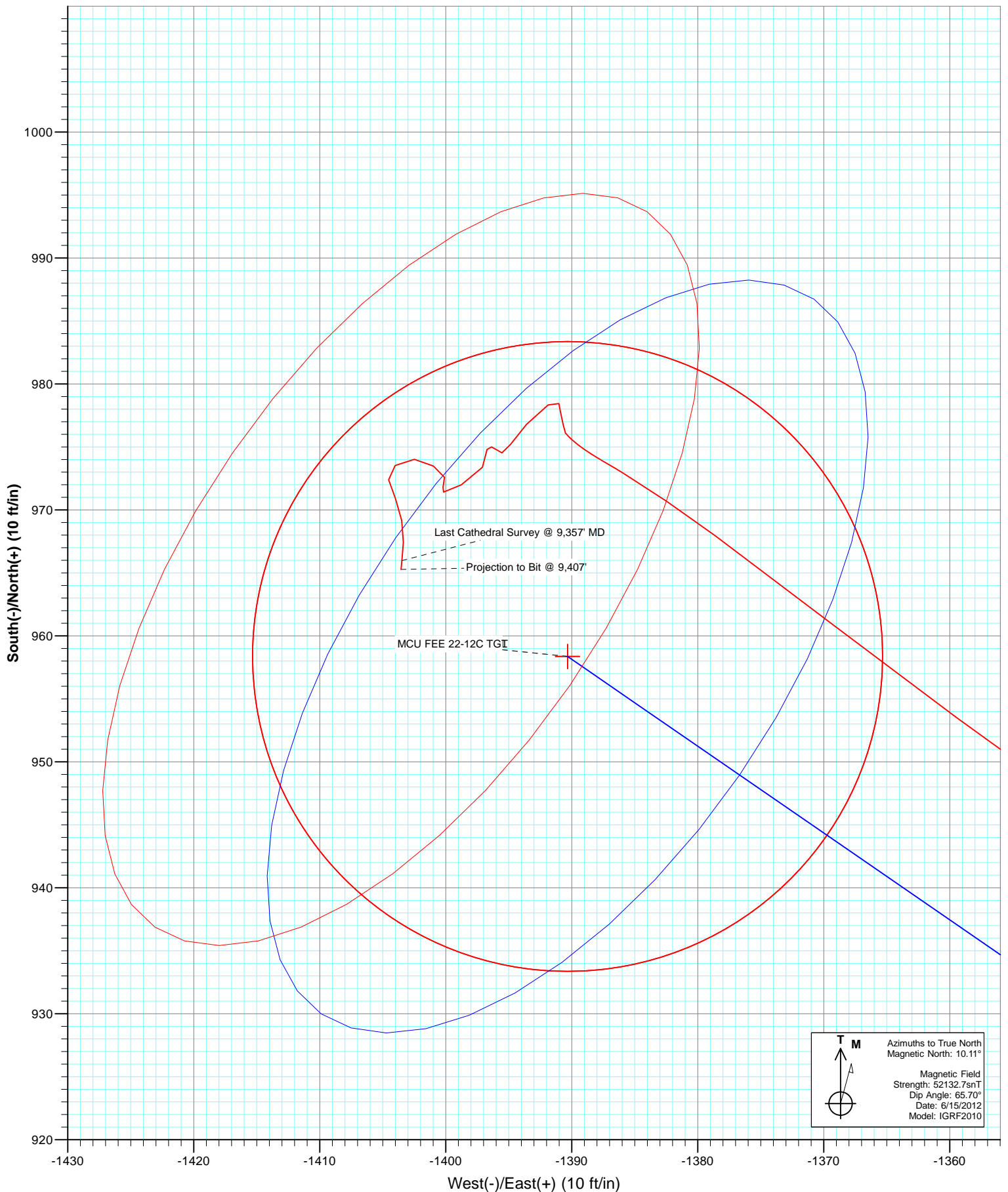


Azimuths to True North
Magnetic North: 10.11°

Magnetic Field
Strength: 52132.7snT
Dip Angle: 65.70°
Date: 6/15/2012
Model: IGRF2010



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU FEE 22-12C (N22W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7048.0ft (Original Well Elev)
Site:	N22W Pad	MD Reference:	KBE @ 7048.0ft (Original Well Elev)
Well:	MCU FEE 22-12C (N22W Pad)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	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		N22W Pad			
Site Position:		Northing:	1,587,870.64 ft	Latitude:	39.425629
From:	Lat/Long	Easting:	2,361,187.41 ft	Longitude:	-107.761673
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.43 °

Well	MCU FEE 22-12C (N22W Pad)					
Well Position	+N/-S	0.0 ft	Northing:	1,587,971.59 ft	Latitude:	39.425900
	+E/-W	0.0 ft	Easting:	2,361,097.53 ft	Longitude:	-107.762000
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,026.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/15/2012	10.11	65.70	52,133

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	304.58

Survey Program	Date	8/6/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
185.0	9,407.0	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	
185.0	0.60	266.30	185.0	-0.1	-1.0	0.8	0.32	0.32	
215.0	0.80	265.90	215.0	-0.1	-1.3	1.0	0.67	0.67	
246.0	0.60	252.70	246.0	-0.2	-1.7	1.3	0.82	-0.65	
277.0	0.10	1.80	277.0	-0.2	-1.9	1.4	2.06	-1.61	
307.0	0.20	277.50	307.0	-0.1	-1.9	1.5	0.72	0.33	
338.0	0.40	36.40	338.0	0.0	-1.9	1.5	1.70	0.65	
369.0	0.40	54.60	369.0	0.1	-1.7	1.5	0.41	0.00	
399.0	0.50	354.70	399.0	0.3	-1.7	1.5	1.53	0.33	
430.0	1.60	322.40	430.0	0.8	-1.9	2.0	3.89	3.55	
460.0	2.40	316.60	460.0	1.6	-2.6	3.1	2.75	2.67	
491.0	3.30	313.70	490.9	2.6	-3.7	4.6	2.94	2.90	
521.0	4.50	315.90	520.9	4.1	-5.2	6.6	4.03	4.00	

Cathedral Energy Services

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Site:	N22W Pad	MD Reference:	KBE @ 7048.0ft (Original Well Elev)
Well:	MCU FEE 22-12C (N22W Pad)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	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
552.0	5.60	312.60	551.7	6.0	-7.1	9.3	3.67	3.55	
583.0	6.50	305.40	582.6	8.0	-9.7	12.5	3.79	2.90	
613.0	7.50	303.60	612.3	10.1	-12.7	16.2	3.41	3.33	
644.0	8.90	305.70	643.0	12.6	-16.3	20.6	4.62	4.52	
674.0	9.80	303.20	672.6	15.4	-20.3	25.5	3.29	3.00	
705.0	10.50	302.80	703.1	18.3	-24.9	30.9	2.27	2.26	
736.0	12.00	304.00	733.5	21.7	-30.0	37.0	4.90	4.84	
767.0	13.30	301.70	763.8	25.4	-35.7	43.8	4.50	4.19	
859.0	16.40	306.00	852.7	38.5	-55.2	67.3	3.57	3.37	
949.0	16.40	307.00	939.0	53.7	-75.6	92.7	0.31	0.00	
1,041.0	15.80	300.90	1,027.4	67.9	-96.7	118.2	1.95	-0.65	
1,132.0	15.60	299.60	1,115.0	80.3	-118.0	142.7	0.44	-0.22	
1,223.0	15.30	300.40	1,202.8	92.4	-139.0	166.9	0.40	-0.33	
1,316.0	16.20	304.60	1,292.3	106.0	-160.3	192.1	1.56	0.97	
1,411.0	16.00	304.20	1,383.5	120.9	-182.0	218.5	0.24	-0.21	
1,552.0	16.10	303.90	1,519.0	142.7	-214.3	257.4	0.09	0.07	
1,647.0	16.40	304.50	1,610.3	157.7	-236.3	284.0	0.36	0.32	
1,743.0	15.70	303.30	1,702.5	172.5	-258.3	310.6	0.81	-0.73	
1,839.0	17.40	304.40	1,794.5	187.7	-281.0	337.9	1.80	1.77	
1,934.0	17.50	306.30	1,885.2	204.2	-304.2	366.4	0.61	0.11	
2,030.0	18.20	305.60	1,976.5	221.5	-328.1	395.8	0.76	0.73	
2,125.0	18.20	305.80	2,066.8	238.8	-352.2	425.5	0.07	0.00	
2,221.0	18.10	305.10	2,158.0	256.1	-376.5	455.4	0.25	-0.10	
2,316.0	18.20	305.00	2,248.3	273.1	-400.8	485.0	0.11	0.11	
2,411.0	18.70	305.90	2,338.4	290.6	-425.2	515.0	0.61	0.53	
2,506.0	17.30	305.60	2,428.7	307.7	-449.1	544.4	1.48	-1.47	
2,601.0	17.40	305.90	2,519.4	324.3	-472.1	572.7	0.14	0.11	
2,697.0	17.40	306.40	2,611.0	341.2	-495.2	601.4	0.16	0.00	
2,792.0	17.10	306.80	2,701.8	358.0	-517.9	629.6	0.34	-0.32	
2,887.0	17.10	306.60	2,792.6	374.7	-540.3	657.5	0.06	0.00	
2,983.0	17.20	307.00	2,884.3	391.7	-562.9	685.8	0.16	0.10	
3,078.0	15.20	304.00	2,975.5	407.1	-584.5	712.2	2.28	-2.11	
3,174.0	14.70	303.60	3,068.3	420.8	-605.0	737.0	0.53	-0.52	
3,269.0	15.20	304.80	3,160.1	434.6	-625.3	761.5	0.62	0.53	
3,364.0	15.30	305.50	3,251.7	449.0	-645.7	786.5	0.22	0.11	
3,460.0	15.80	306.00	3,344.2	464.1	-666.6	812.2	0.54	0.52	
3,555.0	15.30	305.60	3,435.7	478.9	-687.3	837.7	0.54	-0.53	
3,651.0	15.30	305.70	3,528.3	493.7	-707.9	863.0	0.03	0.00	
3,747.0	15.20	305.70	3,620.9	508.4	-728.4	888.3	0.10	-0.10	
3,842.0	15.60	306.70	3,712.5	523.4	-748.7	913.5	0.51	0.42	
3,937.0	15.60	307.00	3,804.0	538.7	-769.2	939.0	0.08	0.00	
4,033.0	15.00	306.40	3,896.6	553.8	-789.5	964.3	0.65	-0.62	
4,128.0	15.40	304.30	3,988.3	568.2	-809.8	989.2	0.72	0.42	
4,222.0	15.00	304.60	4,079.0	582.2	-830.1	1,013.9	0.43	-0.43	
4,318.0	15.40	306.30	4,171.6	596.8	-850.6	1,039.0	0.62	0.42	
4,413.0	15.70	304.50	4,263.2	611.5	-871.4	1,064.5	0.60	0.32	
4,508.0	16.00	304.70	4,354.6	626.2	-892.7	1,090.4	0.32	0.32	
4,603.0	16.20	305.70	4,445.8	641.4	-914.3	1,116.8	0.36	0.21	
4,699.0	16.50	306.20	4,538.0	657.3	-936.1	1,143.8	0.35	0.31	
4,794.0	16.10	305.60	4,629.1	672.9	-957.7	1,170.5	0.46	-0.42	
4,889.0	16.20	305.70	4,720.4	688.3	-979.2	1,196.9	0.11	0.11	
4,985.0	16.30	306.30	4,812.5	704.1	-1,000.9	1,223.7	0.20	0.10	
5,079.0	15.80	306.80	4,902.9	719.6	-1,021.8	1,249.7	0.55	-0.53	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU FEE 22-12C (N22W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7048.0ft (Original Well Elev)
Site:	N22W Pad	MD Reference:	KBE @ 7048.0ft (Original Well Elev)
Well:	MCU FEE 22-12C (N22W Pad)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	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
5,175.0	15.90	302.60	4,995.2	734.5	-1,043.4	1,275.9	1.20	0.10	
5,270.0	15.90	301.40	5,086.6	748.3	-1,065.4	1,301.9	0.35	0.00	
5,366.0	16.30	303.20	5,178.8	762.5	-1,087.9	1,328.5	0.67	0.42	
5,461.0	16.30	303.20	5,270.0	777.1	-1,110.2	1,355.2	0.00	0.00	
5,557.0	16.30	303.70	5,362.2	792.0	-1,132.7	1,382.1	0.15	0.00	
5,652.0	16.70	304.00	5,453.2	807.0	-1,155.1	1,409.1	0.43	0.42	
5,746.0	15.50	307.20	5,543.6	822.2	-1,176.3	1,435.1	1.59	-1.28	
5,842.0	15.60	305.40	5,636.0	837.4	-1,197.1	1,460.9	0.51	0.10	
5,937.0	16.00	305.10	5,727.5	852.3	-1,218.2	1,486.7	0.43	0.42	
6,033.0	14.60	306.50	5,820.1	867.1	-1,238.7	1,512.0	1.51	-1.46	
6,128.0	13.50	305.90	5,912.2	880.7	-1,257.4	1,535.1	1.17	-1.16	
6,224.0	13.10	305.70	6,005.6	893.7	-1,275.3	1,557.2	0.42	-0.42	
6,319.0	12.40	304.20	6,098.3	905.7	-1,292.4	1,578.1	0.82	-0.74	
6,414.0	12.00	303.50	6,191.1	916.9	-1,309.1	1,598.2	0.45	-0.42	
6,509.0	10.70	304.30	6,284.3	927.3	-1,324.6	1,616.9	1.38	-1.37	
6,605.0	9.20	310.30	6,378.8	937.3	-1,337.9	1,633.5	1.90	-1.56	
6,700.0	8.00	305.40	6,472.8	946.0	-1,349.0	1,647.6	1.48	-1.26	
6,795.0	7.60	306.10	6,566.9	953.5	-1,359.5	1,660.5	0.43	-0.42	
6,891.0	7.20	307.80	6,662.1	961.0	-1,369.4	1,672.9	0.47	-0.42	
6,987.0	6.70	306.30	6,757.4	968.0	-1,378.6	1,684.5	0.55	-0.52	
7,073.0	5.00	301.40	6,842.9	972.9	-1,385.9	1,693.2	2.06	-1.98	
7,104.0	2.90	300.30	6,873.9	974.0	-1,387.7	1,695.4	6.78	-6.77	
7,136.0	1.80	304.30	6,905.8	974.7	-1,388.8	1,696.7	3.47	-3.44	
7,168.0	1.30	308.90	6,937.8	975.2	-1,389.5	1,697.5	1.61	-1.56	
7,264.0	0.30	331.90	7,033.8	976.1	-1,390.5	1,698.8	1.07	-1.04	
7,306.1	0.38	343.60	7,075.9	976.3	-1,390.6	1,699.0	0.26	0.20	MCU FEE 22-12C TGT
7,359.0	0.50	352.40	7,128.8	976.7	-1,390.7	1,699.3	0.26	0.22	
7,455.0	0.50	343.90	7,224.8	977.6	-1,390.8	1,699.9	0.08	0.00	
7,550.0	0.60	353.10	7,319.8	978.4	-1,391.0	1,700.6	0.14	0.11	
7,645.0	1.20	232.40	7,414.8	978.3	-1,391.9	1,701.2	1.68	0.63	
7,740.0	1.60	225.00	7,509.8	976.8	-1,393.6	1,701.8	0.46	0.42	
7,835.0	0.90	207.00	7,604.7	975.2	-1,394.9	1,701.9	0.84	-0.74	
7,930.0	0.40	272.40	7,699.7	974.5	-1,395.5	1,702.1	0.86	-0.53	
8,025.0	0.80	313.00	7,794.7	975.0	-1,396.4	1,703.0	0.59	0.42	
8,121.0	0.80	169.40	7,890.7	974.8	-1,396.7	1,703.2	1.58	0.00	
8,216.0	1.10	212.60	7,985.7	973.4	-1,397.1	1,702.7	0.79	0.32	
8,311.0	1.60	242.10	8,080.7	972.0	-1,398.8	1,703.3	0.88	0.53	
8,406.0	0.30	280.10	8,175.7	971.4	-1,400.2	1,704.1	1.45	-1.37	
8,501.0	0.50	29.80	8,270.7	971.8	-1,400.2	1,704.4	0.70	0.21	
8,596.0	0.50	346.50	8,365.7	972.6	-1,400.1	1,704.7	0.39	0.00	
8,692.0	1.10	302.80	8,461.7	973.5	-1,401.0	1,706.0	0.85	0.62	
8,787.0	0.90	272.30	8,556.7	974.0	-1,402.5	1,707.5	0.59	-0.21	
8,883.0	1.10	236.00	8,652.6	973.5	-1,404.0	1,708.5	0.68	0.21	
8,978.0	0.80	160.00	8,747.6	972.4	-1,404.5	1,708.3	1.26	-0.32	
9,073.0	1.10	160.10	8,842.6	970.9	-1,404.0	1,707.0	0.32	0.32	
9,168.0	1.10	168.00	8,937.6	969.2	-1,403.5	1,705.6	0.16	0.00	
9,264.0	1.00	183.70	9,033.6	967.4	-1,403.4	1,704.5	0.32	-0.10	
9,357.0	0.80	185.80	9,126.6	966.0	-1,403.5	1,703.8	0.22	-0.22	Last Cathedral Survey @ 9,357' MD
9,394.5	0.80	185.80	9,164.1	965.4	-1,403.5	1,703.5	0.00	0.00	MCU FEE 22-12C BHL
9,407.0	0.80	185.80	9,176.6	965.3	-1,403.5	1,703.4	0.00	0.00	Projection to Bit @ 9,407'

Cathedral Energy Services

Survey Report

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Site:	N22W Pad	MD Reference:	KBE @ 7048.0ft (Original Well Elev)
Well:	MCU FEE 22-12C (N22W Pad)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
MCU FEE 22-12C TGT	0.00	0.00	7,076.0	958.4	-1,390.3	1,588,964.27	2,359,731.49	39.428531	-107.766922
- actual wellpath misses target center by 18.0ft at 7306.1ft MD (7075.9 TVD, 976.3 N, -1390.6 E)									
- Point									
MCU FEE 22-12C BHL	0.00	0.00	9,164.0	958.4	-1,390.3	1,588,964.27	2,359,731.49	39.428531	-107.766922
- actual wellpath misses target center by 15.0ft at 9394.5ft MD (9164.1 TVD, 965.4 N, -1403.5 E)									
- Circle (radius 25.0)									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
9,357.0	9,126.6	966.0	-1,403.5	Last Cathedral Survey @ 9,357' MD
9,407.0	9,176.6	965.3	-1,403.5	Projection to Bit @ 9,407'

Checked By: _____ Approved By: _____ Date: _____