

FORMATION TOP DETAILS

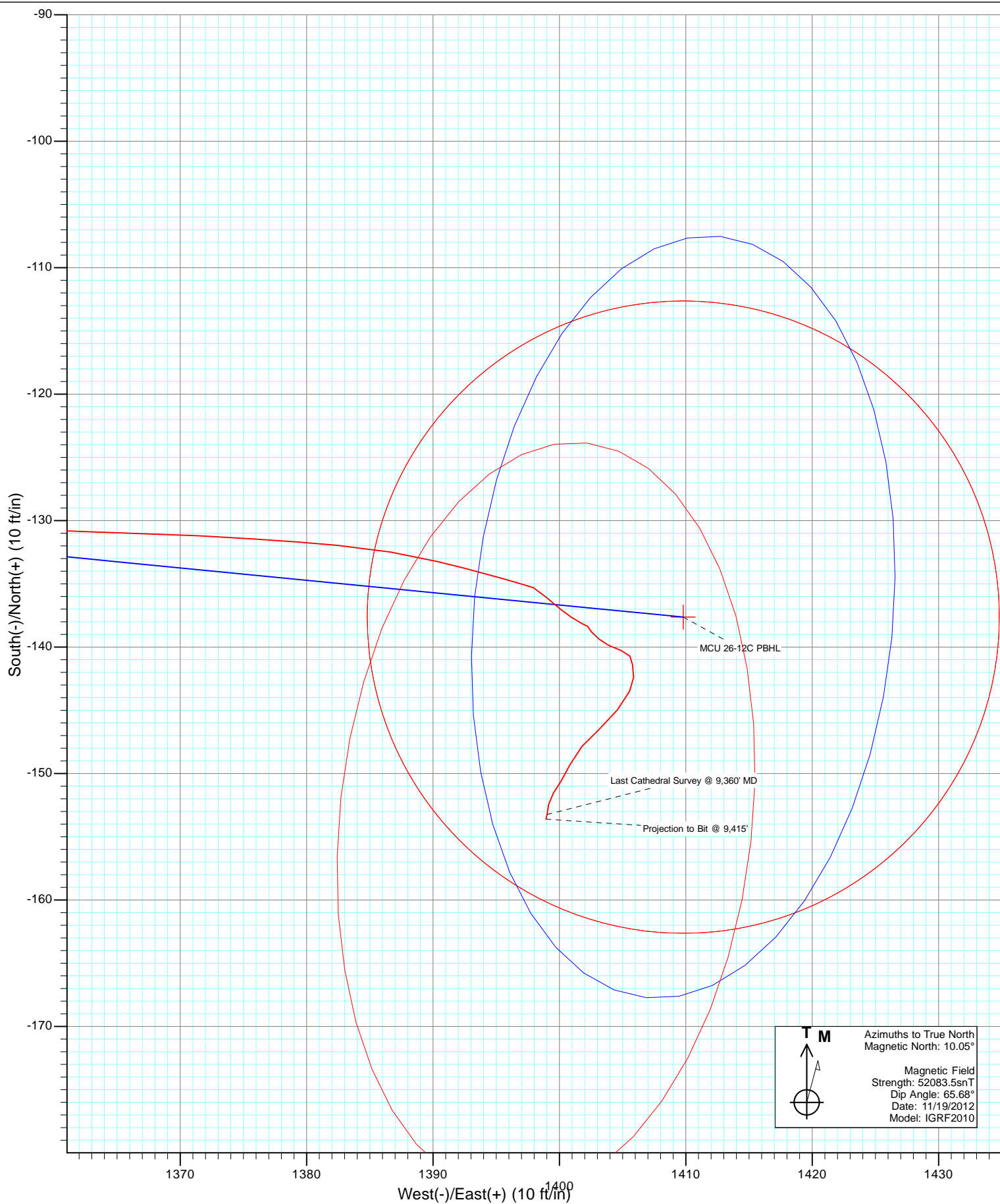
No formation data is available



Azimuths to True North
Magnetic North: 10.05°

Magnetic Field
Strength: 52083.5nT
Dip Angle: 65.68°
Date: 11/19/2012
Model: IGRF2010

DD MCU 26-12C (I27W Pad) 125548/191655 (SH) 125615/197055 (MH); SC					
KBE @ 7223.0ft (Original Well Elev) North American Datum 1983 Well MCU 26-12C (I27W Pad), True North					
Target No Target (Freehand)	Azimuth 95.58	Origin Type Slot	N/S 0.0	E/W 0.0	
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
MCU 26-12C TGT	7158.0	-137.6	1409.8	39.415199	-107.747842
MCU 26-12C PBHL	9216.0	-137.6	1409.8	39.415199	-107.747842



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU 26-12C (I27W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7223.0ft (Original Well Elev)
Site:	I27W	MD Reference:	KBE @ 7223.0ft (Original Well Elev)
Well:	MCU 26-12C (I27W Pad)	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		I27W			
Site Position:		Northing:	1,584,160.49 ft	Latitude:	39.415612
From:	Lat/Long	Easting:	2,363,622.14 ft	Longitude:	-107.752731
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.42 °

Well		MCU 26-12C (I27W Pad)				
Well Position	+N/-S	0.0 ft	Northing:	1,584,148.44 ft	Latitude:	39.415577
	+E/-W	0.0 ft	Easting:	2,363,593.29 ft	Longitude:	-107.752832
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,201.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/19/2012	10.05	65.68	52,084

Design	DD				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	95.58	

Survey Program	Date	12/20/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
245.0	9,415.0	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		
245.0	0.70	58.70	245.0	0.8	1.3	1.2	0.29	0.29		
276.0	0.40	66.10	276.0	0.9	1.5	1.4	0.99	-0.97		
306.0	1.20	85.50	306.0	1.0	1.9	1.8	2.78	2.67		
336.0	2.20	107.60	336.0	0.8	2.8	2.7	3.93	3.33		
367.0	3.00	95.20	366.9	0.6	4.2	4.1	3.14	2.58		
397.0	3.70	99.00	396.9	0.4	5.9	5.9	2.45	2.33		
428.0	4.70	97.80	427.8	0.0	8.2	8.1	3.24	3.23		
458.0	5.70	89.80	457.7	-0.1	10.9	10.8	4.11	3.33		
489.0	6.90	97.30	488.5	-0.4	14.3	14.2	4.69	3.87		
581.0	9.90	94.70	579.5	-1.7	27.6	27.7	3.29	3.26		
672.0	13.40	97.40	668.6	-3.7	45.9	46.0	3.89	3.85		
763.0	14.60	96.90	756.9	-6.4	67.7	68.0	1.33	1.32		

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Site:	I27W	MD Reference:	KBE @ 7223.0ft (Original Well Elev)
Well:	MCU 26-12C (I27W Pad)	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
854.0	13.20	96.10	845.2	-8.9	89.5	89.9	1.55	-1.54	
946.0	13.50	94.50	934.8	-10.9	110.6	111.1	0.52	0.33	
1,039.0	14.00	92.30	1,025.1	-12.2	132.7	133.2	0.78	0.54	
1,135.0	13.40	97.00	1,118.4	-14.0	155.3	155.9	1.32	-0.62	
1,230.0	13.90	95.90	1,210.7	-16.5	177.6	178.4	0.59	0.53	
1,326.0	14.10	94.70	1,303.8	-18.7	200.7	201.6	0.37	0.21	
1,420.0	13.00	94.20	1,395.2	-20.4	222.7	223.6	1.18	-1.17	
1,548.0	13.20	92.90	1,519.9	-22.2	251.6	252.6	0.28	0.16	
1,644.0	12.70	92.40	1,613.4	-23.2	273.1	274.1	0.53	-0.52	
1,739.0	12.70	92.20	1,706.1	-24.0	294.0	294.9	0.05	0.00	
1,835.0	13.40	93.60	1,799.6	-25.1	315.6	316.6	0.80	0.73	
1,930.0	13.80	94.90	1,892.0	-26.8	337.9	338.9	0.53	0.42	
2,026.0	13.80	99.20	1,985.2	-29.6	360.6	361.8	1.07	0.00	
2,122.0	13.70	98.70	2,078.4	-33.1	383.2	384.6	0.16	-0.10	
2,217.0	13.40	99.20	2,170.8	-36.6	405.1	406.8	0.34	-0.32	
2,312.0	13.00	98.50	2,263.3	-39.9	426.6	428.4	0.45	-0.42	
2,417.0	12.50	99.10	2,365.7	-43.5	449.5	451.6	0.49	-0.48	
2,503.0	13.40	97.40	2,449.5	-46.2	468.5	470.8	1.14	1.05	
2,598.0	13.10	97.40	2,542.0	-49.0	490.1	492.6	0.32	-0.32	
2,693.0	13.10	96.20	2,634.5	-51.6	511.5	514.1	0.29	0.00	
2,789.0	12.80	96.20	2,728.1	-53.9	532.9	535.6	0.31	-0.31	
2,885.0	12.40	96.40	2,821.8	-56.2	553.7	556.6	0.42	-0.42	
2,980.0	13.20	96.10	2,914.4	-58.5	574.6	577.6	0.85	0.84	
3,075.0	13.10	96.50	3,006.9	-60.9	596.1	599.2	0.14	-0.11	
3,171.0	12.40	98.40	3,100.5	-63.6	617.1	620.4	0.85	-0.73	
3,266.0	11.90	97.50	3,193.4	-66.4	636.9	640.4	0.56	-0.53	
3,361.0	12.80	95.40	3,286.2	-68.6	657.1	660.7	1.06	0.95	
3,456.0	12.10	96.30	3,379.0	-70.7	677.5	681.2	0.76	-0.74	
3,551.0	12.70	98.10	3,471.8	-73.3	697.7	701.6	0.75	0.63	
3,647.0	12.00	100.00	3,565.5	-76.5	718.0	722.0	0.84	-0.73	
3,742.0	12.30	98.00	3,658.4	-79.6	737.8	742.0	0.54	0.32	
3,837.0	12.60	95.00	3,751.2	-81.9	758.1	762.5	0.75	0.32	
3,931.0	11.80	95.70	3,843.1	-83.8	777.9	782.3	0.87	-0.85	
4,026.0	11.70	94.00	3,936.1	-85.4	797.1	801.7	0.38	-0.11	
4,121.0	12.20	93.40	4,029.0	-86.7	816.8	821.3	0.54	0.53	
4,217.0	12.20	92.80	4,122.8	-87.8	837.0	841.6	0.13	0.00	
4,312.0	12.70	91.90	4,215.6	-88.6	857.5	862.1	0.56	0.53	
4,408.0	12.00	92.30	4,309.4	-89.4	878.0	882.5	0.73	-0.73	
4,503.0	12.30	91.10	4,402.3	-90.0	898.0	902.5	0.41	0.32	
4,599.0	12.50	89.00	4,496.0	-90.0	918.6	923.0	0.51	0.21	
4,694.0	12.90	94.10	4,588.7	-90.6	939.5	943.8	1.25	0.42	
4,790.0	12.40	94.90	4,682.4	-92.2	960.4	964.8	0.55	-0.52	
4,885.0	12.90	97.00	4,775.1	-94.4	981.1	985.6	0.72	0.53	
4,980.0	12.00	95.10	4,867.8	-96.5	1,001.5	1,006.1	1.04	-0.95	
5,074.0	11.80	99.00	4,959.8	-98.9	1,020.7	1,025.5	0.88	-0.21	
5,169.0	12.40	99.50	5,052.7	-102.1	1,040.4	1,045.4	0.64	0.63	
5,265.0	12.00	99.40	5,146.5	-105.5	1,060.4	1,065.6	0.42	-0.42	
5,359.0	11.70	100.00	5,238.5	-108.7	1,079.4	1,084.9	0.35	-0.32	
5,454.0	12.10	98.80	5,331.5	-111.9	1,098.7	1,104.4	0.50	0.42	
5,550.0	11.40	97.50	5,425.5	-114.7	1,118.1	1,123.9	0.78	-0.73	
5,645.0	11.70	94.30	5,518.5	-116.6	1,137.0	1,142.9	0.74	0.32	
5,740.0	11.90	94.30	5,611.5	-118.1	1,156.4	1,162.4	0.21	0.21	
5,836.0	11.20	93.20	5,705.6	-119.3	1,175.5	1,181.6	0.76	-0.73	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well MCU 26-12C (I27W Pad)
Project:	Mamm Creek	TVD Reference:	KBE @ 7223.0ft (Original Well Elev)
Site:	I27W	MD Reference:	KBE @ 7223.0ft (Original Well Elev)
Well:	MCU 26-12C (I27W Pad)	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
5,931.0	11.90	95.90	5,798.7	-120.9	1,194.5	1,200.6	0.93	0.74	
6,025.0	12.80	96.40	5,890.5	-123.0	1,214.5	1,220.7	0.96	0.96	
6,120.0	11.80	96.60	5,983.3	-125.3	1,234.6	1,240.9	1.05	-1.05	
6,216.0	10.90	96.80	6,077.4	-127.5	1,253.4	1,259.8	0.94	-0.94	
6,311.0	10.10	96.50	6,170.9	-129.5	1,270.6	1,277.1	0.84	-0.84	
6,406.0	9.40	94.30	6,264.5	-131.0	1,286.6	1,293.2	0.83	-0.74	
6,502.0	8.50	93.20	6,359.3	-132.0	1,301.5	1,308.1	0.95	-0.94	
6,597.0	8.70	89.50	6,453.2	-132.4	1,315.7	1,322.3	0.62	0.21	
6,693.0	8.60	85.30	6,548.2	-131.7	1,330.1	1,336.6	0.67	-0.10	
6,788.0	8.30	87.60	6,642.1	-130.8	1,344.0	1,350.4	0.48	-0.32	
6,883.0	8.30	91.20	6,736.1	-130.7	1,357.7	1,364.0	0.55	0.00	
6,979.0	8.20	93.00	6,831.1	-131.2	1,371.5	1,377.7	0.29	-0.10	
7,072.0	5.40	95.40	6,923.5	-132.0	1,382.5	1,388.7	3.03	-3.01	
7,167.0	4.30	103.90	7,018.1	-133.2	1,390.4	1,396.7	1.38	-1.16	
7,262.0	2.30	106.20	7,113.0	-134.6	1,395.7	1,402.1	2.11	-2.11	
7,357.0	0.60	107.60	7,207.9	-135.3	1,398.0	1,404.5	1.79	-1.79	
7,453.0	1.00	138.80	7,303.9	-136.1	1,399.0	1,405.6	0.60	0.42	
7,549.0	0.70	117.00	7,399.9	-137.0	1,400.1	1,406.7	0.45	-0.31	
7,644.0	0.70	136.40	7,494.9	-137.7	1,401.0	1,407.7	0.25	0.00	
7,740.0	0.50	97.10	7,590.9	-138.1	1,401.8	1,408.6	0.46	-0.21	
7,835.0	0.20	177.30	7,685.9	-138.4	1,402.2	1,409.0	0.53	-0.32	
7,931.0	0.50	131.30	7,781.9	-138.8	1,402.5	1,409.4	0.40	0.31	
8,026.0	0.50	136.50	7,876.9	-139.4	1,403.1	1,410.0	0.05	0.00	
8,121.0	0.60	111.00	7,971.9	-139.9	1,403.9	1,410.8	0.28	0.11	
8,216.0	0.70	114.80	8,066.9	-140.3	1,404.9	1,411.9	0.11	0.11	
8,312.0	0.30	141.20	8,162.9	-140.7	1,405.6	1,412.6	0.47	-0.42	
8,407.0	0.60	172.70	8,257.9	-141.4	1,405.8	1,412.9	0.40	0.32	
8,502.0	0.60	178.20	8,352.9	-142.4	1,405.9	1,413.1	0.06	0.00	
8,598.0	0.80	209.80	8,448.9	-143.5	1,405.6	1,412.8	0.44	0.21	
8,694.0	1.30	215.00	8,544.8	-145.0	1,404.6	1,412.0	0.53	0.52	
8,789.0	1.30	231.10	8,639.8	-146.5	1,403.1	1,410.7	0.38	0.00	
8,884.0	1.00	218.00	8,734.8	-147.8	1,401.8	1,409.5	0.42	-0.32	
8,980.0	1.10	208.80	8,830.8	-149.3	1,400.8	1,408.7	0.20	0.10	
9,075.0	0.70	208.10	8,925.8	-150.6	1,400.1	1,408.1	0.42	-0.42	
9,170.0	0.60	217.70	9,020.8	-151.5	1,399.5	1,407.6	0.16	-0.11	
9,266.0	0.60	188.60	9,116.8	-152.4	1,399.2	1,407.3	0.31	0.00	
9,360.0	0.40	191.80	9,210.8	-153.2	1,399.0	1,407.3	0.21	-0.21	Last Cathedral Survey @ 9,360' MD Projection to Bit @ 9,415'
9,415.0	0.40	191.80	9,265.8	-153.6	1,398.9	1,407.2	0.00	0.00	

Cathedral Energy Services

Survey Report

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Site:	I27W	MD Reference:	KBE @ 7223.0ft (Original Well Elev)
Well:	MCU 26-12C (I27W Pad)	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
MCU 26-12C TGT	0.00	358.58	7,158.0	-137.6	1,409.8	1,583,975.90	2,364,999.25	39.415199	-107.747842
- actual wellpath misses target center by 13.0ft at 7307.4ft MD (7158.3 TVD, -135.0 N, 1397.1 E)									
- Point									
MCU 26-12C PBHL	0.00	358.58	9,216.0	-137.6	1,409.8	1,583,975.90	2,364,999.25	39.415199	-107.747842
- actual wellpath misses target center by 19.7ft at 9360.0ft MD (9210.8 TVD, -153.2 N, 1399.0 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
9,360.0	9,210.8	-153.2	1,399.0	Last Cathedral Survey @ 9,360' MD	
9,415.0	9,265.8	-153.6	1,398.9	Projection to Bit @ 9,415'	

Checked By: _____ Approved By: _____ Date: _____