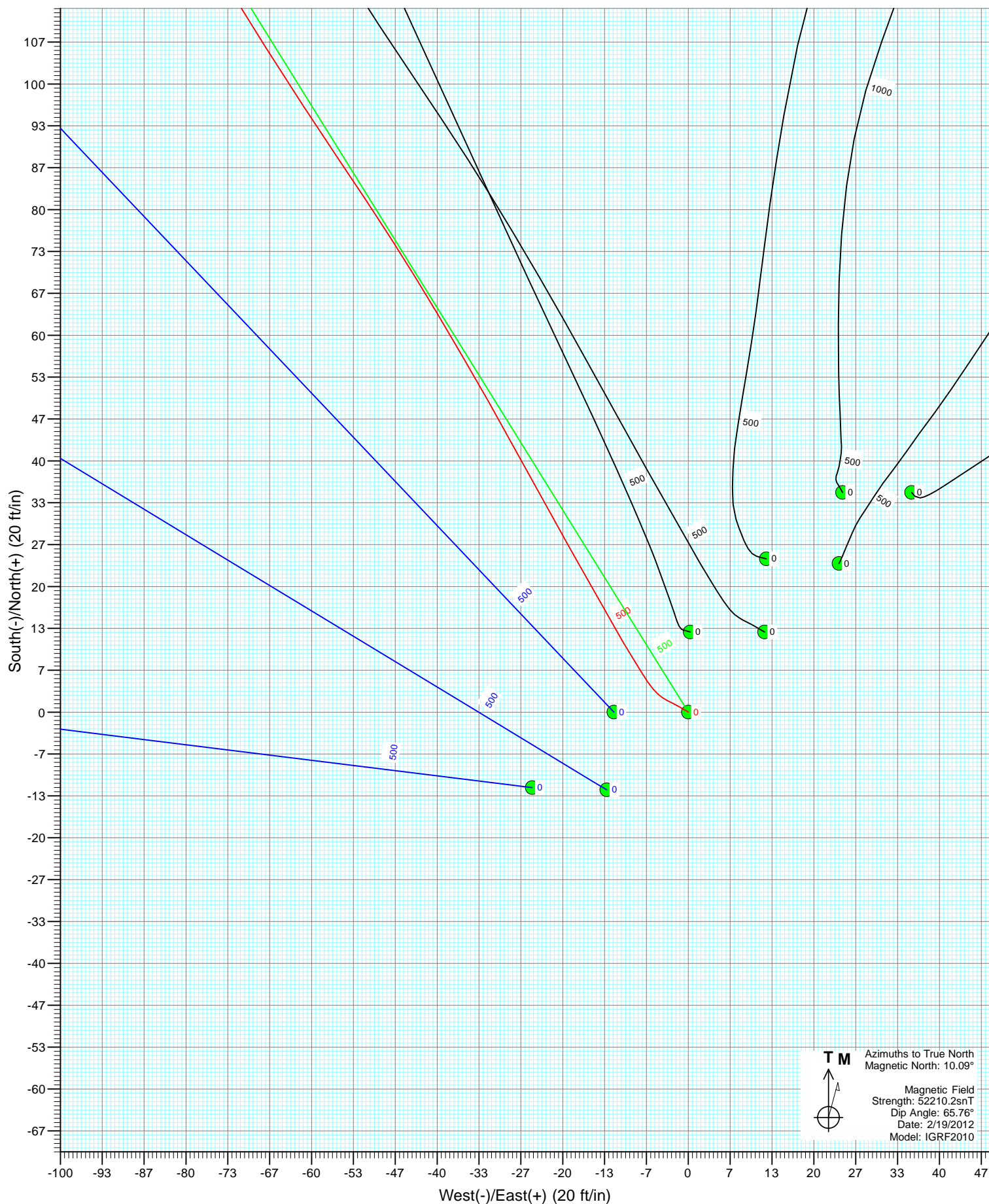


Azimuths to True North
Magnetic North: 10.09°

Magnetic Field
Strength: 52210.2snT
Dip Angle: 65.76°
Date: 2/19/2012
Model: IGRF2010





Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Twin Creek 12-4D1 (F12E)
Project:	Mamm Creek	TVD Reference:	KBE @ 6167.0ft (Nabors M15)
Site:	F12E Pad	MD Reference:	KBE @ 6167.0ft (Nabors M15)
Well:	Twin Creek 12-4D1 (F12E)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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		F12E Pad			
Site Position:		Northing:	1,600,159.70 ft	Latitude:	39.462050
From:	Lat/Long	Easting:	2,401,852.74 ft	Longitude:	-107.618770
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.34 °

Well	Twin Creek 12-4D1 (F12E)					
Well Position	+N/-S	0.0 ft	Northing:	1,600,137.76 ft	Latitude:	39.461988
	+E/-W	0.0 ft	Easting:	2,401,824.55 ft	Longitude:	-107.618868
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,145.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/19/2012	10.09	65.76	52,210

Design	DD				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	328.23	

Survey Program	Date	3/2/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
154.0	5,970.0	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		
154.0	1.30	300.40	154.0	0.9	-1.5	1.5	0.84	0.84		
185.0	1.20	299.00	185.0	1.2	-2.1	2.1	0.34	-0.32		
216.0	1.40	295.00	216.0	1.5	-2.7	2.7	0.71	0.65		
247.0	1.40	297.10	247.0	1.9	-3.4	3.4	0.17	0.00		
277.0	1.60	304.20	277.0	2.3	-4.1	4.1	0.91	0.67		
308.0	1.80	309.60	307.9	2.8	-4.8	4.9	0.83	0.65		
338.0	2.60	321.10	337.9	3.7	-5.6	6.1	3.03	2.67		
369.0	3.20	325.50	368.9	4.9	-6.5	7.6	2.06	1.94		
400.0	4.00	328.40	399.8	6.5	-7.6	9.6	2.65	2.58		
430.0	4.90	328.40	429.7	8.5	-8.8	11.9	3.00	3.00		
461.0	6.00	329.50	460.6	11.1	-10.3	14.8	3.56	3.55		
492.0	6.90	330.60	491.4	14.1	-12.1	18.3	2.93	2.90		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Twin Creek 12-4D1 (F12E)
Project:	Mamm Creek	TVD Reference:	KBE @ 6167.0ft (Nabors M15)
Site:	F12E Pad	MD Reference:	KBE @ 6167.0ft (Nabors M15)
Well:	Twin Creek 12-4D1 (F12E)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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
584.0	10.40	330.50	582.3	26.1	-18.9	32.1	3.80	3.80	
676.0	13.60	331.30	672.3	42.8	-28.1	51.2	3.48	3.48	
768.0	16.50	329.20	761.1	63.6	-40.0	75.1	3.21	3.15	
860.0	20.00	325.90	848.5	87.8	-55.5	103.9	3.97	3.80	
951.0	22.60	328.60	933.3	115.6	-73.4	136.9	3.05	2.86	
1,044.0	26.00	329.80	1,018.0	148.5	-93.0	175.2	3.69	3.66	
1,110.0	26.20	329.10	1,077.3	173.5	-107.7	204.2	0.56	0.30	
1,257.0	26.90	328.30	1,208.8	229.7	-141.9	269.9	0.53	0.48	
1,352.0	29.00	329.00	1,292.7	267.7	-165.0	314.5	2.24	2.21	
1,448.0	31.20	329.70	1,375.8	309.1	-189.5	362.6	2.32	2.29	
1,543.0	34.01	329.40	1,455.8	353.2	-215.5	413.8	2.96	2.96	
1,638.0	35.20	328.40	1,534.0	399.4	-243.4	467.7	1.39	1.25	
1,732.0	35.90	327.20	1,610.5	445.7	-272.5	522.4	1.05	0.74	
1,827.0	36.25	329.70	1,687.2	493.3	-301.7	578.3	1.59	0.37	
1,923.0	35.80	327.30	1,764.9	541.5	-331.2	634.7	1.54	-0.47	
2,018.0	35.90	331.30	1,841.9	589.3	-359.6	690.3	2.47	0.11	
2,113.0	35.30	330.90	1,919.1	637.7	-386.4	745.6	0.68	-0.63	
2,209.0	34.70	330.50	1,997.8	685.7	-413.3	800.6	0.67	-0.62	
2,304.0	35.80	331.10	2,075.4	733.6	-440.0	855.3	1.21	1.16	
2,399.0	34.10	331.90	2,153.2	781.4	-466.0	909.7	1.85	-1.79	
2,494.0	34.30	329.10	2,231.8	827.9	-492.3	963.0	1.67	0.21	
2,589.0	34.50	329.50	2,310.2	874.0	-519.7	1,016.7	0.32	0.21	
2,684.0	34.40	327.90	2,388.5	919.9	-547.6	1,070.4	0.96	-0.11	
2,779.0	36.90	328.90	2,465.7	967.1	-576.6	1,125.8	2.70	2.63	
2,874.0	37.10	328.52	2,541.6	1,015.9	-606.3	1,183.0	0.32	0.21	
2,969.0	36.30	329.00	2,617.8	1,064.5	-635.8	1,239.7	0.89	-0.84	
3,065.0	34.10	328.50	2,696.2	1,111.8	-664.5	1,295.1	2.31	-2.29	
3,159.0	32.00	326.80	2,775.0	1,155.1	-691.9	1,346.3	2.44	-2.23	
3,254.0	29.60	328.50	2,856.6	1,196.2	-717.9	1,394.9	2.69	-2.53	
3,349.0	26.10	325.20	2,940.6	1,233.4	-742.1	1,439.3	4.02	-3.68	
3,444.0	23.40	325.70	3,026.8	1,266.1	-764.7	1,479.0	2.85	-2.84	
3,539.0	22.20	324.90	3,114.4	1,296.4	-785.6	1,515.8	1.30	-1.26	
3,634.0	20.40	327.30	3,202.9	1,325.0	-804.9	1,550.3	2.10	-1.89	
3,729.0	18.30	328.60	3,292.6	1,351.7	-821.6	1,581.7	2.26	-2.21	
3,824.0	17.10	326.20	3,383.1	1,376.0	-837.2	1,610.6	1.48	-1.26	
3,919.0	15.10	327.80	3,474.3	1,398.1	-851.5	1,636.9	2.16	-2.11	
4,014.0	12.80	325.70	3,566.5	1,417.2	-864.0	1,659.8	2.48	-2.42	
4,109.0	12.10	331.90	3,659.3	1,434.7	-874.7	1,680.3	1.59	-0.74	
4,202.0	10.90	332.70	3,750.4	1,451.1	-883.3	1,698.8	1.30	-1.29	
4,299.0	9.70	333.70	3,845.9	1,466.6	-891.1	1,716.0	1.25	-1.24	
4,393.0	8.00	329.50	3,938.7	1,479.3	-897.9	1,730.5	1.93	-1.81	
4,463.0	6.74	327.36	4,008.2	1,487.0	-902.6	1,739.5	1.83	-1.79	Twin Creek 12-4D1 (F12E) TOG
4,488.0	6.30	326.40	4,033.0	1,489.4	-904.2	1,742.3	1.83	-1.78	
4,583.0	5.40	336.20	4,127.5	1,497.8	-908.9	1,751.9	1.41	-0.95	
4,678.0	3.20	321.20	4,222.2	1,504.0	-912.3	1,759.0	2.58	-2.32	
4,773.0	0.60	284.90	4,317.2	1,506.2	-914.5	1,762.0	2.88	-2.74	
4,867.0	1.30	191.10	4,411.2	1,505.2	-915.2	1,761.6	1.56	0.74	
4,963.0	2.00	188.00	4,507.1	1,502.5	-915.6	1,759.5	0.73	0.73	
5,057.0	1.10	247.50	4,601.1	1,500.6	-916.7	1,758.4	1.84	-0.96	
5,152.0	0.40	122.90	4,696.1	1,500.0	-917.2	1,758.2	1.44	-0.74	
5,247.0	0.80	189.80	4,791.1	1,499.2	-917.1	1,757.4	0.78	0.42	
5,343.0	1.40	175.10	4,887.1	1,497.4	-917.1	1,755.9	0.69	0.62	
5,438.0	1.90	191.80	4,982.0	1,494.7	-917.3	1,753.7	0.72	0.53	

Cathedral Energy Services

Survey Report

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Site:	F12E Pad	MD Reference:	KBE @ 6167.0ft (Nabors M15)
Well:	Twin Creek 12-4D1 (F12E)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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
5,532.0	0.40	145.90	5,076.0	1,492.9	-917.4	1,752.2	1.75	-1.60	
5,627.0	2.50	210.30	5,171.0	1,490.8	-918.3	1,750.9	2.48	2.21	
5,722.0	3.40	214.70	5,265.9	1,486.7	-920.9	1,748.8	0.98	0.95	
5,817.0	3.40	212.20	5,360.7	1,482.0	-924.1	1,746.5	0.16	0.00	
5,912.0	3.90	212.40	5,455.5	1,476.9	-927.3	1,743.8	0.53	0.53	
5,920.0	3.90	209.20	5,463.5	1,476.4	-927.6	1,743.6	2.72	0.00	
5,970.0	3.90	209.20	5,513.3	1,473.4	-929.2	1,741.9	0.00	0.00	Last Cathedral Survey @ 5,970' MD - Twin Creel

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 12-4D1 (F12	0.00	0.00	4,007.0	1,486.8	-920.9	1,601,645.68	2,400,938.54	39.466070	-107.622130
- actual wellpath misses target center by 18.3ft at 4463.0ft MD (4008.2 TVD, 1487.0 N, -902.6 E)									
- Point									
Twin Creek 12-4D1 (F12	0.00	0.00	5,537.0	1,486.8	-920.9	1,601,645.68	2,400,938.54	39.466070	-107.622130
- actual wellpath misses target center by 28.4ft at 5970.0ft MD (5513.3 TVD, 1473.4 N, -929.2 E)									
- Circle (radius 25.0)									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,970.0	5,513.3	1,473.4	-929.2	Last Cathedral Survey @ 5,970' MD

Checked By: _____ Approved By: _____ Date: _____