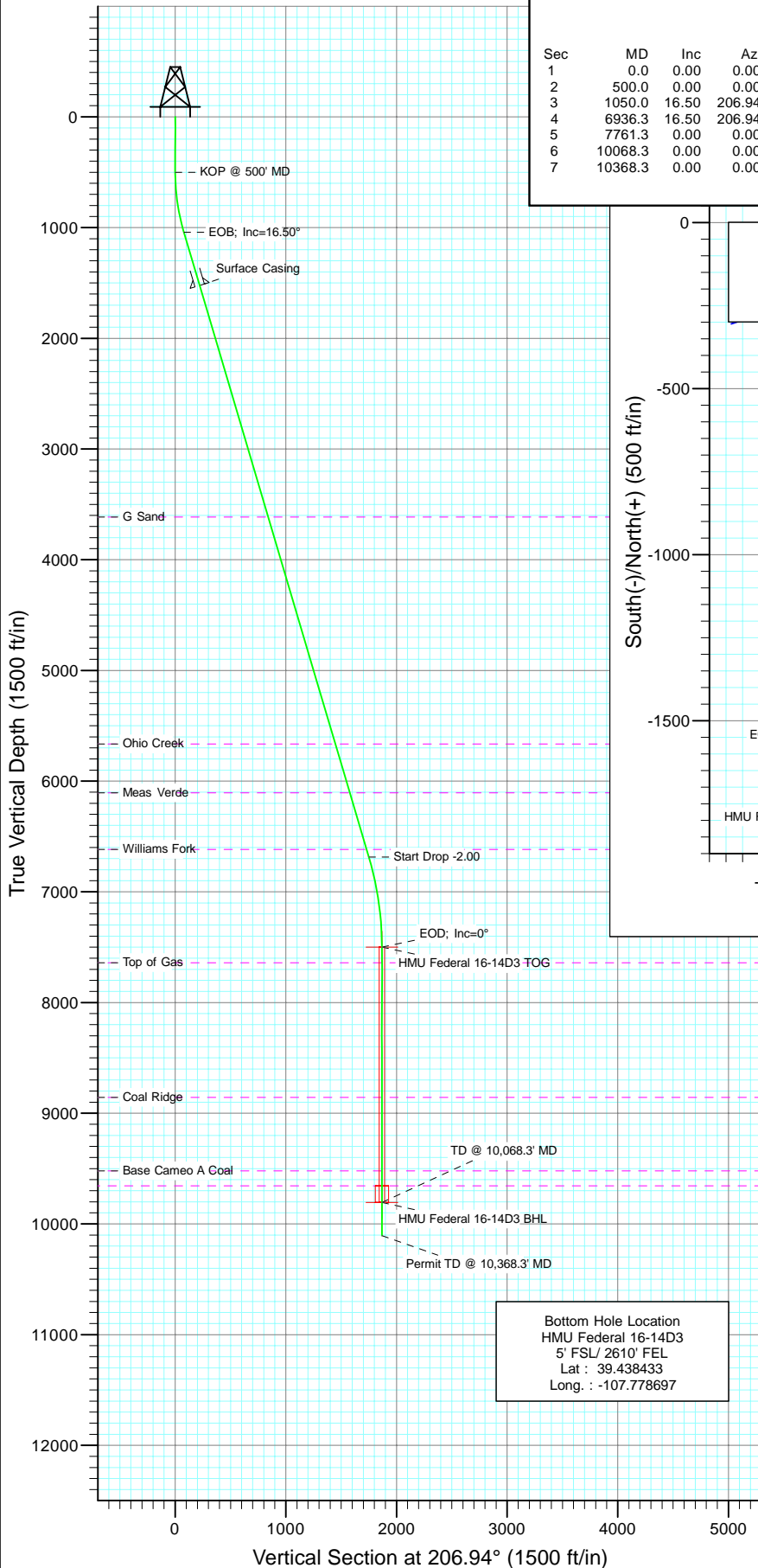
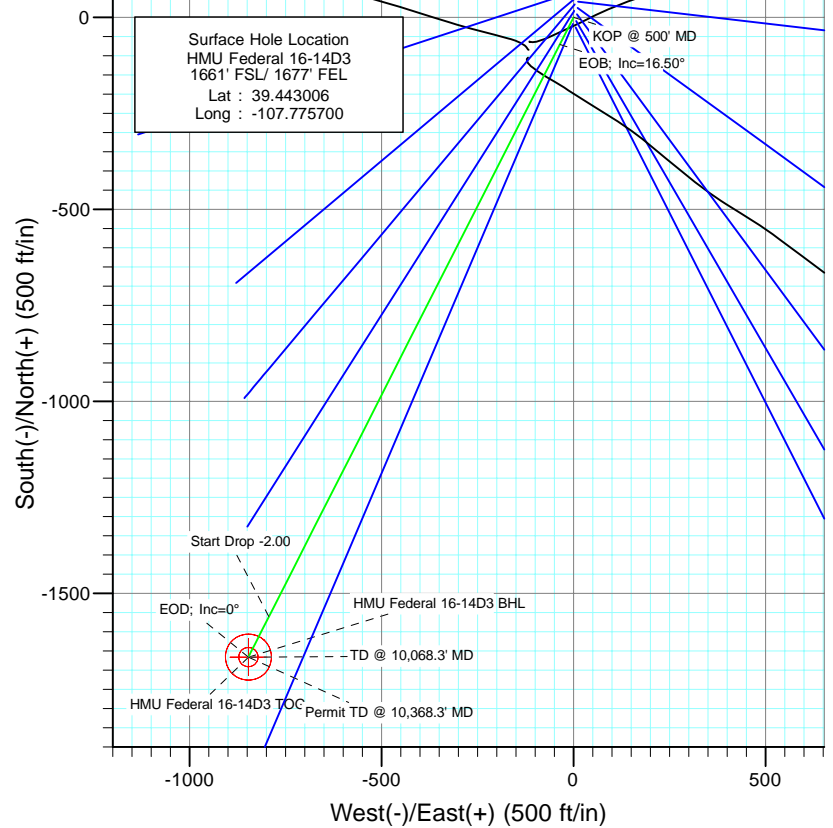




Project: Mamm Creek  
 Site: (J16W)  
 Well: HMU Federal 16-14D3  
 Wellbore: DD  
 Design: Plan #1



SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	
3	1050.0	16.50	206.94	1042.4	-70.1	-35.6	3.00	206.94	78.6	
4	6936.3	16.50	206.94	6686.4	-1560.5	-793.0	0.00	0.00	1750.4	
5	7761.3	0.00	0.00	7500.0	-1665.6	-846.4	2.00	180.00	1868.4	HMU Federal 16-14D3 TOG
6	10068.3	0.00	0.00	9807.0	-1665.6	-846.4	0.00	0.00	1868.4	HMU Federal 16-14D3 BHL
7	10368.3	0.00	0.00	10107.0	-1665.6	-846.4	0.00	0.00	1868.4	



Azimuths to True North  
 Magnetic North: 10.30°  
 Magnetic Field  
 Strength: 52330.6snT  
 Dip Angle: 65.77°  
 Date: 10/29/2010  
 Model: IGRF200510

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3615.0	3733.1	G Sand
5665.0	5871.1	Ohio Creek
6106.0	6331.0	Meas Verde
6618.0	6865.0	Williams Fork
7641.0	7902.3	Top of Gas
8857.0	9118.3	Coal Ridge
9521.0	9782.3	Base Cameo A Coal
9657.0	9918.3	Rollins

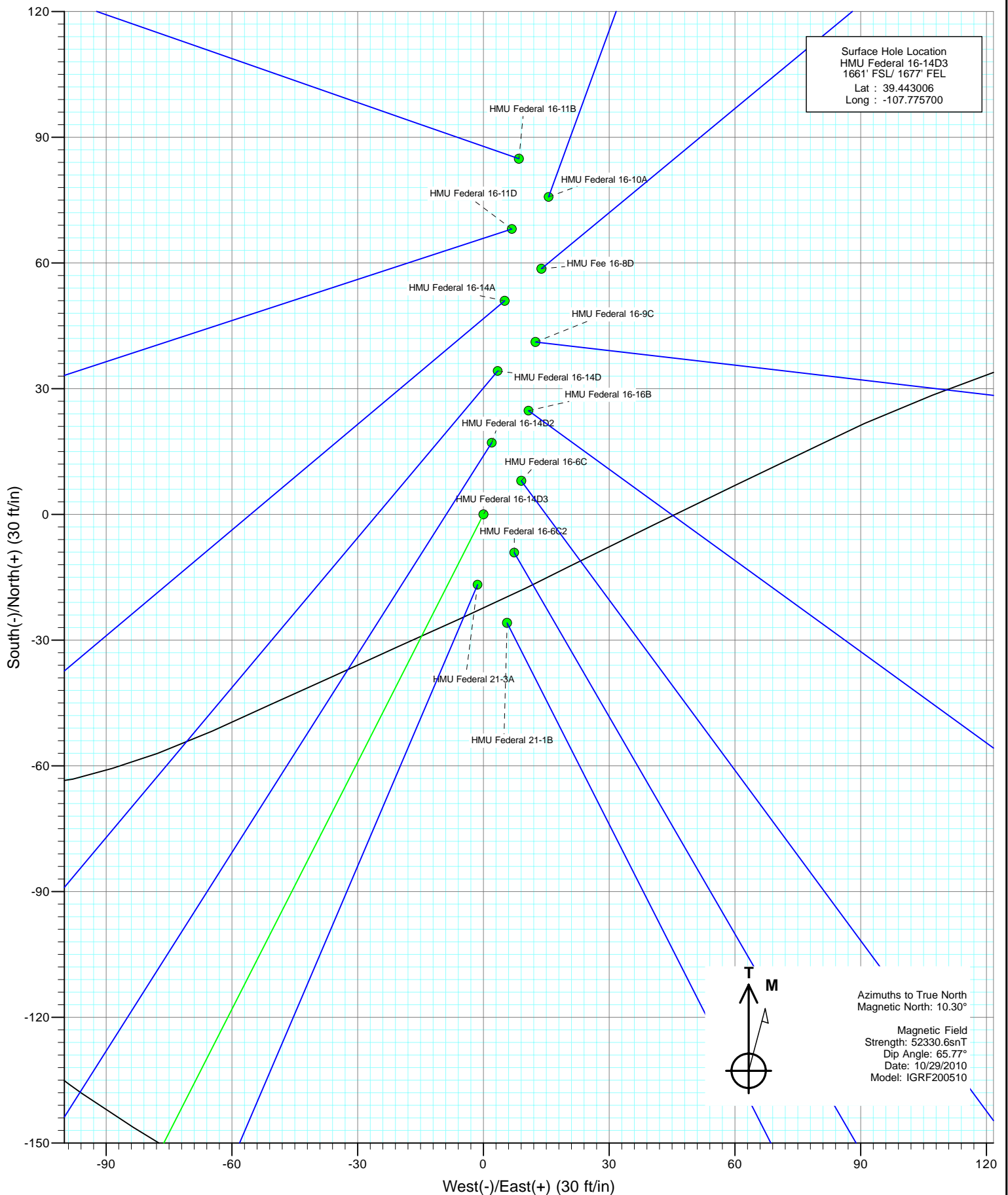
#### DESIGN DETAILS: Plan #1

105XXX; KR  
 KBE @ 7667.0ft (Original Well Elev)

Target	Azimuth	Origin	N/S	E/W	From TVD
HMU Federal 16-14D3 BHL	206.94	Slot	0.0	0.0	0.0

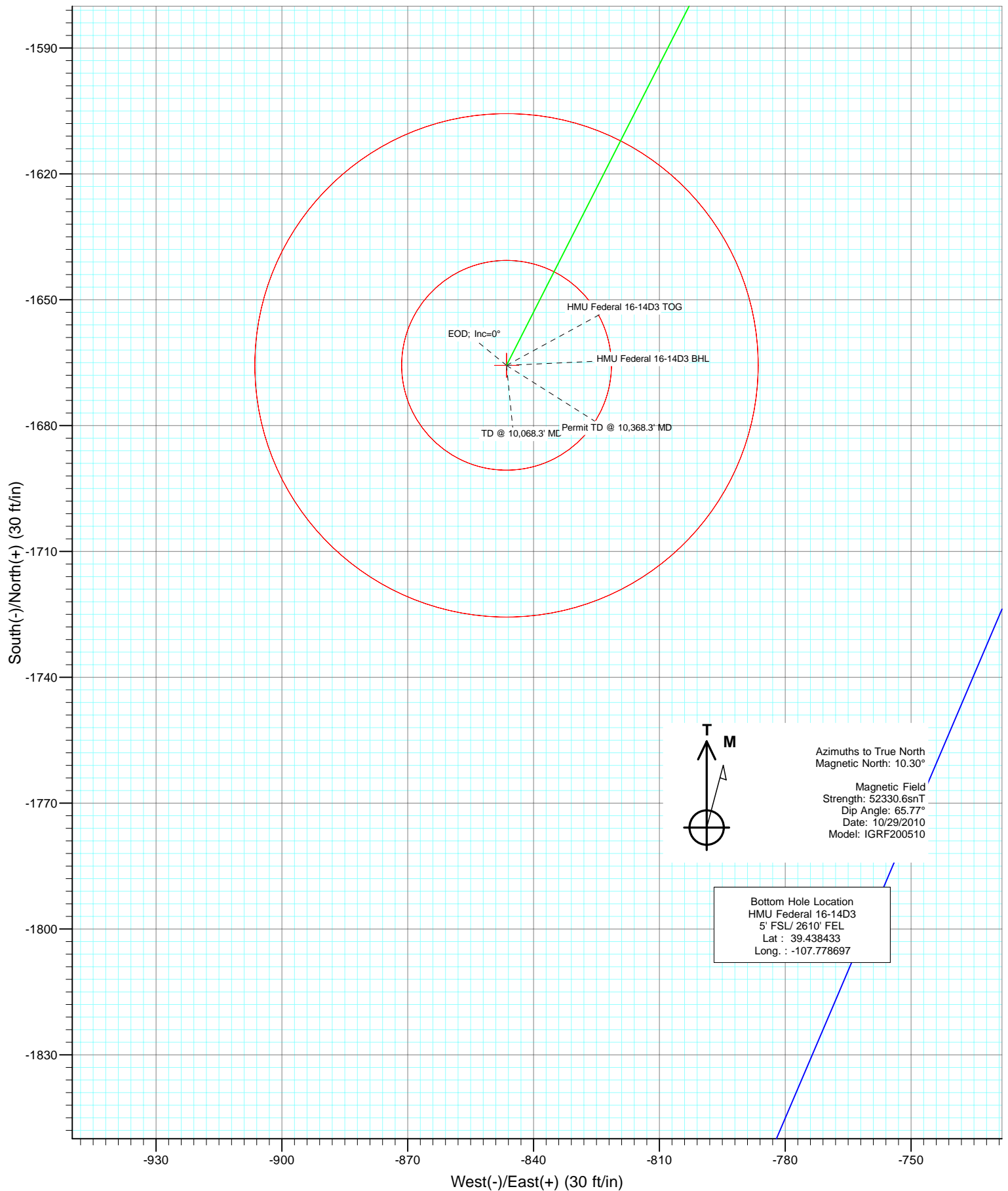


Project: Mamm Creek  
Site: (J16W)  
Well: HMU Federal 16-14D3  
Wellbore: DD  
Design: Plan #1





Project: Mamm Creek  
Site: (J16W)  
Well: HMU Federal 16-14D3  
Wellbore: DD  
Design: Plan #1



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	EDM 5000.1 US Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site:</b>	(J16W)	<b>North Reference:</b>	True
<b>Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

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		(J16W)			
Site Position:		Northing:	1,594,381.52 ft	Latitude:	39.443239
From:	Lat/Long	Easting:	2,357,395.39 ft	Longitude:	-107.775670
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.44 °

Well	HMU Federal 16-14D3					
Well Position	+N/-S	0.0 ft	Northing:	1,594,296.89 ft	Latitude:	39.443006
	+E/-W	0.0 ft	Easting:	2,357,384.79 ft	Longitude:	-107.775700
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,645.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	10/29/2010	10.30	65.77	52,331

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	206.94

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,050.0	16.50	206.94	1,042.4	-70.1	-35.6	3.00	3.00	0.00	206.94	
6,936.3	16.50	206.94	6,686.4	-1,560.5	-793.0	0.00	0.00	0.00	0.00	
7,761.3	0.00	0.00	7,500.0	-1,665.6	-846.4	2.00	-2.00	0.00	180.00	HMU Federal 16-14D:
10,068.3	0.00	0.00	9,807.0	-1,665.6	-846.4	0.00	0.00	0.00	0.00	HMU Federal 16-14D:
10,368.3	0.00	0.00	10,107.0	-1,665.6	-846.4	0.00	0.00	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	EDM 5000.1 US Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site:</b>	(J16W)	<b>North Reference:</b>	True
<b>Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
30.0	0.00	0.00	30.0	0.0	0.0	0.0	0.00	0.00	
60.0	0.00	0.00	60.0	0.0	0.0	0.0	0.00	0.00	
90.0	0.00	0.00	90.0	0.0	0.0	0.0	0.00	0.00	
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	
150.0	0.00	0.00	150.0	0.0	0.0	0.0	0.00	0.00	
180.0	0.00	0.00	180.0	0.0	0.0	0.0	0.00	0.00	
210.0	0.00	0.00	210.0	0.0	0.0	0.0	0.00	0.00	
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	
270.0	0.00	0.00	270.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
330.0	0.00	0.00	330.0	0.0	0.0	0.0	0.00	0.00	
360.0	0.00	0.00	360.0	0.0	0.0	0.0	0.00	0.00	
390.0	0.00	0.00	390.0	0.0	0.0	0.0	0.00	0.00	
420.0	0.00	0.00	420.0	0.0	0.0	0.0	0.00	0.00	
450.0	0.00	0.00	450.0	0.0	0.0	0.0	0.00	0.00	
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	KOP @ 500' MD
510.0	0.30	206.94	510.0	0.0	0.0	0.0	3.00	3.00	
540.0	1.20	206.94	540.0	-0.4	-0.2	0.4	3.00	3.00	
570.0	2.10	206.94	570.0	-1.1	-0.6	1.3	3.00	3.00	
600.0	3.00	206.94	600.0	-2.3	-1.2	2.6	3.00	3.00	
630.0	3.90	206.94	629.9	-3.9	-2.0	4.4	3.00	3.00	
660.0	4.80	206.94	659.8	-6.0	-3.0	6.7	3.00	3.00	
690.0	5.70	206.94	689.7	-8.4	-4.3	9.4	3.00	3.00	
720.0	6.60	206.94	719.5	-11.3	-5.7	12.7	3.00	3.00	
750.0	7.50	206.94	749.3	-14.6	-7.4	16.3	3.00	3.00	
780.0	8.40	206.94	779.0	-18.3	-9.3	20.5	3.00	3.00	
810.0	9.30	206.94	808.6	-22.4	-11.4	25.1	3.00	3.00	
840.0	10.20	206.94	838.2	-26.9	-13.7	30.2	3.00	3.00	
870.0	11.10	206.94	867.7	-31.9	-16.2	35.7	3.00	3.00	
900.0	12.00	206.94	897.1	-37.2	-18.9	41.7	3.00	3.00	
930.0	12.90	206.94	926.4	-43.0	-21.8	48.2	3.00	3.00	
960.0	13.80	206.94	955.6	-49.1	-25.0	55.1	3.00	3.00	
990.0	14.70	206.94	984.6	-55.7	-28.3	62.5	3.00	3.00	
1,020.0	15.60	206.94	1,013.6	-62.7	-31.9	70.4	3.00	3.00	
1,050.0	16.50	206.94	1,042.4	-70.1	-35.6	78.6	3.00	3.00	EOB; Inc=16.50°
1,080.0	16.50	206.94	1,071.2	-77.7	-39.5	87.2	0.00	0.00	
1,110.0	16.50	206.94	1,100.0	-85.3	-43.4	95.7	0.00	0.00	
1,140.0	16.50	206.94	1,128.7	-92.9	-47.2	104.2	0.00	0.00	
1,170.0	16.50	206.94	1,157.5	-100.5	-51.1	112.7	0.00	0.00	
1,200.0	16.50	206.94	1,186.3	-108.1	-54.9	121.2	0.00	0.00	
1,230.0	16.50	206.94	1,215.0	-115.7	-58.8	129.8	0.00	0.00	
1,260.0	16.50	206.94	1,243.8	-123.3	-62.7	138.3	0.00	0.00	
1,290.0	16.50	206.94	1,272.5	-130.9	-66.5	146.8	0.00	0.00	
1,320.0	16.50	206.94	1,301.3	-138.5	-70.4	155.3	0.00	0.00	
1,350.0	16.50	206.94	1,330.1	-146.1	-74.2	163.8	0.00	0.00	
1,380.0	16.50	206.94	1,358.8	-153.7	-78.1	172.4	0.00	0.00	
1,410.0	16.50	206.94	1,387.6	-161.3	-82.0	180.9	0.00	0.00	
1,440.0	16.50	206.94	1,416.4	-168.9	-85.8	189.4	0.00	0.00	
1,470.0	16.50	206.94	1,445.1	-176.5	-89.7	197.9	0.00	0.00	
1,500.0	16.50	206.94	1,473.9	-184.0	-93.5	206.5	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	EDM 5000.1 US Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site:</b>	(J16W)	<b>North Reference:</b>	True
<b>Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
1,530.0	16.50	206.94	1,502.7	-191.6	-97.4	215.0	0.00	0.00	
1,552.7	16.50	206.94	1,524.4	-197.4	-100.3	221.4	0.00	0.00	Surface Casing
1,560.0	16.50	206.94	1,531.4	-199.2	-101.3	223.5	0.00	0.00	
1,590.0	16.50	206.94	1,560.2	-206.8	-105.1	232.0	0.00	0.00	
1,620.0	16.50	206.94	1,589.0	-214.4	-109.0	240.5	0.00	0.00	
1,650.0	16.50	206.94	1,617.7	-222.0	-112.8	249.1	0.00	0.00	
1,680.0	16.50	206.94	1,646.5	-229.6	-116.7	257.6	0.00	0.00	
1,710.0	16.50	206.94	1,675.3	-237.2	-120.6	266.1	0.00	0.00	
1,740.0	16.50	206.94	1,704.0	-244.8	-124.4	274.6	0.00	0.00	
1,770.0	16.50	206.94	1,732.8	-252.4	-128.3	283.1	0.00	0.00	
1,800.0	16.50	206.94	1,761.5	-260.0	-132.1	291.7	0.00	0.00	
1,830.0	16.50	206.94	1,790.3	-267.6	-136.0	300.2	0.00	0.00	
1,860.0	16.50	206.94	1,819.1	-275.2	-139.9	308.7	0.00	0.00	
1,890.0	16.50	206.94	1,847.8	-282.8	-143.7	317.2	0.00	0.00	
1,920.0	16.50	206.94	1,876.6	-290.4	-147.6	325.7	0.00	0.00	
1,950.0	16.50	206.94	1,905.4	-298.0	-151.4	334.3	0.00	0.00	
1,980.0	16.50	206.94	1,934.1	-305.6	-155.3	342.8	0.00	0.00	
2,010.0	16.50	206.94	1,962.9	-313.2	-159.2	351.3	0.00	0.00	
2,040.0	16.50	206.94	1,991.7	-320.8	-163.0	359.8	0.00	0.00	
2,070.0	16.50	206.94	2,020.4	-328.4	-166.9	368.3	0.00	0.00	
2,100.0	16.50	206.94	2,049.2	-336.0	-170.7	376.9	0.00	0.00	
2,130.0	16.50	206.94	2,078.0	-343.6	-174.6	385.4	0.00	0.00	
2,160.0	16.50	206.94	2,106.7	-351.2	-178.5	393.9	0.00	0.00	
2,190.0	16.50	206.94	2,135.5	-358.7	-182.3	402.4	0.00	0.00	
2,220.0	16.50	206.94	2,164.3	-366.3	-186.2	410.9	0.00	0.00	
2,250.0	16.50	206.94	2,193.0	-373.9	-190.0	419.5	0.00	0.00	
2,280.0	16.50	206.94	2,221.8	-381.5	-193.9	428.0	0.00	0.00	
2,310.0	16.50	206.94	2,250.5	-389.1	-197.8	436.5	0.00	0.00	
2,340.0	16.50	206.94	2,279.3	-396.7	-201.6	445.0	0.00	0.00	
2,370.0	16.50	206.94	2,308.1	-404.3	-205.5	453.5	0.00	0.00	
2,400.0	16.50	206.94	2,336.8	-411.9	-209.3	462.1	0.00	0.00	
2,430.0	16.50	206.94	2,365.6	-419.5	-213.2	470.6	0.00	0.00	
2,460.0	16.50	206.94	2,394.4	-427.1	-217.1	479.1	0.00	0.00	
2,490.0	16.50	206.94	2,423.1	-434.7	-220.9	487.6	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									
HMU Federal 16-14D3 T	0.00	0.00	7,500.0	-1,665.6	-846.4	1,592,652.99	2,356,496.89	39.438433	-107.778697
- plan misses target center by 5261.3ft at 2490.0ft MD (2423.1 TVD, -434.7 N, -220.9 E)									
- Circle (radius 25.0)									
HMU Federal 16-14D3 E	0.00	0.00	9,807.0	-1,665.6	-846.4	1,592,652.99	2,356,496.89	39.438433	-107.778697
- plan misses target center by 7511.9ft at 2490.0ft MD (2423.1 TVD, -434.7 N, -220.9 E)									
- Circle (radius 60.0)									

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	EDM 5000.1 US Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site:</b>	(J16W)	<b>North Reference:</b>	True
<b>Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
2,500.0	16.50	206.94	2,432.7	-437.2	-222.2	490.5	0.00	0.00	
2,600.0	16.50	206.94	2,528.6	-462.6	-235.1	518.9	0.00	0.00	
2,700.0	16.50	206.94	2,624.5	-487.9	-247.9	547.3	0.00	0.00	
2,800.0	16.50	206.94	2,720.4	-513.2	-260.8	575.7	0.00	0.00	
2,900.0	16.50	206.94	2,816.3	-538.5	-273.7	604.1	0.00	0.00	
3,000.0	16.50	206.94	2,912.1	-563.8	-286.5	632.5	0.00	0.00	
3,100.0	16.50	206.94	3,008.0	-589.1	-299.4	660.9	0.00	0.00	
3,200.0	16.50	206.94	3,103.9	-614.5	-312.3	689.3	0.00	0.00	
3,300.0	16.50	206.94	3,199.8	-639.8	-325.1	717.7	0.00	0.00	
3,400.0	16.50	206.94	3,295.7	-665.1	-338.0	746.1	0.00	0.00	
3,500.0	16.50	206.94	3,391.5	-690.4	-350.9	774.5	0.00	0.00	
3,600.0	16.50	206.94	3,487.4	-715.7	-363.7	802.9	0.00	0.00	
3,700.0	16.50	206.94	3,583.3	-741.1	-376.6	831.3	0.00	0.00	
3,733.1	16.50	206.94	3,615.0	-749.4	-380.8	840.6	0.00	0.00	G Sand
3,800.0	16.50	206.94	3,679.2	-766.4	-389.5	859.7	0.00	0.00	
3,900.0	16.50	206.94	3,775.1	-791.7	-402.3	888.1	0.00	0.00	
4,000.0	16.50	206.94	3,871.0	-817.0	-415.2	916.5	0.00	0.00	
4,100.0	16.50	206.94	3,966.8	-842.3	-428.1	944.9	0.00	0.00	
4,200.0	16.50	206.94	4,062.7	-867.7	-440.9	973.3	0.00	0.00	
4,300.0	16.50	206.94	4,158.6	-893.0	-453.8	1,001.7	0.00	0.00	
4,400.0	16.50	206.94	4,254.5	-918.3	-466.7	1,030.1	0.00	0.00	
4,500.0	16.50	206.94	4,350.4	-943.6	-479.5	1,058.5	0.00	0.00	
4,600.0	16.50	206.94	4,446.3	-968.9	-492.4	1,086.9	0.00	0.00	
4,700.0	16.50	206.94	4,542.1	-994.2	-505.3	1,115.3	0.00	0.00	
4,800.0	16.50	206.94	4,638.0	-1,019.6	-518.1	1,143.7	0.00	0.00	
4,900.0	16.50	206.94	4,733.9	-1,044.9	-531.0	1,172.1	0.00	0.00	
5,000.0	16.50	206.94	4,829.8	-1,070.2	-543.9	1,200.5	0.00	0.00	
5,100.0	16.50	206.94	4,925.7	-1,095.5	-556.7	1,228.9	0.00	0.00	
5,200.0	16.50	206.94	5,021.5	-1,120.8	-569.6	1,257.3	0.00	0.00	
5,300.0	16.50	206.94	5,117.4	-1,146.2	-582.5	1,285.7	0.00	0.00	
5,400.0	16.50	206.94	5,213.3	-1,171.5	-595.3	1,314.1	0.00	0.00	
5,500.0	16.50	206.94	5,309.2	-1,196.8	-608.2	1,342.5	0.00	0.00	
5,600.0	16.50	206.94	5,405.1	-1,222.1	-621.1	1,370.9	0.00	0.00	
5,700.0	16.50	206.94	5,501.0	-1,247.4	-633.9	1,399.3	0.00	0.00	
5,800.0	16.50	206.94	5,596.8	-1,272.8	-646.8	1,427.7	0.00	0.00	
5,871.1	16.50	206.94	5,665.0	-1,290.8	-655.9	1,447.9	0.00	0.00	Ohio Creek
5,900.0	16.50	206.94	5,692.7	-1,298.1	-659.7	1,456.1	0.00	0.00	
6,000.0	16.50	206.94	5,788.6	-1,323.4	-672.5	1,484.5	0.00	0.00	
6,100.0	16.50	206.94	5,884.5	-1,348.7	-685.4	1,512.9	0.00	0.00	
6,200.0	16.50	206.94	5,980.4	-1,374.0	-698.3	1,541.3	0.00	0.00	
6,300.0	16.50	206.94	6,076.2	-1,399.3	-711.1	1,569.7	0.00	0.00	
6,331.0	16.50	206.94	6,106.0	-1,407.2	-715.1	1,578.5	0.00	0.00	Meas Verde
6,400.0	16.50	206.94	6,172.1	-1,424.7	-724.0	1,598.1	0.00	0.00	
6,500.0	16.50	206.94	6,268.0	-1,450.0	-736.9	1,626.5	0.00	0.00	
6,600.0	16.50	206.94	6,363.9	-1,475.3	-749.7	1,654.9	0.00	0.00	
6,700.0	16.50	206.94	6,459.8	-1,500.6	-762.6	1,683.3	0.00	0.00	
6,800.0	16.50	206.94	6,555.7	-1,525.9	-775.5	1,711.7	0.00	0.00	
6,865.0	16.50	206.94	6,618.0	-1,542.4	-783.8	1,730.1	0.00	0.00	Williams Fork
6,900.0	16.50	206.94	6,651.5	-1,551.3	-788.3	1,740.1	0.00	0.00	
6,936.3	16.50	206.94	6,686.4	-1,560.5	-793.0	1,750.4	0.00	0.00	Start Drop -2.00
7,000.0	15.23	206.94	6,747.6	-1,576.0	-800.9	1,767.8	2.00	-2.00	
7,100.0	13.23	206.94	6,844.5	-1,597.9	-812.0	1,792.4	2.00	-2.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	EDM 5000.1 US Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site:</b>	(J16W)	<b>North Reference:</b>	True
<b>Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
7,200.0	11.23	206.94	6,942.3	-1,616.8	-821.6	1,813.5	2.00	-2.00	
7,300.0	9.23	206.94	7,040.7	-1,632.6	-829.7	1,831.3	2.00	-2.00	
7,400.0	7.23	206.94	7,139.6	-1,645.3	-836.1	1,845.6	2.00	-2.00	
7,500.0	5.23	206.94	7,239.1	-1,655.0	-841.1	1,856.5	2.00	-2.00	
7,600.0	3.23	206.94	7,338.8	-1,661.6	-844.4	1,863.8	2.00	-2.00	
7,700.0	1.23	206.94	7,438.7	-1,665.0	-846.2	1,867.7	2.00	-2.00	
7,761.3	0.00	0.00	7,500.0	-1,665.6	-846.4	1,868.4	2.00	-2.00	EOD; Inc=0° - HMU Federal 16-14D3 TOG
7,800.0	0.00	0.00	7,538.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
7,900.0	0.00	0.00	7,638.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
7,902.3	0.00	0.00	7,641.0	-1,665.6	-846.4	1,868.4	0.00	0.00	Top of Gas
8,000.0	0.00	0.00	7,738.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,100.0	0.00	0.00	7,838.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,200.0	0.00	0.00	7,938.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,300.0	0.00	0.00	8,038.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,400.0	0.00	0.00	8,138.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,500.0	0.00	0.00	8,238.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,600.0	0.00	0.00	8,338.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,700.0	0.00	0.00	8,438.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,800.0	0.00	0.00	8,538.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
8,900.0	0.00	0.00	8,638.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,000.0	0.00	0.00	8,738.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,100.0	0.00	0.00	8,838.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,118.3	0.00	0.00	8,857.0	-1,665.6	-846.4	1,868.4	0.00	0.00	Coal Ridge
9,200.0	0.00	0.00	8,938.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,300.0	0.00	0.00	9,038.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,400.0	0.00	0.00	9,138.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,500.0	0.00	0.00	9,238.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,600.0	0.00	0.00	9,338.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,700.0	0.00	0.00	9,438.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,782.3	0.00	0.00	9,521.0	-1,665.6	-846.4	1,868.4	0.00	0.00	Base Cameo A Coal
9,800.0	0.00	0.00	9,538.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,900.0	0.00	0.00	9,638.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
9,918.3	0.00	0.00	9,657.0	-1,665.6	-846.4	1,868.4	0.00	0.00	Rollins
10,000.0	0.00	0.00	9,738.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
10,068.3	0.00	0.00	9,807.0	-1,665.6	-846.4	1,868.4	0.00	0.00	TD @ 10,068.3' MD - HMU Federal 16-14D3 B+
10,100.0	0.00	0.00	9,838.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
10,200.0	0.00	0.00	9,938.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
10,300.0	0.00	0.00	10,038.7	-1,665.6	-846.4	1,868.4	0.00	0.00	
10,368.3	0.00	0.00	10,107.0	-1,665.6	-846.4	1,868.4	0.00	0.00	Permit TD @ 10,368.3' MD



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	EDM 5000.1 US Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Project:</b>	Mamm Creek	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site:</b>	(J16W)	<b>North Reference:</b>	True
<b>Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

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)		
HMU Federal 16-14D3 T	0.00	0.00	7,500.0	-1,665.6	-846.4	1,592,652.99	2,356,496.89	39.438433	-107.778697
- plan hits target center									
- Circle (radius 25.0)									
HMU Federal 16-14D3 E	0.00	0.00	9,807.0	-1,665.6	-846.4	1,592,652.99	2,356,496.89	39.438433	-107.778697
- plan hits target center									
- Circle (radius 60.0)									

Casing Points					
Measured Depth	Vertical Depth			Casing Diameter	Hole Diameter
(ft)	(ft)	Name		(in)	(in)
1,552.7	1,524.4	Surface Casing		5.500	6.000

Formations						
Measured Depth	Vertical Depth				Dip	Dip Direction
(ft)	(ft)	Name	Lithology		(°)	(°)
3,733.1	3,615.0	G Sand			0.00	
5,871.1	5,665.0	Ohio Creek			0.00	
6,331.0	6,106.0	Meas Verde			0.00	
6,865.0	6,618.0	Williams Fork			0.00	
7,902.3	7,641.0	Top of Gas			0.00	
9,118.3	8,857.0	Coal Ridge			0.00	
9,782.3	9,521.0	Base Cameo A Coal			0.00	
9,918.3	9,657.0	Rollins			0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W	Comment	
(ft)	(ft)	(ft)	(ft)		
500.0	500.0	0.0	0.0	KOP @ 500' MD	
1,050.0	1,042.4	-70.1	-35.6	EOB; Inc=16.50°	
6,936.3	6,686.4	-1,560.5	-793.0	Start Drop -2.00	
7,761.3	7,500.0	-1,665.6	-846.4	EOD; Inc=0°	
10,068.3	9,807.0	-1,665.6	-846.4	TD @ 10,068.3' MD	
10,368.3	10,107.0	-1,665.6	-846.4	Permit TD @ 10,368.3' MD	

# **EnCana Oil & Gas (USA) Inc**

**Mamm Creek**

**(J16W)**

**HMU Federal 16-14D3**

**DD**

**Plan #1**

## **Anticollision Report**

**01 November, 2010**

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Reference	Plan #1		
Filter type:	GLOBAL FILTER APPLIED: All wellpaths within 200'+ 100/1000 of reference		
Interpolation Method:	MD Interval 100.0ft	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,236.8ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	11/1/2010		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	10,368.3	Plan #1 (DD)	MWD	Geolink MWD	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
(J16W)						
Existing 16-11 - DD - DD	974.4	955.1	130.9	127.2	35.504	CC, ES
Existing 16-11 - DD - DD	1,200.0	1,161.6	149.6	144.5	29.251	SF
Existing 16-16 - DD - DD	1,278.7	1,260.9	43.7	38.4	8.245	CC, ES
Existing 16-16 - DD - DD	1,300.0	1,280.7	44.3	38.8	7.987	SF
Existing 16-9 - DD - DD	1,020.7	1,020.2	25.9	21.6	6.009	CC, ES, SF
HMU Federal 16-10A - DD - Plan #1	500.0	500.0	77.3	75.7	46.350	CC, ES
HMU Federal 16-10A - DD - Plan #1	600.0	595.9	82.4	80.3	40.989	SF
HMU Federal 16-11B - DD - Plan #1	200.0	200.0	85.3	84.7	137.273	CC, ES
HMU Federal 16-11B - DD - Plan #1	700.0	685.8	124.1	121.4	46.044	SF
HMU Federal 16-11D - DD - Plan #1	554.0	556.3	64.1	62.2	32.779	CC, ES
HMU Federal 16-11D - DD - Plan #1	900.0	899.7	93.8	90.0	24.773	SF
HMU Federal 16-14A - DD - Plan #1	563.3	565.9	36.3	34.2	16.933	CC, ES
HMU Federal 16-14A - DD - Plan #1	1,000.0	1,000.8	61.7	57.0	13.008	SF
HMU Federal 16-14D - DD - Plan #1	500.0	500.0	34.4	32.7	20.620	CC, ES
HMU Federal 16-14D - DD - Plan #1	10,368.3	10,247.9	674.6	627.5	14.299	SF
HMU Federal 16-14D2 - DD - Plan #1	500.0	500.0	17.2	15.6	10.328	CC, ES
HMU Federal 16-14D2 - DD - Plan #1	10,300.0	10,238.4	339.8	293.1	7.268	SF
HMU Federal 16-16B - DD - Plan #1	348.5	348.6	26.3	25.2	22.631	CC, ES
HMU Federal 16-16B - DD - Plan #1	500.0	498.5	31.7	29.9	17.321	SF
HMU Federal 16-6C - DD - Plan #1	359.9	359.9	12.0	10.8	10.178	CC
HMU Federal 16-6C - DD - Plan #1	400.0	400.0	12.1	10.8	9.152	ES
HMU Federal 16-6C - DD - Plan #1	500.0	499.4	15.2	13.5	8.918	SF
HMU Federal 16-6C2 - DD - Plan #1	200.0	200.0	11.7	11.1	18.826	CC, ES
HMU Federal 16-6C2 - DD - Plan #1	300.0	299.3	14.3	13.3	14.685	SF
HMU Federal 16-9C - DD - Plan #1	300.0	300.0	43.0	42.0	44.305	CC, ES
HMU Federal 16-9C - DD - Plan #1	600.0	597.3	54.3	52.2	26.030	SF
HMU Federal 21-1B - DD - Plan #1	300.0	300.0	26.5	25.5	27.278	CC, ES
HMU Federal 21-1B - DD - Plan #1	500.0	496.7	36.5	34.9	21.927	SF
HMU Federal 21-3A - DD - Plan #1	200.0	200.0	16.8	16.2	27.061	CC, ES
HMU Federal 21-3A - DD - Plan #1	7,000.0	6,977.5	285.3	245.9	7.237	SF
HMU Fee 16-8D - DD - Plan #1	200.0	200.0	60.2	59.6	96.965	CC, ES
HMU Fee 16-8D - DD - Plan #1	500.0	490.4	79.7	77.9	45.366	SF

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - Existing 16-11 - DD - DD													Offset Site Error:	0.0 ft
Survey Program: 212-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Total Uncertainty Axis	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
0.0	0.0	0.0	0.0	0.0	0.0	-125.75	-84.1	-116.9	144.0					
100.0	100.0	99.7	99.7	0.1	0.2	-125.62	-84.0	-117.2	144.1	143.8	0.29	490.943		
200.0	200.0	199.4	199.4	0.3	0.3	-125.26	-83.4	-117.9	144.4	143.8	0.63	230.908		
300.0	300.0	299.7	299.7	0.5	0.5	-124.55	-82.1	-119.3	144.8	143.8	0.98	148.268		
400.0	400.0	400.5	400.4	0.7	0.7	-123.33	-79.5	-120.9	144.7	143.4	1.33	108.449		
431.4	431.4	431.5	431.4	0.7	0.7	-122.86	-78.5	-121.5	144.7	143.2	1.45	99.987		
500.0	500.0	499.1	499.0	0.8	0.9	-121.74	-76.2	-123.2	144.9	143.2	1.69	85.551		
600.0	600.0	597.0	596.7	1.0	1.1	33.84	-72.7	-126.9	144.1	142.1	2.06	69.914		
700.0	699.6	694.2	693.7	1.2	1.3	37.96	-69.1	-132.3	141.0	138.6	2.44	57.866		
800.0	798.8	790.7	789.9	1.5	1.5	43.88	-65.6	-139.3	136.5	133.6	2.83	48.157		
900.0	897.1	885.7	884.4	1.8	1.7	52.15	-61.4	-148.2	132.1	128.9	3.29	40.205		
974.4	969.6	955.1	953.3	2.1	1.9	59.54	-58.5	-156.3	130.9	127.2	3.69	35.504 CC, ES		
1,000.0	994.3	978.7	976.7	2.2	2.0	62.27	-57.5	-159.3	131.1	127.2	3.83	34.236		
1,100.0	1,090.4	1,070.4	1,067.2	2.6	2.2	73.43	-53.7	-173.1	136.2	131.7	4.46	30.558		
1,200.0	1,186.3	1,161.6	1,156.9	3.1	2.6	83.44	-49.6	-189.5	149.6	144.5	5.11	29.251 SF		
1,300.0	1,282.1	1,253.2	1,246.4	3.6	2.9	91.70	-44.5	-208.1	169.9	164.1	5.79	29.352		
1,400.0	1,378.0	1,346.1	1,336.9	4.1	3.3	98.13	-39.0	-228.3	194.5	188.0	6.48	30.037		
1,500.0	1,473.9	1,439.6	1,427.7	4.6	3.7	103.01	-33.4	-249.5	221.7	214.5	7.18	30.867		
1,600.0	1,569.8	1,533.7	1,519.1	5.2	4.1	106.79	-27.8	-271.3	250.5	242.6	7.90	31.695		
1,700.0	1,665.7	1,627.5	1,610.2	5.7	4.5	109.85	-21.9	-292.9	280.2	271.5	8.63	32.467		
1,800.0	1,761.5	1,722.2	1,702.2	6.2	4.9	112.46	-15.4	-314.5	310.8	301.4	9.36	33.200		
1,900.0	1,857.4	1,818.6	1,796.0	6.7	5.3	114.69	-9.0	-335.9	341.4	331.3	10.09	33.821		
2,000.0	1,953.3	1,912.9	1,887.9	7.2	5.7	116.61	-2.7	-356.2	372.0	361.2	10.82	34.375		
2,100.0	2,049.2	2,007.2	1,979.7	7.8	6.2	118.22	3.7	-376.7	403.2	391.7	11.55	34.919		
2,200.0	2,145.1	2,100.3	2,070.4	8.3	6.6	119.66	10.3	-396.5	434.7	422.4	12.27	35.429		
2,300.0	2,241.0	2,191.9	2,159.4	8.8	7.0	120.79	16.9	-416.8	466.9	453.9	13.00	35.908		
2,400.0	2,336.8	2,286.5	2,251.2	9.3	7.4	121.68	23.4	-439.0	499.6	485.8	13.75	36.327		
2,500.0	2,432.7	2,378.1	2,340.1	9.9	7.8	122.42	29.6	-460.4	532.2	517.7	14.50	36.704		
2,600.0	2,528.6	2,469.5	2,428.4	10.4	8.3	123.00	36.2	-482.9	565.8	550.6	15.26	37.091		
2,700.0	2,624.5	2,567.1	2,522.8	10.9	8.7	123.56	43.1	-506.6	599.3	583.3	16.03	37.394		
2,800.0	2,720.4	2,661.9	2,614.7	11.4	9.2	124.08	49.5	-529.2	632.3	615.5	16.79	37.662		
2,900.0	2,816.3	2,755.4	2,705.2	12.0	9.6	124.53	55.9	-551.7	665.5	648.0	17.55	37.914		
3,000.0	2,912.1	2,851.9	2,798.6	12.5	10.1	124.89	62.1	-575.4	698.6	680.3	18.33	38.108		
3,100.0	3,008.0	2,950.2	2,893.8	13.0	10.6	125.27	68.3	-598.8	731.4	712.3	19.11	38.275		
3,200.0	3,103.9	3,043.9	2,984.7	13.5	11.0	125.64	74.0	-620.7	763.8	743.9	19.87	38.433		
3,300.0	3,199.8	3,135.5	3,073.4	14.1	11.4	125.92	79.8	-642.6	796.6	776.0	20.63	38.613		
3,400.0	3,295.7	3,230.2	3,165.3	14.6	11.9	126.23	86.0	-665.0	829.6	808.2	21.39	38.784		
3,500.0	3,391.5	3,327.2	3,259.4	15.1	12.3	126.58	92.6	-687.1	862.4	840.3	22.14	38.949		
3,600.0	3,487.4	3,418.7	3,348.5	15.7	12.7	126.92	98.9	-707.4	895.0	872.2	22.88	39.121		
3,700.0	3,583.3	3,508.2	3,435.2	16.2	13.2	127.18	105.3	-728.3	928.4	904.8	23.62	39.305		
3,800.0	3,679.2	3,605.7	3,529.7	16.7	13.6	127.41	112.1	-751.4	961.8	937.4	24.40	39.425		
3,900.0	3,775.1	3,701.9	3,623.0	17.2	14.1	127.62	118.4	-774.2	994.8	969.7	25.17	39.527		
4,000.0	3,871.0	3,798.3	3,716.4	17.8	14.5	127.81	124.7	-797.0	1,027.8	1,001.9	25.94	39.625		
4,100.0	3,966.8	3,894.6	3,810.0	18.3	15.0	128.02	130.8	-819.2	1,060.5	1,033.8	26.70	39.723		
4,200.0	4,062.7	3,985.7	3,898.5	18.8	15.4	128.24	137.0	-839.8	1,093.3	1,065.9	27.44	39.849		
4,300.0	4,158.6	4,077.2	3,987.3	19.4	15.8	128.42	143.2	-860.9	1,126.4	1,098.3	28.18	39.972		
4,400.0	4,254.5	4,171.4	4,078.8	19.9	16.2	128.61	149.9	-882.6	1,159.7	1,130.7	28.94	40.077		
4,500.0	4,350.4	4,267.6	4,171.9	20.4	16.7	128.74	156.3	-905.4	1,192.9	1,163.2	29.71	40.150		
4,600.0	4,446.3	4,364.7	4,266.1	20.9	17.1	128.88	162.5	-928.3	1,225.8	1,195.3	30.48	40.217		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - Existing 16-16 - DD - DD													Offset Site Error: 0.0 ft	
Survey Program: 212-MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-131.38	-104.4	-118.5	157.9					
100.0	100.0	98.5	98.5	0.1	0.2	-131.41	-104.7	-118.8	158.4	158.1	0.29	545.036		
200.0	200.0	196.9	196.9	0.3	0.3	-131.48	-105.8	-119.7	159.8	159.2	0.62	257.971		
300.0	300.0	297.2	297.2	0.5	0.5	-131.62	-107.4	-120.9	161.7	160.8	0.97	167.382		
400.0	400.0	397.3	397.2	0.7	0.7	-131.97	-109.3	-121.5	163.4	162.1	1.31	124.263		
500.0	500.0	496.8	496.7	0.8	0.9	-132.87	-112.4	-121.1	165.2	163.6	1.66	99.324		
600.0	600.0	598.2	598.0	1.0	1.0	19.03	-116.7	-119.4	164.5	162.4	2.03	80.978		
700.0	699.6	699.0	698.7	1.2	1.2	18.05	-121.2	-116.2	157.9	155.5	2.40	65.907		
800.0	798.8	799.5	798.9	1.5	1.4	16.98	-126.3	-111.3	145.7	142.9	2.77	52.557		
900.0	897.1	899.5	898.5	1.8	1.7	15.18	-132.3	-103.8	127.5	124.3	3.16	40.279		
1,000.0	994.3	997.3	995.4	2.2	1.9	11.56	-139.7	-93.5	103.8	100.2	3.57	29.110		
1,100.0	1,090.4	1,093.1	1,089.8	2.6	2.2	2.89	-148.7	-79.7	75.9	71.9	3.98	19.064		
1,200.0	1,186.3	1,187.3	1,181.8	3.1	2.6	-18.52	-159.0	-62.7	51.7	47.2	4.50	11.472		
1,278.7	1,261.7	1,260.9	1,253.5	3.5	2.8	-48.49	-167.6	-48.5	43.7	38.4	5.30	8.245 CC, ES		
1,300.0	1,282.1	1,280.7	1,272.8	3.6	2.9	-57.42	-170.0	-44.6	44.3	38.8	5.55	7.987 SF		
1,400.0	1,378.0	1,374.0	1,363.4	4.1	3.3	-89.95	-181.8	-25.8	61.3	54.8	6.55	9.364		
1,500.0	1,473.9	1,467.4	1,454.0	4.6	3.7	-106.00	-194.1	-6.6	89.8	82.5	7.31	12.282		
1,600.0	1,569.8	1,559.6	1,543.3	5.2	4.1	-114.07	-206.3	12.8	122.1	114.1	8.01	15.248		
1,700.0	1,665.7	1,653.4	1,633.9	5.7	4.6	-118.76	-218.9	33.2	156.6	147.9	8.71	17.982		
1,800.0	1,761.5	1,747.5	1,725.1	6.2	5.0	-121.84	-231.4	53.3	191.1	181.7	9.41	20.315		
1,900.0	1,857.4	1,841.9	1,816.5	6.7	5.4	-124.03	-243.8	73.0	225.7	215.5	10.11	22.317		
2,000.0	1,953.3	1,936.2	1,908.0	7.2	5.8	-125.72	-256.0	92.3	260.1	249.3	10.81	24.054		
2,100.0	2,049.2	2,030.4	1,999.5	7.8	6.3	-127.01	-268.1	111.5	294.5	282.9	11.52	25.549		
2,200.0	2,145.1	2,126.5	2,092.8	8.3	6.7	-127.99	-280.9	130.6	328.6	316.3	12.24	26.837		
2,300.0	2,241.0	2,221.4	2,184.9	8.8	7.1	-128.74	-293.9	149.1	362.2	349.2	12.98	27.909		
2,400.0	2,336.8	2,315.9	2,276.6	9.3	7.6	-129.22	-307.7	167.7	395.8	382.1	13.71	28.858		
2,500.0	2,432.7	2,412.2	2,370.1	9.9	8.0	-129.67	-321.6	186.3	429.1	414.6	14.46	29.670		
2,600.0	2,528.6	2,506.6	2,461.5	10.4	8.4	-129.93	-336.1	204.3	462.1	446.9	15.23	30.353		
2,700.0	2,624.5	2,604.0	2,555.8	10.9	8.9	-130.07	-351.8	223.0	495.0	479.0	16.00	30.934		
2,800.0	2,720.4	2,699.6	2,648.5	11.4	9.3	-130.25	-367.0	240.8	527.3	510.6	16.76	31.455		
2,900.0	2,816.3	2,795.0	2,741.2	12.0	9.8	-130.44	-381.8	258.3	559.6	542.1	17.52	31.934		
3,000.0	2,912.1	2,883.0	2,826.4	12.5	10.2	-130.58	-395.6	274.8	592.2	574.0	18.27	32.421		
3,100.0	3,008.0	2,976.8	2,917.2	13.0	10.6	-130.66	-410.5	293.3	625.7	606.7	19.03	32.874		
3,200.0	3,103.9	3,063.0	3,000.5	13.5	11.1	-130.74	-424.1	310.6	659.4	639.7	19.78	33.346		
3,300.0	3,199.8	3,153.4	3,087.7	14.1	11.5	-130.77	-438.4	329.9	694.4	673.8	20.54	33.812		
3,400.0	3,295.7	3,248.6	3,179.6	14.6	12.0	-130.82	-453.3	350.1	729.2	707.9	21.31	34.218		
3,500.0	3,391.5	3,339.5	3,267.3	15.1	12.4	-130.90	-467.1	369.2	764.1	742.0	22.06	34.635		
3,600.0	3,487.4	3,429.6	3,354.3	15.7	12.9	-131.01	-480.2	388.5	799.4	776.7	22.80	35.067		
3,700.0	3,583.3	3,522.1	3,443.7	16.2	13.3	-131.15	-493.1	408.5	835.1	811.5	23.54	35.478		
3,800.0	3,679.2	3,616.5	3,535.0	16.7	13.8	-131.31	-505.8	428.7	870.7	846.4	24.27	35.868		
3,900.0	3,775.1	3,711.0	3,626.6	17.2	14.2	-131.50	-518.0	448.6	906.1	881.1	25.00	36.245		
4,000.0	3,871.0	3,807.2	3,719.9	17.8	14.7	-131.71	-530.0	468.7	941.5	915.8	25.73	36.586		
4,100.0	3,966.8	3,906.5	3,816.1	18.3	15.1	-131.84	-543.5	489.2	976.4	949.9	26.50	36.844		
4,200.0	4,062.7	4,004.6	3,911.1	18.8	15.6	-131.90	-558.1	509.3	1,010.8	983.6	27.28	37.059		
4,300.0	4,158.6	4,098.7	4,002.1	19.4	16.0	-131.96	-572.0	528.3	1,045.0	1,017.0	28.04	37.275		
4,400.0	4,254.5	4,193.6	4,094.0	19.9	16.5	-132.01	-586.1	547.6	1,079.3	1,050.5	28.80	37.479		
4,500.0	4,350.4	4,290.7	4,188.1	20.4	17.0	-132.07	-600.5	567.0	1,113.3	1,083.7	29.56	37.656		
4,600.0	4,446.3	4,387.1	4,281.5	20.9	17.4	-132.13	-614.6	586.0	1,147.0	1,116.7	30.32	37.826		
4,700.0	4,542.1	4,482.8	4,374.3	21.5	17.8	-132.21	-628.4	604.7	1,180.7	1,149.6	31.08	37.992		
4,800.0	4,638.0	4,580.7	4,469.4	22.0	18.3	-132.30	-642.3	623.5	1,214.1	1,182.3	31.83	38.141		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - Existing 16-9 - DD - DD													Offset Site Error: 0.0 ft	
Survey Program: 195-MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	-119.16	-63.9	-114.5	131.2					
100.0	100.0	100.1	100.1	0.1	0.2	-119.08	-63.7	-114.6	131.1	130.8	0.29	449.974		
200.0	200.0	200.3	200.3	0.3	0.3	-118.86	-63.2	-114.7	131.0	130.4	0.62	210.517		
300.0	300.0	301.0	301.0	0.5	0.5	-118.82	-62.9	-114.4	130.6	129.6	0.97	134.306		
400.0	400.0	403.2	403.1	0.7	0.7	-119.46	-63.4	-112.3	129.0	127.6	1.33	97.154		
500.0	500.0	505.5	505.4	0.8	0.9	-120.66	-64.1	-108.1	125.8	124.1	1.69	74.460		
600.0	600.0	608.4	608.0	1.0	1.1	31.71	-63.8	-101.5	117.9	115.9	2.04	57.784		
700.0	699.6	710.7	710.0	1.2	1.3	32.72	-61.8	-92.8	103.1	100.7	2.40	42.924		
800.0	798.8	811.0	809.5	1.5	1.5	36.28	-58.3	-81.3	80.6	77.8	2.77	29.108		
900.0	897.1	907.7	905.2	1.8	1.8	47.06	-53.2	-68.1	52.3	49.2	3.19	16.390		
1,000.0	994.3	1,001.2	997.4	2.2	2.1	89.18	-46.9	-54.1	27.2	23.1	4.09	6.653		
1,020.7	1,014.3	1,020.2	1,016.2	2.3	2.2	105.67	-45.5	-51.1	25.9	21.6	4.31	6.009	CC, ES, SF	
1,100.0	1,090.4	1,091.9	1,086.7	2.6	2.4	155.10	-40.2	-39.4	42.8	38.5	4.32	9.914		
1,200.0	1,186.3	1,182.4	1,175.7	3.1	2.7	174.87	-33.4	-24.4	81.4	77.0	4.40	18.493		
1,300.0	1,282.1	1,272.6	1,264.4	3.6	3.0	-178.31	-26.8	-9.9	122.6	117.9	4.70	26.095		
1,400.0	1,378.0	1,361.8	1,352.1	4.1	3.3	-174.77	-20.0	5.1	165.1	160.1	5.04	32.736		
1,500.0	1,473.9	1,450.0	1,438.8	4.6	3.7	-172.76	-12.7	20.0	208.6	203.2	5.41	38.569		
1,600.0	1,569.8	1,538.8	1,525.8	5.2	4.0	-171.38	-4.9	35.6	252.8	247.0	5.79	43.701		
1,700.0	1,665.7	1,628.7	1,613.9	5.7	4.3	-170.30	2.8	51.8	297.3	291.1	6.17	48.179		
1,800.0	1,761.5	1,720.4	1,703.9	6.2	4.7	-169.57	10.7	67.7	341.4	334.8	6.56	52.043		
1,900.0	1,857.4	1,812.8	1,794.6	6.7	5.0	-169.04	18.1	83.2	384.9	377.9	6.95	55.349		
2,000.0	1,953.3	1,904.9	1,885.2	7.2	5.4	-168.59	25.1	98.6	427.9	420.6	7.35	58.187		
2,100.0	2,049.2	1,995.9	1,974.7	7.8	5.7	-168.10	31.1	114.2	470.6	462.9	7.76	60.635		
2,200.0	2,145.1	2,084.7	2,061.9	8.3	6.0	-167.67	36.9	129.8	513.5	505.3	8.17	62.863		
2,300.0	2,241.0	2,172.6	2,148.1	8.8	6.4	-167.27	42.7	145.6	556.7	548.1	8.58	64.913		
2,400.0	2,336.8	2,265.4	2,239.3	9.3	6.7	-166.93	48.8	162.2	599.9	590.9	8.99	66.699		
2,500.0	2,432.7	2,356.4	2,328.6	9.9	7.0	-166.63	54.6	178.3	642.8	633.4	9.41	68.294		
2,600.0	2,528.6	2,443.9	2,414.5	10.4	7.4	-166.33	60.0	194.4	685.9	676.1	9.83	69.788		
2,700.0	2,624.5	2,532.8	2,501.7	10.9	7.7	-166.07	65.6	210.7	729.3	719.0	10.25	71.172		
2,800.0	2,720.4	2,616.4	2,583.6	11.4	8.1	-165.82	71.0	226.7	773.1	762.4	10.66	72.511		
2,900.0	2,816.3	2,709.2	2,674.4	12.0	8.4	-165.54	77.0	244.8	817.2	806.1	11.10	73.629		
3,000.0	2,912.1	2,788.9	2,752.3	12.5	8.8	-165.32	82.2	260.6	861.5	850.0	11.51	74.866		
3,100.0	3,008.0	2,877.2	2,838.5	13.0	9.1	-165.09	88.5	278.6	906.7	894.7	11.94	75.964		
3,200.0	3,103.9	2,969.8	2,929.1	13.5	9.5	-164.90	95.2	297.1	951.6	939.2	12.37	76.924		
3,300.0	3,199.8	3,062.0	3,019.2	14.1	9.9	-164.75	101.8	315.0	996.2	983.4	12.80	77.822		
3,400.0	3,295.7	3,154.4	3,109.7	14.6	10.2	-164.62	108.4	332.7	1,040.6	1,027.3	13.23	78.653		
3,500.0	3,391.5	3,248.4	3,201.7	15.1	10.6	-164.52	115.1	350.3	1,084.7	1,071.0	13.66	79.402		
3,600.0	3,487.4	3,344.7	3,296.2	15.7	11.0	-164.43	121.7	367.9	1,128.3	1,114.2	14.09	80.059		
3,700.0	3,583.3	3,430.4	3,380.4	16.2	11.3	-164.36	127.4	383.4	1,171.7	1,157.2	14.51	80.752		
3,800.0	3,679.2	3,515.9	3,464.0	16.7	11.6	-164.25	132.9	399.8	1,215.7	1,200.8	14.93	81.427		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-10A - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total	Separation	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	11.59	75.8	15.5	77.3					
100.0	100.0	100.0	100.0	0.1	0.1	11.59	75.8	15.5	77.3	77.1	0.27	284.043		
200.0	200.0	200.0	200.0	0.3	0.3	11.59	75.8	15.5	77.3	76.7	0.62	124.468		
300.0	300.0	300.0	300.0	0.5	0.5	11.59	75.8	15.5	77.3	76.4	0.97	79.695		
400.0	400.0	400.0	400.0	0.7	0.7	11.59	75.8	15.5	77.3	76.0	1.32	58.612		
500.0	500.0	500.0	500.0	0.8	0.8	11.59	75.8	15.5	77.3	75.7	1.67	46.350 CC, ES		
600.0	600.0	595.9	595.9	1.0	1.0	165.32	78.0	16.4	82.4	80.3	2.01	40.989 SF		
700.0	699.6	690.3	690.0	1.2	1.2	166.90	84.7	18.8	97.4	95.0	2.34	41.541		
800.0	798.8	784.8	783.8	1.5	1.4	168.68	95.1	22.6	121.6	119.0	2.67	45.506		
900.0	897.1	880.1	878.4	1.8	1.6	170.21	106.1	26.6	151.5	148.5	3.00	50.563		
1,000.0	994.3	973.8	971.3	2.2	1.9	171.43	117.0	30.5	186.4	183.1	3.31	56.313		
1,100.0	1,090.4	1,065.7	1,062.6	2.6	2.1	172.47	127.6	34.4	225.6	221.9	3.63	62.164		
1,200.0	1,186.3	1,157.4	1,153.6	3.1	2.3	173.28	138.2	38.3	265.4	261.4	3.96	67.006		
1,300.0	1,282.1	1,249.1	1,244.5	3.6	2.6	173.88	148.8	42.1	305.2	300.9	4.29	71.116		
1,400.0	1,378.0	1,340.7	1,335.5	4.1	2.8	174.34	159.4	46.0	345.1	340.5	4.62	74.648		
1,500.0	1,473.9	1,432.4	1,426.5	4.6	3.1	174.70	170.1	49.9	385.0	380.0	4.95	77.716		
1,600.0	1,569.8	1,524.1	1,517.5	5.2	3.3	175.00	180.7	53.7	424.9	419.6	5.28	80.405		
1,700.0	1,665.7	1,615.8	1,608.5	5.7	3.6	175.25	191.3	57.6	464.8	459.1	5.61	82.780		
1,800.0	1,761.5	1,707.4	1,699.4	6.2	3.8	175.45	201.9	61.5	504.7	498.7	5.94	84.895		
1,900.0	1,857.4	1,799.1	1,790.4	6.7	4.1	175.63	212.5	65.3	544.6	538.3	6.27	86.789		
2,000.0	1,953.3	1,890.8	1,881.4	7.2	4.3	175.78	223.1	69.2	584.5	577.9	6.60	88.496		
2,100.0	2,049.2	1,982.5	1,972.4	7.8	4.6	175.92	233.7	73.0	624.4	617.5	6.93	90.041		
2,200.0	2,145.1	2,074.2	2,063.4	8.3	4.8	176.03	244.3	76.9	664.3	657.1	7.26	91.447		
2,300.0	2,241.0	2,165.8	2,154.4	8.8	5.1	176.14	255.0	80.8	704.2	696.6	7.59	92.731		
2,400.0	2,336.8	2,257.5	2,245.3	9.3	5.3	176.23	265.6	84.6	744.2	736.2	7.92	93.910		
2,500.0	2,432.7	2,349.2	2,336.3	9.9	5.6	176.31	276.2	88.5	784.1	775.8	8.25	94.994		
2,600.0	2,528.6	2,440.9	2,427.3	10.4	5.8	176.39	286.8	92.4	824.0	815.4	8.58	95.996		
2,700.0	2,624.5	2,532.6	2,518.3	10.9	6.1	176.46	297.4	96.2	863.9	855.0	8.91	96.924		
2,800.0	2,720.4	2,624.2	2,609.3	11.4	6.3	176.52	308.0	100.1	903.9	894.6	9.24	97.786		
2,900.0	2,816.3	2,715.9	2,700.2	12.0	6.6	176.58	318.6	104.0	943.8	934.2	9.57	98.589		
3,000.0	2,912.1	2,807.6	2,791.2	12.5	6.8	176.63	329.2	107.8	983.7	973.8	9.90	99.339		
3,100.0	3,008.0	2,899.3	2,882.2	13.0	7.1	176.68	339.8	111.7	1,023.6	1,013.4	10.23	100.041		
3,200.0	3,103.9	2,991.0	2,973.2	13.5	7.3	176.72	350.5	115.6	1,063.6	1,053.0	10.56	100.699		
3,300.0	3,199.8	3,082.6	3,064.2	14.1	7.6	176.76	361.1	119.4	1,103.5	1,092.6	10.89	101.317		
3,400.0	3,295.7	3,174.3	3,155.1	14.6	7.8	176.80	371.7	123.3	1,143.4	1,132.2	11.22	101.899		
3,500.0	3,391.5	3,266.0	3,246.1	15.1	8.1	176.84	382.3	127.1	1,183.4	1,171.8	11.55	102.448		
3,600.0	3,487.4	3,357.7	3,337.1	15.7	8.4	176.87	392.9	131.0	1,223.3	1,211.4	11.88	102.967		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-11B - DD - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Separation Factor			
0.0	0.0	0.0	0.0	0.0	0.0	5.70	84.9	8.5	85.3						
100.0	100.0	100.0	100.0	0.1	0.1	5.70	84.9	8.5	85.3	85.0	0.27	313.264			
200.0	200.0	200.0	200.0	0.3	0.3	5.70	84.9	8.5	85.3	84.7	0.62	137.273 CC, ES			
300.0	300.0	298.9	298.8	0.5	0.5	4.04	85.7	6.1	85.9	85.0	0.97	88.309			
400.0	400.0	397.2	396.9	0.7	0.7	-0.74	88.2	-1.1	88.3	86.9	1.34	65.873			
500.0	500.0	494.5	493.4	0.8	1.0	-7.97	92.3	-12.9	93.5	91.8	1.72	54.442			
600.0	600.0	590.4	587.6	1.0	1.3	137.25	98.0	-29.1	104.8	102.6	2.24	46.857			
700.0	699.6	685.8	680.7	1.2	1.7	130.96	105.0	-49.2	124.1	121.4	2.70	46.044 SF			
800.0	798.8	782.6	774.8	1.5	2.1	127.42	112.4	-70.4	148.1	144.9	3.19	46.452			
900.0	897.1	878.8	868.4	1.8	2.6	126.04	119.8	-91.4	175.3	171.5	3.74	46.920			
1,000.0	994.3	974.1	961.1	2.2	3.0	126.00	127.0	-112.3	205.4	201.1	4.35	47.212			
1,100.0	1,090.4	1,068.4	1,052.9	2.6	3.4	127.05	134.3	-132.9	238.3	233.2	5.03	47.367			
1,200.0	1,186.3	1,162.6	1,144.5	3.1	3.8	128.28	141.4	-153.5	271.6	265.8	5.74	47.314			
1,300.0	1,282.1	1,256.7	1,236.0	3.6	4.2	129.24	148.6	-174.2	304.9	298.5	6.46	47.238			
1,400.0	1,378.0	1,350.9	1,327.6	4.1	4.6	130.01	155.8	-194.8	338.4	331.2	7.18	47.160			
1,500.0	1,473.9	1,445.0	1,419.2	4.6	5.1	130.64	163.0	-215.4	371.9	364.0	7.90	47.086			
1,600.0	1,569.8	1,539.2	1,510.8	5.2	5.5	131.17	170.2	-236.0	405.4	396.8	8.62	47.021			
1,700.0	1,665.7	1,633.3	1,602.4	5.7	5.9	131.62	177.4	-256.6	439.0	429.6	9.35	46.962			
1,800.0	1,761.5	1,727.5	1,694.0	6.2	6.3	132.00	184.6	-277.2	472.6	462.5	10.07	46.911			
1,900.0	1,857.4	1,821.6	1,785.5	6.7	6.8	132.34	191.8	-297.8	506.2	495.4	10.80	46.866			
2,000.0	1,953.3	1,915.8	1,877.1	7.2	7.2	132.63	199.0	-318.4	539.8	528.2	11.53	46.826			
2,100.0	2,049.2	2,009.9	1,968.7	7.8	7.6	132.89	206.2	-339.0	573.4	561.1	12.25	46.790			
2,200.0	2,145.1	2,104.1	2,060.3	8.3	8.0	133.11	213.4	-359.6	607.0	594.0	12.98	46.758			
2,300.0	2,241.0	2,198.2	2,151.9	8.8	8.4	133.32	220.6	-380.2	640.6	626.9	13.71	46.730			
2,400.0	2,336.8	2,292.4	2,243.5	9.3	8.9	133.50	227.8	-400.9	674.3	659.8	14.44	46.704			
2,500.0	2,432.7	2,386.5	2,335.1	9.9	9.3	133.67	235.0	-421.5	707.9	692.8	15.17	46.681			
2,600.0	2,528.6	2,480.7	2,426.6	10.4	9.7	133.82	242.2	-442.1	741.6	725.7	15.89	46.660			
2,700.0	2,624.5	2,574.8	2,518.2	10.9	10.1	133.96	249.4	-462.7	775.2	758.6	16.62	46.642			
2,800.0	2,720.4	2,669.0	2,609.8	11.4	10.6	134.09	256.6	-483.3	808.9	791.5	17.35	46.624			
2,900.0	2,816.3	2,763.1	2,701.4	12.0	11.0	134.21	263.8	-503.9	842.6	824.5	18.08	46.608			
3,000.0	2,912.1	2,857.3	2,793.0	12.5	11.4	134.31	271.0	-524.5	876.2	857.4	18.81	46.594			
3,100.0	3,008.0	2,951.4	2,884.6	13.0	11.8	134.41	278.2	-545.1	909.9	890.4	19.53	46.580			
3,200.0	3,103.9	3,045.6	2,976.2	13.5	12.2	134.51	285.4	-565.7	943.6	923.3	20.26	46.568			
3,300.0	3,199.8	3,139.7	3,067.7	14.1	12.7	134.59	292.6	-586.3	977.2	956.2	20.99	46.556			
3,400.0	3,295.7	3,233.9	3,159.3	14.6	13.1	134.67	299.8	-606.9	1,010.9	989.2	21.72	46.546			
3,500.0	3,391.5	3,328.0	3,250.9	15.1	13.5	134.75	307.0	-627.6	1,044.6	1,022.1	22.45	46.536			
3,600.0	3,487.4	3,422.2	3,342.5	15.7	13.9	134.82	314.2	-648.2	1,078.3	1,055.1	23.18	46.527			
3,700.0	3,583.3	3,516.3	3,434.1	16.2	14.4	134.89	321.4	-668.8	1,111.9	1,088.0	23.90	46.518			
3,800.0	3,679.2	3,610.5	3,525.7	16.7	14.8	134.95	328.6	-689.4	1,145.6	1,121.0	24.63	46.510			
3,900.0	3,775.1	3,704.6	3,617.2	17.2	15.2	135.01	335.8	-710.0	1,179.3	1,153.9	25.36	46.502			
4,000.0	3,871.0	3,798.8	3,708.8	17.8	15.6	135.06	343.0	-730.6	1,213.0	1,186.9	26.09	46.495			



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-11D - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance		Total		Separation		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis			
0.0	0.0	0.0	0.0	0.0	0.0	5.68	68.1	6.8	68.4					
100.0	100.0	100.0	100.0	0.1	0.1	5.68	68.1	6.8	68.4	68.2	0.27	251.397		
200.0	200.0	200.0	200.0	0.3	0.3	5.68	68.1	6.8	68.4	67.8	0.62	110.163		
300.0	300.0	300.0	300.0	0.5	0.5	5.68	68.1	6.8	68.4	67.5	0.97	70.536		
400.0	400.0	401.4	401.3	0.7	0.7	3.59	67.3	4.2	67.4	66.1	1.33	50.746		
500.0	500.0	502.2	501.8	0.8	0.9	-2.99	64.8	-3.4	64.9	63.2	1.72	37.810		
554.0	554.0	556.3	555.5	0.9	1.0	144.83	62.8	-9.5	64.1	62.2	1.96	32.779 CC, ES		
600.0	600.0	602.1	600.9	1.0	1.2	139.92	60.7	-15.9	64.7	62.6	2.16	29.913		
700.0	699.6	701.3	698.7	1.2	1.5	130.14	55.5	-31.9	70.3	67.6	2.66	26.425		
800.0	798.8	800.6	796.4	1.5	1.8	124.83	50.2	-48.0	80.4	77.2	3.19	25.172		
900.0	897.1	899.7	894.1	1.8	2.1	123.33	44.9	-64.1	93.8	90.0	3.79	24.773 SF		
1,000.0	994.3	998.3	991.2	2.2	2.4	124.37	39.7	-80.1	110.1	105.7	4.44	24.811		
1,100.0	1,090.4	1,096.3	1,087.8	2.6	2.8	126.90	34.5	-96.1	129.1	124.0	5.12	25.228		
1,200.0	1,186.3	1,194.2	1,184.2	3.1	3.1	129.14	29.3	-112.0	148.8	143.0	5.81	25.624		
1,300.0	1,282.1	1,292.1	1,280.7	3.6	3.5	130.86	24.1	-127.9	168.6	162.1	6.49	25.962		
1,400.0	1,378.0	1,390.0	1,377.2	4.1	3.8	132.22	18.9	-143.8	188.5	181.3	7.18	26.255		
1,500.0	1,473.9	1,487.9	1,473.6	4.6	4.1	133.32	13.6	-159.8	208.5	200.6	7.86	26.512		
1,600.0	1,569.8	1,585.8	1,570.1	5.2	4.5	134.23	8.4	-175.7	228.6	220.0	8.55	26.737		
1,700.0	1,665.7	1,683.7	1,666.6	5.7	4.8	134.99	3.2	-191.6	248.7	239.4	9.23	26.936		
1,800.0	1,761.5	1,781.6	1,763.0	6.2	5.1	135.63	-2.0	-207.5	268.8	258.9	9.91	27.114		
1,900.0	1,857.4	1,879.6	1,859.5	6.7	5.5	136.19	-7.2	-223.4	289.0	278.4	10.60	27.273		
2,000.0	1,953.3	1,977.5	1,956.0	7.2	5.8	136.67	-12.4	-239.4	309.2	297.9	11.28	27.417		
2,100.0	2,049.2	2,075.4	2,052.4	7.8	6.2	137.10	-17.6	-255.3	329.4	317.5	11.96	27.546		
2,200.0	2,145.1	2,173.3	2,148.9	8.3	6.5	137.47	-22.8	-271.2	349.7	337.0	12.64	27.664		
2,300.0	2,241.0	2,271.2	2,245.3	8.8	6.8	137.81	-28.0	-287.1	369.9	356.6	13.32	27.772		
2,400.0	2,336.8	2,369.1	2,341.8	9.3	7.2	138.11	-33.2	-303.1	390.2	376.2	14.00	27.870		
2,500.0	2,432.7	2,467.0	2,438.3	9.9	7.5	138.38	-38.4	-319.0	410.4	395.8	14.68	27.961		
2,600.0	2,528.6	2,564.9	2,534.7	10.4	7.9	138.62	-43.6	-334.9	430.7	415.3	15.36	28.044		
2,700.0	2,624.5	2,662.8	2,631.2	10.9	8.2	138.84	-48.8	-350.8	451.0	434.9	16.04	28.121		
2,800.0	2,720.4	2,760.7	2,727.7	11.4	8.5	139.05	-54.0	-366.7	471.3	454.6	16.72	28.193		
2,900.0	2,816.3	2,858.6	2,824.1	12.0	8.9	139.23	-59.2	-382.7	491.6	474.2	17.39	28.259		
3,000.0	2,912.1	2,956.5	2,920.6	12.5	9.2	139.41	-64.5	-398.6	511.9	493.8	18.07	28.321		
3,100.0	3,008.0	3,054.4	3,017.1	13.0	9.6	139.57	-69.7	-414.5	532.2	513.4	18.75	28.379		
3,200.0	3,103.9	3,152.4	3,113.5	13.5	9.9	139.71	-74.9	-430.4	552.5	533.0	19.43	28.434		
3,300.0	3,199.8	3,250.3	3,210.0	14.1	10.3	139.85	-80.1	-446.3	572.8	552.7	20.11	28.484		
3,400.0	3,295.7	3,348.2	3,306.4	14.6	10.6	139.98	-85.3	-462.3	593.1	572.3	20.79	28.532		
3,500.0	3,391.5	3,446.1	3,402.9	15.1	10.9	140.10	-90.5	-478.2	613.4	591.9	21.46	28.577		
3,600.0	3,487.4	3,544.0	3,499.4	15.7	11.3	140.21	-95.7	-494.1	633.7	611.6	22.14	28.620		
3,700.0	3,583.3	3,641.9	3,595.8	16.2	11.6	140.31	-100.9	-510.0	654.0	631.2	22.82	28.660		
3,800.0	3,679.2	3,739.8	3,692.3	16.7	12.0	140.41	-106.1	-525.9	674.4	650.9	23.50	28.698		
3,900.0	3,775.1	3,837.7	3,788.8	17.2	12.3	140.50	-111.3	-541.9	694.7	670.5	24.18	28.734		
4,000.0	3,871.0	3,935.6	3,885.2	17.8	12.6	140.59	-116.5	-557.8	715.0	690.2	24.85	28.768		
4,100.0	3,966.8	4,033.5	3,981.7	18.3	13.0	140.67	-121.7	-573.7	735.3	709.8	25.53	28.801		
4,200.0	4,062.7	4,131.4	4,078.2	18.8	13.3	140.75	-126.9	-589.6	755.7	729.4	26.21	28.832		
4,300.0	4,158.6	4,229.3	4,174.6	19.4	13.7	140.82	-132.1	-605.6	776.0	749.1	26.89	28.861		
4,400.0	4,254.5	4,327.2	4,271.1	19.9	14.0	140.89	-137.3	-621.5	796.3	768.8	27.56	28.889		
4,500.0	4,350.4	4,425.1	4,367.6	20.4	14.4	140.96	-142.6	-637.4	816.6	788.4	28.24	28.916		
4,600.0	4,446.3	4,523.1	4,464.0	20.9	14.7	141.02	-147.8	-653.3	837.0	808.1	28.92	28.942		
4,700.0	4,542.1	4,621.0	4,560.5	21.5	15.0	141.08	-153.0	-669.2	857.3	827.7	29.60	28.966		
4,800.0	4,638.0	4,718.9	4,656.9	22.0	15.4	141.14	-158.2	-685.2	877.6	847.4	30.27	28.990		
4,900.0	4,733.9	4,816.8	4,753.4	22.5	15.7	141.19	-163.4	-701.1	898.0	867.0	30.95	29.012		
5,000.0	4,829.8	4,914.7	4,849.9	23.1	16.1	141.25	-168.6	-717.0	918.3	886.7	31.63	29.034		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-11D - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
5,100.0	4,925.7	5,012.6	4,946.3	23.6	16.4	141.30	-173.8	-732.9	938.6	906.3	32.31	29.054		
5,200.0	5,021.5	5,110.5	5,042.8	24.1	16.7	141.35	-179.0	-748.8	959.0	926.0	32.98	29.074		
5,300.0	5,117.4	5,208.4	5,139.3	24.6	17.1	141.39	-184.2	-764.8	979.3	945.7	33.66	29.093		
5,400.0	5,213.3	5,306.3	5,235.7	25.2	17.4	141.44	-189.4	-780.7	999.7	965.3	34.34	29.112		
5,500.0	5,309.2	5,404.2	5,332.2	25.7	17.8	141.48	-194.6	-796.6	1,020.0	985.0	35.02	29.130		
5,600.0	5,405.1	5,502.1	5,428.7	26.2	18.1	141.52	-199.8	-812.5	1,040.3	1,004.6	35.69	29.147		
5,700.0	5,501.0	5,600.0	5,525.1	26.8	18.5	141.56	-205.0	-828.4	1,060.7	1,024.3	36.37	29.163		
5,800.0	5,596.8	5,697.9	5,621.6	27.3	18.8	141.60	-210.2	-844.4	1,081.0	1,044.0	37.05	29.179		
5,900.0	5,692.7	5,795.8	5,718.0	27.8	19.1	141.63	-215.4	-860.3	1,101.4	1,063.6	37.72	29.194		
6,000.0	5,788.6	5,893.8	5,814.5	28.3	19.5	141.67	-220.7	-876.2	1,121.7	1,083.3	38.40	29.209		
6,100.0	5,884.5	5,991.7	5,911.0	28.9	19.8	141.70	-225.9	-892.1	1,142.0	1,103.0	39.08	29.224		
6,200.0	5,980.4	6,089.6	6,007.4	29.4	20.2	141.73	-231.1	-908.1	1,162.4	1,122.6	39.76	29.237		
6,300.0	6,076.2	6,187.5	6,103.9	29.9	20.5	141.76	-236.3	-924.0	1,182.7	1,142.3	40.43	29.251		
6,400.0	6,172.1	6,285.4	6,200.4	30.5	20.8	141.79	-241.5	-939.9	1,203.1	1,161.9	41.11	29.264		
6,500.0	6,268.0	6,383.3	6,296.8	31.0	21.2	141.82	-246.7	-955.8	1,223.4	1,181.6	41.79	29.276		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-14A - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total	Separation	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	5.69	51.0	5.1	51.2					
100.0	100.0	100.0	100.0	0.1	0.1	5.69	51.0	5.1	51.2	51.0	0.27	188.215		
200.0	200.0	200.0	200.0	0.3	0.3	5.69	51.0	5.1	51.2	50.6	0.62	82.476		
300.0	300.0	301.9	301.8	0.5	0.5	3.49	49.2	3.0	49.4	48.4	0.98	50.265		
400.0	400.0	403.1	402.8	0.7	0.7	-4.13	44.0	-3.2	44.2	42.9	1.38	32.026		
500.0	500.0	503.3	502.0	0.8	1.0	-20.54	35.5	-13.3	38.0	36.2	1.84	20.645		
563.3	563.3	565.9	563.8	0.9	1.2	118.57	29.0	-21.1	36.3	34.2	2.15	16.933 CC, ES		
600.0	600.0	602.4	599.8	1.0	1.3	111.50	25.2	-25.6	36.8	34.5	2.33	15.806		
700.0	699.6	701.9	698.0	1.2	1.6	98.86	14.8	-37.9	41.1	38.3	2.82	14.546		
800.0	798.8	801.7	796.5	1.5	2.0	95.23	4.5	-50.3	47.1	43.8	3.37	13.976		
900.0	897.1	901.4	894.9	1.8	2.3	97.96	-5.9	-62.6	53.8	49.8	4.02	13.393		
1,000.0	994.3	1,000.8	993.0	2.2	2.6	104.78	-16.3	-75.0	61.7	57.0	4.75	13.008 SF		
1,100.0	1,090.4	1,099.8	1,090.6	2.6	2.9	113.43	-26.6	-87.2	72.1	66.6	5.46	13.196		
1,200.0	1,186.3	1,198.6	1,188.2	3.1	3.3	120.30	-36.9	-99.5	84.0	77.9	6.12	13.728		
1,300.0	1,282.1	1,297.5	1,285.7	3.6	3.6	125.42	-47.2	-111.7	96.8	90.1	6.74	14.375		
1,400.0	1,378.0	1,396.3	1,383.3	4.1	3.9	129.33	-57.5	-124.0	110.2	102.9	7.33	15.047		
1,500.0	1,473.9	1,495.2	1,480.8	4.6	4.2	132.38	-67.8	-136.2	124.1	116.2	7.90	15.701		
1,600.0	1,569.8	1,594.0	1,578.4	5.2	4.6	134.82	-78.1	-148.5	138.1	129.7	8.46	16.319		
1,700.0	1,665.7	1,692.9	1,675.9	5.7	4.9	136.80	-88.4	-160.7	152.4	143.4	9.02	16.894		
1,800.0	1,761.5	1,791.7	1,773.4	6.2	5.2	138.45	-98.7	-173.0	166.8	157.3	9.57	17.427		
1,900.0	1,857.4	1,890.6	1,871.0	6.7	5.6	139.83	-109.0	-185.2	181.4	171.3	10.12	17.918		
2,000.0	1,953.3	1,989.4	1,968.5	7.2	5.9	141.00	-119.3	-197.5	196.0	185.4	10.67	18.371		
2,100.0	2,049.2	2,088.3	2,066.1	7.8	6.2	142.02	-129.6	-209.7	210.7	199.5	11.22	18.788		
2,200.0	2,145.1	2,187.1	2,163.6	8.3	6.6	142.90	-139.9	-222.0	225.5	213.7	11.76	19.174		
2,300.0	2,241.0	2,286.0	2,261.2	8.8	6.9	143.67	-150.2	-234.2	240.3	228.0	12.30	19.531		
2,400.0	2,336.8	2,384.8	2,358.7	9.3	7.2	144.35	-160.5	-246.5	255.1	242.3	12.85	19.861		
2,500.0	2,432.7	2,483.7	2,456.3	9.9	7.5	144.96	-170.7	-258.7	270.0	256.6	13.39	20.168		
2,600.0	2,528.6	2,582.5	2,553.8	10.4	7.9	145.50	-181.0	-271.0	284.9	271.0	13.93	20.453		
2,700.0	2,624.5	2,681.4	2,651.4	10.9	8.2	145.99	-191.3	-283.2	299.8	285.4	14.47	20.720		
2,800.0	2,720.4	2,780.2	2,748.9	11.4	8.5	146.44	-201.6	-295.5	314.8	299.8	15.01	20.968		
2,900.0	2,816.3	2,879.1	2,846.4	12.0	8.9	146.84	-211.9	-307.7	329.7	314.2	15.55	21.201		
3,000.0	2,912.1	2,977.9	2,944.0	12.5	9.2	147.21	-222.2	-320.0	344.7	328.6	16.09	21.419		
3,100.0	3,008.0	3,076.8	3,041.5	13.0	9.5	147.55	-232.5	-332.2	359.7	343.1	16.63	21.624		
3,200.0	3,103.9	3,175.6	3,139.1	13.5	9.8	147.86	-242.8	-344.5	374.7	357.5	17.17	21.817		
3,300.0	3,199.8	3,274.5	3,236.6	14.1	10.2	148.14	-253.1	-356.7	389.7	372.0	17.71	21.998		
3,400.0	3,295.7	3,373.3	3,334.2	14.6	10.5	148.41	-263.4	-369.0	404.7	386.5	18.26	22.170		
3,500.0	3,391.5	3,472.2	3,431.7	15.1	10.8	148.65	-273.7	-381.2	419.7	400.9	18.80	22.332		
3,600.0	3,487.4	3,571.0	3,529.3	15.7	11.2	148.88	-284.0	-393.5	434.8	415.4	19.34	22.486		
3,700.0	3,583.3	3,669.9	3,626.8	16.2	11.5	149.10	-294.3	-405.7	449.8	429.9	19.88	22.631		
3,800.0	3,679.2	3,768.7	3,724.4	16.7	11.8	149.30	-304.6	-418.0	464.9	444.4	20.42	22.769		
3,900.0	3,775.1	3,867.6	3,821.9	17.2	12.2	149.49	-314.9	-430.2	479.9	458.9	20.96	22.901		
4,000.0	3,871.0	3,966.4	3,919.4	17.8	12.5	149.66	-325.2	-442.5	495.0	473.5	21.50	23.026		
4,100.0	3,966.8	4,065.2	4,017.0	18.3	12.8	149.83	-335.5	-454.7	510.0	488.0	22.04	23.145		
4,200.0	4,062.7	4,164.1	4,114.5	18.8	13.1	149.98	-345.8	-467.0	525.1	502.5	22.58	23.258		
4,300.0	4,158.6	4,262.9	4,212.1	19.4	13.5	150.13	-356.1	-479.2	540.1	517.0	23.12	23.367		
4,400.0	4,254.5	4,361.8	4,309.6	19.9	13.8	150.27	-366.4	-491.5	555.2	531.5	23.66	23.470		
4,500.0	4,350.4	4,460.6	4,407.2	20.4	14.1	150.40	-376.7	-503.7	570.3	546.1	24.20	23.570		
4,600.0	4,446.3	4,559.5	4,504.7	20.9	14.5	150.53	-387.0	-516.0	585.4	560.6	24.74	23.664		
4,700.0	4,542.1	4,658.3	4,602.3	21.5	14.8	150.65	-397.3	-528.2	600.4	575.2	25.28	23.755		
4,800.0	4,638.0	4,757.2	4,699.8	22.0	15.1	150.76	-407.6	-540.5	615.5	589.7	25.82	23.843		
4,900.0	4,733.9	4,856.0	4,797.4	22.5	15.5	150.87	-417.9	-552.7	630.6	604.2	26.36	23.927		
5,000.0	4,829.8	4,954.9	4,894.9	23.1	15.8	150.97	-428.2	-565.0	645.7	618.8	26.90	24.007		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-14A - DD - Plan #1													Offset Site Error: 0.0 ft	
Survey Program: 0-MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
5,100.0	4,925.7	5,053.7	4,992.4	23.6	16.1	151.07	-438.5	-577.2	660.8	633.3	27.44	24.085		
5,200.0	5,021.5	5,152.6	5,090.0	24.1	16.4	151.16	-448.8	-589.5	675.8	647.9	27.97	24.159		
5,300.0	5,117.4	5,251.4	5,187.5	24.6	16.8	151.25	-459.1	-601.7	690.9	662.4	28.51	24.231		
5,400.0	5,213.3	5,350.3	5,285.1	25.2	17.1	151.34	-469.4	-614.0	706.0	677.0	29.05	24.300		
5,500.0	5,309.2	5,449.1	5,382.6	25.7	17.4	151.42	-479.7	-626.3	721.1	691.5	29.59	24.367		
5,600.0	5,405.1	5,548.0	5,480.2	26.2	17.8	151.50	-490.0	-638.5	736.2	706.1	30.13	24.431		
5,700.0	5,501.0	5,646.8	5,577.7	26.8	18.1	151.58	-500.2	-650.8	751.3	720.6	30.67	24.493		
5,800.0	5,596.8	5,745.7	5,675.3	27.3	18.4	151.65	-510.5	-663.0	766.4	735.2	31.21	24.553		
5,900.0	5,692.7	5,844.5	5,772.8	27.8	18.8	151.72	-520.8	-675.3	781.5	749.7	31.75	24.611		
6,000.0	5,788.6	5,943.4	5,870.4	28.3	19.1	151.79	-531.1	-687.5	796.6	764.3	32.29	24.667		
6,100.0	5,884.5	6,042.2	5,967.9	28.9	19.4	151.85	-541.4	-699.8	811.7	778.9	32.83	24.721		
6,200.0	5,980.4	6,141.1	6,065.4	29.4	19.7	151.91	-551.7	-712.0	826.8	793.4	33.37	24.774		
6,300.0	6,076.2	6,239.9	6,163.0	29.9	20.1	151.97	-562.0	-724.3	841.9	808.0	33.91	24.825		
6,400.0	6,172.1	6,338.8	6,260.5	30.5	20.4	152.03	-572.3	-736.5	857.0	822.5	34.45	24.874		
6,500.0	6,268.0	6,437.6	6,358.1	31.0	20.7	152.09	-582.6	-748.8	872.1	837.1	34.99	24.922		
6,600.0	6,363.9	6,536.5	6,455.6	31.5	21.1	152.14	-592.9	-761.0	887.2	851.7	35.53	24.968		
6,700.0	6,459.8	6,635.3	6,553.2	32.0	21.4	152.20	-603.2	-773.3	902.3	866.2	36.07	25.013		
6,800.0	6,555.7	6,734.2	6,650.7	32.6	21.7	152.25	-613.5	-785.5	917.4	880.8	36.61	25.057		
6,900.0	6,651.5	6,833.0	6,748.3	33.1	22.1	152.29	-623.8	-797.8	932.5	895.4	37.15	25.100		
7,000.0	6,747.6	6,932.0	6,845.9	33.6	22.4	152.41	-634.1	-810.0	947.0	909.3	37.70	25.121		
7,100.0	6,844.5	7,031.3	6,943.9	34.0	22.7	152.45	-644.5	-822.3	958.6	920.4	38.27	25.051		
7,200.0	6,942.3	7,130.9	7,042.2	34.4	23.1	152.37	-654.8	-834.7	967.2	928.3	38.87	24.884		
7,300.0	7,040.7	7,230.6	7,140.6	34.8	23.4	152.17	-665.2	-847.0	972.7	933.2	39.50	24.624		
7,400.0	7,139.6	7,315.8	7,224.7	35.0	23.6	151.94	-673.6	-857.0	975.7	935.7	40.05	24.361		
7,500.0	7,239.1	7,400.0	7,308.3	35.2	23.9	151.73	-680.3	-864.9	977.5	936.9	40.52	24.121		
7,600.0	7,338.8	7,480.4	7,388.3	35.4	24.0	151.55	-685.2	-870.8	978.0	937.1	40.91	23.908		
7,700.0	7,438.7	7,562.8	7,470.6	35.5	24.2	151.38	-688.8	-875.0	977.2	936.0	41.23	23.704		
7,800.0	7,538.7	7,645.3	7,553.0	35.6	24.3	-1.82	-690.8	-877.4	975.4	933.9	41.50	23.506		
7,900.0	7,638.7	7,731.0	7,638.7	35.6	24.3	-1.86	-691.3	-878.0	974.8	933.1	41.73	23.360		
8,000.0	7,738.7	7,831.0	7,738.7	35.7	24.4	-1.86	-691.3	-878.0	974.8	932.9	41.96	23.233		
8,100.0	7,838.7	7,931.0	7,838.7	35.8	24.5	-1.86	-691.3	-878.0	974.8	932.7	42.19	23.106		
8,200.0	7,938.7	8,031.0	7,938.7	35.8	24.6	-1.86	-691.3	-878.0	974.8	932.4	42.42	22.980		
8,300.0	8,038.7	8,131.0	8,038.7	35.9	24.7	-1.86	-691.3	-878.0	974.8	932.2	42.65	22.854		
8,400.0	8,138.7	8,231.0	8,138.7	36.0	24.8	-1.86	-691.3	-878.0	974.8	932.0	42.89	22.729		
8,500.0	8,238.7	8,331.0	8,238.7	36.0	24.9	-1.86	-691.3	-878.0	974.8	931.7	43.13	22.605		
8,600.0	8,338.7	8,431.0	8,338.7	36.1	25.0	-1.86	-691.3	-878.0	974.8	931.5	43.36	22.481		
8,700.0	8,438.7	8,531.0	8,438.7	36.2	25.1	-1.86	-691.3	-878.0	974.8	931.2	43.60	22.357		
8,800.0	8,538.7	8,631.0	8,538.7	36.3	25.2	-1.86	-691.3	-878.0	974.8	931.0	43.84	22.234		
8,900.0	8,638.7	8,731.0	8,638.7	36.3	25.4	-1.86	-691.3	-878.0	974.8	930.8	44.09	22.112		
9,000.0	8,738.7	8,831.0	8,738.7	36.4	25.5	-1.86	-691.3	-878.0	974.8	930.5	44.33	21.991		
9,100.0	8,838.7	8,931.0	8,838.7	36.5	25.6	-1.86	-691.3	-878.0	974.8	930.3	44.57	21.870		
9,200.0	8,938.7	9,031.0	8,938.7	36.6	25.7	-1.86	-691.3	-878.0	974.8	930.0	44.82	21.749		
9,300.0	9,038.7	9,131.0	9,038.7	36.6	25.8	-1.86	-691.3	-878.0	974.8	929.8	45.07	21.630		
9,400.0	9,138.7	9,231.0	9,138.7	36.7	25.9	-1.86	-691.3	-878.0	974.8	929.5	45.32	21.511		
9,500.0	9,238.7	9,331.0	9,238.7	36.8	26.0	-1.86	-691.3	-878.0	974.8	929.3	45.57	21.393		
9,600.0	9,338.7	9,431.0	9,338.7	36.9	26.1	-1.86	-691.3	-878.0	974.8	929.0	45.82	21.275		
9,700.0	9,438.7	9,531.0	9,438.7	36.9	26.2	-1.86	-691.3	-878.0	974.8	928.8	46.07	21.158		
9,800.0	9,538.7	9,631.0	9,538.7	37.0	26.3	-1.86	-691.3	-878.0	974.8	928.5	46.33	21.042		
9,900.0	9,638.7	9,731.0	9,638.7	37.1	26.4	-1.86	-691.3	-878.0	974.8	928.3	46.58	20.927		
10,000.0	9,738.7	9,831.0	9,738.7	37.2	26.5	-1.86	-691.3	-878.0	974.8	928.0	46.84	20.812		
10,100.0	9,838.7	9,931.0	9,838.7	37.3	26.7	-1.86	-691.3	-878.0	974.8	927.7	47.10	20.698		
10,200.0	9,938.7	10,031.0	9,938.7	37.4	26.8	-1.86	-691.3	-878.0	974.8	927.5	47.36	20.585		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 16-14A - DD - Plan #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
10,266.1	10,004.8	10,097.1	10,004.8	37.4	26.8	-1.86	-691.3	-878.0	974.8	927.3	47.53	20.510		
10,300.0	10,038.7	10,129.3	10,037.0	37.4	26.9	-1.86	-691.3	-878.0	974.8	927.2	47.62	20.473		
10,368.3	10,107.0	10,129.3	10,037.0	37.5	26.9	-1.86	-691.3	-878.0	977.4	929.6	47.71	20.487		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-14D - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance		Total		Separation		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis			
0.0	0.0	0.0	0.0	0.0	0.0	5.65	34.2	3.4	34.4					
100.0	100.0	100.0	100.0	0.1	0.1	5.65	34.2	3.4	34.4	34.1	0.27	126.364		
200.0	200.0	200.0	200.0	0.3	0.3	5.65	34.2	3.4	34.4	33.8	0.62	55.373		
300.0	300.0	300.0	300.0	0.5	0.5	5.65	34.2	3.4	34.4	33.4	0.97	35.455		
400.0	400.0	400.0	400.0	0.7	0.7	5.65	34.2	3.4	34.4	33.1	1.32	26.075		
500.0	500.0	500.0	500.0	0.8	0.8	5.65	34.2	3.4	34.4	32.7	1.67	20.620 CC, ES		
600.0	600.0	600.0	600.0	1.0	1.0	160.17	34.2	3.4	36.9	34.8	2.02	18.278		
700.0	699.6	699.6	699.6	1.2	1.2	163.54	34.2	3.4	44.3	42.0	2.36	18.766		
800.0	798.8	798.8	798.8	1.5	1.4	167.18	34.2	3.4	57.0	54.3	2.70	21.086		
900.0	897.1	897.1	897.1	1.8	1.5	170.18	34.2	3.4	74.8	71.8	3.03	24.678		
1,000.0	994.3	994.3	994.3	2.2	1.7	172.42	34.2	3.4	97.9	94.6	3.35	29.196		
1,100.0	1,090.4	1,096.3	1,096.2	2.6	1.9	173.76	32.4	1.8	123.4	119.7	3.69	33.406		
1,200.0	1,186.3	1,201.0	1,200.6	3.1	2.1	173.99	26.1	-3.4	144.5	140.4	4.06	35.622		
1,300.0	1,282.1	1,307.8	1,306.4	3.6	2.3	173.47	15.3	-12.5	160.5	156.1	4.44	36.186		
1,400.0	1,378.0	1,415.6	1,412.4	4.1	2.6	172.37	-0.3	-25.6	171.2	166.4	4.83	35.422		
1,500.0	1,473.9	1,515.2	1,509.7	4.6	2.9	171.17	-16.6	-39.3	179.6	174.4	5.24	34.296		
1,600.0	1,569.8	1,614.8	1,606.9	5.2	3.3	170.07	-32.9	-53.0	188.1	182.4	5.65	33.257		
1,700.0	1,665.7	1,714.4	1,704.2	5.7	3.6	169.07	-49.3	-66.7	196.6	190.5	6.09	32.292		
1,800.0	1,761.5	1,814.0	1,801.5	6.2	4.0	168.16	-65.6	-80.4	205.1	198.6	6.53	31.395		
1,900.0	1,857.4	1,913.6	1,898.7	6.7	4.4	167.32	-81.9	-94.1	213.7	206.7	6.99	30.560		
2,000.0	1,953.3	2,013.1	1,996.0	7.2	4.7	166.54	-98.2	-107.8	222.4	214.9	7.47	29.784		
2,100.0	2,049.2	2,112.7	2,093.3	7.8	5.1	165.82	-114.6	-121.5	231.1	223.1	7.95	29.063		
2,200.0	2,145.1	2,212.3	2,190.6	8.3	5.5	165.15	-130.9	-135.2	239.8	231.3	8.45	28.392		
2,300.0	2,241.0	2,311.9	2,287.8	8.8	5.9	164.53	-147.2	-148.9	248.5	239.6	8.95	27.768		
2,400.0	2,336.8	2,411.5	2,385.1	9.3	6.3	163.96	-163.6	-162.6	257.3	247.8	9.46	27.189		
2,500.0	2,432.7	2,511.0	2,482.4	9.9	6.7	163.42	-179.9	-176.3	266.1	256.1	9.99	26.649		
2,600.0	2,528.6	2,610.6	2,579.7	10.4	7.1	162.91	-196.2	-190.0	274.9	264.4	10.51	26.147		
2,700.0	2,624.5	2,710.2	2,676.9	10.9	7.5	162.44	-212.5	-203.7	283.8	272.7	11.05	25.678		
2,800.0	2,720.4	2,809.8	2,774.2	11.4	7.9	161.99	-228.9	-217.4	292.6	281.0	11.59	25.241		
2,900.0	2,816.3	2,909.4	2,871.5	12.0	8.3	161.58	-245.2	-231.1	301.5	289.3	12.14	24.833		
3,000.0	2,912.1	3,009.0	2,968.8	12.5	8.7	161.18	-261.5	-244.8	310.4	297.7	12.69	24.451		
3,100.0	3,008.0	3,108.5	3,066.0	13.0	9.1	160.81	-277.9	-258.5	319.3	306.0	13.25	24.093		
3,200.0	3,103.9	3,208.1	3,163.3	13.5	9.5	160.46	-294.2	-272.2	328.2	314.4	13.81	23.758		
3,300.0	3,199.8	3,307.7	3,260.6	14.1	9.9	160.12	-310.5	-285.9	337.1	322.8	14.38	23.443		
3,400.0	3,295.7	3,407.3	3,357.9	14.6	10.3	159.81	-326.8	-299.6	346.1	331.1	14.95	23.147		
3,500.0	3,391.5	3,506.9	3,455.1	15.1	10.7	159.50	-343.2	-313.3	355.0	339.5	15.52	22.868		
3,600.0	3,487.4	3,606.4	3,552.4	15.7	11.2	159.22	-359.5	-327.0	364.0	347.9	16.10	22.605		
3,700.0	3,583.3	3,706.0	3,649.7	16.2	11.6	158.95	-375.8	-340.7	372.9	356.3	16.68	22.357		
3,800.0	3,679.2	3,805.6	3,747.0	16.7	12.0	158.69	-392.2	-354.4	381.9	364.7	17.26	22.123		
3,900.0	3,775.1	3,905.2	3,844.2	17.2	12.4	158.44	-408.5	-368.1	390.9	373.1	17.85	21.901		
4,000.0	3,871.0	4,004.8	3,941.5	17.8	12.8	158.20	-424.8	-381.8	399.9	381.5	18.44	21.691		
4,100.0	3,966.8	4,104.4	4,038.8	18.3	13.2	157.98	-441.1	-395.5	408.9	389.9	19.03	21.491		
4,200.0	4,062.7	4,203.9	4,136.0	18.8	13.6	157.76	-457.5	-409.2	417.9	398.3	19.62	21.302		
4,300.0	4,158.6	4,303.5	4,233.3	19.4	14.0	157.55	-473.8	-422.9	426.9	406.7	20.21	21.122		
4,400.0	4,254.5	4,403.1	4,330.6	19.9	14.4	157.36	-490.1	-436.6	435.9	415.1	20.81	20.951		
4,500.0	4,350.4	4,502.7	4,427.9	20.4	14.8	157.16	-506.5	-450.3	444.9	423.5	21.40	20.788		
4,600.0	4,446.3	4,602.3	4,525.1	20.9	15.3	156.98	-522.8	-464.0	454.0	432.0	22.00	20.633		
4,700.0	4,542.1	4,701.9	4,622.4	21.5	15.7	156.81	-539.1	-477.7	463.0	440.4	22.60	20.485		
4,800.0	4,638.0	4,801.4	4,719.7	22.0	16.1	156.64	-555.4	-491.4	472.0	448.8	23.20	20.343		
4,900.0	4,733.9	4,901.0	4,817.0	22.5	16.5	156.47	-571.8	-505.1	481.1	457.2	23.81	20.208		
5,000.0	4,829.8	5,000.6	4,914.2	23.1	16.9	156.32	-588.1	-518.8	490.1	465.7	24.41	20.078		
5,100.0	4,925.7	5,100.2	5,011.5	23.6	17.3	156.17	-604.4	-532.5	499.1	474.1	25.01	19.954		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-14D - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total Uncertainty Axis	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
5,200.0	5,021.5	5,199.8	5,108.8	24.1	17.7	156.02	-620.8	-546.2	508.2	482.6	25.62	19.835		
5,300.0	5,117.4	5,299.3	5,206.1	24.6	18.1	155.88	-637.1	-559.9	517.2	491.0	26.23	19.721		
5,400.0	5,213.3	5,398.9	5,303.3	25.2	18.5	155.74	-653.4	-573.6	526.3	499.4	26.83	19.612		
5,500.0	5,309.2	5,498.5	5,400.6	25.7	19.0	155.61	-669.7	-587.3	535.3	507.9	27.44	19.507		
5,600.0	5,405.1	5,598.1	5,497.9	26.2	19.4	155.49	-686.1	-601.0	544.4	516.3	28.05	19.405		
5,700.0	5,501.0	5,697.7	5,595.2	26.8	19.8	155.36	-702.4	-614.7	553.5	524.8	28.66	19.308		
5,800.0	5,596.8	5,797.3	5,692.4	27.3	20.2	155.25	-718.7	-628.4	562.5	533.2	29.28	19.215		
5,900.0	5,692.7	5,896.8	5,789.7	27.8	20.6	155.13	-735.1	-642.1	571.6	541.7	29.89	19.124		
6,000.0	5,788.6	5,996.4	5,887.0	28.3	21.0	155.02	-751.4	-655.8	580.6	550.1	30.50	19.037		
6,100.0	5,884.5	6,096.0	5,984.3	28.9	21.4	154.91	-767.7	-669.5	589.7	558.6	31.11	18.954		
6,200.0	5,980.4	6,195.6	6,081.5	29.4	21.8	154.81	-784.0	-683.2	598.8	567.1	31.73	18.873		
6,300.0	6,076.2	6,295.2	6,178.8	29.9	22.3	154.70	-800.4	-696.9	607.9	575.5	32.34	18.794		
6,400.0	6,172.1	6,394.7	6,276.1	30.5	22.7	154.61	-816.7	-710.6	616.9	584.0	32.96	18.719		
6,500.0	6,268.0	6,494.3	6,373.3	31.0	23.1	154.51	-833.0	-724.3	626.0	592.4	33.57	18.646		
6,600.0	6,363.9	6,593.9	6,470.6	31.5	23.5	154.42	-849.4	-738.0	635.1	600.9	34.19	18.575		
6,700.0	6,459.8	6,693.5	6,567.9	32.0	23.9	154.33	-865.7	-751.7	644.2	609.4	34.81	18.507		
6,800.0	6,555.7	6,793.1	6,665.2	32.6	24.3	154.24	-882.0	-765.4	653.3	617.8	35.42	18.441		
6,900.0	6,651.5	6,892.7	6,762.4	33.1	24.7	154.15	-898.3	-779.1	662.3	626.3	36.04	18.377		
7,000.0	6,747.6	6,992.3	6,859.8	33.6	25.1	154.09	-914.7	-792.8	670.8	634.1	36.68	18.290		
7,100.0	6,844.5	7,092.1	6,957.3	34.0	25.6	153.91	-931.0	-806.5	676.3	639.0	37.36	18.101		
7,200.0	6,942.3	7,185.1	7,048.2	34.4	25.9	153.62	-946.1	-819.2	679.0	640.9	38.06	17.838		
7,300.0	7,040.7	7,289.6	7,131.1	34.8	26.2	153.35	-958.2	-829.3	680.4	641.8	38.67	17.597		
7,400.0	7,139.6	7,384.0	7,214.6	35.0	26.5	153.09	-968.4	-837.9	681.1	641.8	39.21	17.370		
7,500.0	7,239.1	7,438.6	7,298.4	35.2	26.7	152.85	-976.8	-844.9	680.9	641.2	39.69	17.156		
7,600.0	7,338.8	7,523.2	7,382.6	35.4	26.9	152.62	-983.2	-850.3	679.8	639.7	40.10	16.953		
7,700.0	7,438.7	7,607.9	7,467.1	35.5	27.0	152.41	-987.7	-854.1	678.0	637.5	40.45	16.760		
7,800.0	7,538.7	7,700.0	7,559.1	35.6	27.1	-0.84	-990.5	-856.4	675.5	634.8	40.77	16.568		
7,880.0	7,618.7	7,760.6	7,619.7	35.6	27.2	-0.89	-991.1	-856.9	674.6	633.7	40.96	16.470		
7,900.0	7,638.7	7,779.6	7,638.7	35.6	27.2	-0.89	-991.1	-856.9	674.6	633.6	41.01	16.452		
8,000.0	7,738.7	7,879.6	7,738.7	35.7	27.3	-0.89	-991.1	-856.9	674.6	633.4	41.24	16.359		
8,100.0	7,838.7	7,979.6	7,838.7	35.8	27.4	-0.89	-991.1	-856.9	674.6	633.2	41.48	16.266		
8,200.0	7,938.7	8,079.6	7,938.7	35.8	27.5	-0.89	-991.1	-856.9	674.6	632.9	41.71	16.174		
8,300.0	8,038.7	8,179.6	8,038.7	35.9	27.5	-0.89	-991.1	-856.9	674.6	632.7	41.95	16.082		
8,400.0	8,138.7	8,279.6	8,138.7	36.0	27.6	-0.89	-991.1	-856.9	674.6	632.5	42.19	15.991		
8,500.0	8,238.7	8,379.6	8,238.7	36.0	27.7	-0.89	-991.1	-856.9	674.6	632.2	42.43	15.900		
8,600.0	8,338.7	8,479.6	8,338.7	36.1	27.8	-0.89	-991.1	-856.9	674.6	632.0	42.67	15.810		
8,700.0	8,438.7	8,579.6	8,438.7	36.2	27.9	-0.89	-991.1	-856.9	674.6	631.7	42.92	15.720		
8,800.0	8,538.7	8,679.6	8,538.7	36.3	28.0	-0.89	-991.1	-856.9	674.6	631.5	43.16	15.631		
8,900.0	8,638.7	8,779.6	8,638.7	36.3	28.1	-0.89	-991.1	-856.9	674.6	631.2	43.41	15.542		
9,000.0	8,738.7	8,879.6	8,738.7	36.4	28.2	-0.89	-991.1	-856.9	674.6	631.0	43.66	15.453		
9,100.0	8,838.7	8,979.6	8,838.7	36.5	28.3	-0.89	-991.1	-856.9	674.6	630.7	43.91	15.366		
9,200.0	8,938.7	9,079.6	8,938.7	36.6	28.4	-0.89	-991.1	-856.9	674.6	630.5	44.16	15.278		
9,300.0	9,038.7	9,179.6	9,038.7	36.6	28.5	-0.89	-991.1	-856.9	674.6	630.2	44.41	15.191		
9,400.0	9,138.7	9,279.6	9,138.7	36.7	28.6	-0.89	-991.1	-856.9	674.6	630.0	44.66	15.105		
9,500.0	9,238.7	9,379.6	9,238.7	36.8	28.7	-0.89	-991.1	-856.9	674.6	629.7	44.92	15.020		
9,600.0	9,338.7	9,479.6	9,338.7	36.9	28.8	-0.89	-991.1	-856.9	674.6	629.5	45.17	14.934		
9,700.0	9,438.7	9,579.6	9,438.7	36.9	28.9	-0.89	-991.1	-856.9	674.6	629.2	45.43	14.850		
9,800.0	9,538.7	9,679.6	9,538.7	37.0	29.0	-0.89	-991.1	-856.9	674.6	629.0	45.69	14.766		
9,900.0	9,638.7	9,779.6	9,638.7	37.1	29.1	-0.89	-991.1	-856.9	674.6	628.7	45.95	14.682		
10,000.0	9,738.7	9,879.6	9,738.7	37.2	29.2	-0.89	-991.1	-856.9	674.6	628.4	46.21	14.599		
10,100.0	9,838.7	9,979.6	9,838.7	37.3	29.3	-0.89	-991.1	-856.9	674.6	628.2	46.47	14.517		
10,200.0	9,938.7	10,079.6	9,938.7	37.4	29.4	-0.89	-991.1	-856.9	674.6	627.9	46.74	14.435		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 16-14D - DD - Plan #1													<b>Offset Site Error:</b> 0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b> 0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre +N/-S	+E/-W	Between Centres	Between Ellipses	Total Uncertainty Axis	Separation Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)			
10,300.0	10,038.7	10,179.6	10,038.7	37.4	29.5	-0.89	-991.1	-856.9	674.6	627.6	47.00	14.354	
10,368.3	10,107.0	10,247.9	10,107.0	37.5	29.6	-0.89	-991.1	-856.9	674.6	627.5	47.18	14.299 SF	



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-14D2 - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance		Total		Separation		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis			
0.0	0.0	0.0	0.0	0.0	0.0	6.59	17.1	2.0	17.2					
100.0	100.0	100.0	100.0	0.1	0.1	6.59	17.1	2.0	17.2	17.0	0.27	63.293		
200.0	200.0	200.0	200.0	0.3	0.3	6.59	17.1	2.0	17.2	16.6	0.62	27.735		
300.0	300.0	300.0	300.0	0.5	0.5	6.59	17.1	2.0	17.2	16.3	0.97	17.758		
400.0	400.0	400.0	400.0	0.7	0.7	6.59	17.1	2.0	17.2	15.9	1.32	13.060		
500.0	500.0	500.0	500.0	0.8	0.8	6.59	17.1	2.0	17.2	15.6	1.67	10.328 CC, ES		
600.0	600.0	600.0	600.0	1.0	1.0	162.27	17.1	2.0	19.7	17.7	2.02	9.774		
700.0	699.6	699.6	699.6	1.2	1.2	167.24	17.1	2.0	27.3	24.9	2.36	11.560		
800.0	798.8	798.8	798.8	1.5	1.4	171.30	17.1	2.0	40.1	37.4	2.70	14.872		
900.0	897.1	897.1	897.1	1.8	1.5	173.96	17.1	2.0	58.2	55.2	3.03	19.226		
1,000.0	994.3	994.3	994.3	2.2	1.7	175.63	17.1	2.0	81.5	78.1	3.35	24.334		
1,100.0	1,090.4	1,095.7	1,095.7	2.6	1.9	176.57	15.1	0.7	106.9	103.2	3.68	29.028		
1,200.0	1,186.3	1,199.8	1,199.5	3.1	2.1	176.82	8.3	-3.6	127.9	123.8	4.04	31.641		
1,300.0	1,282.1	1,306.1	1,304.8	3.6	2.3	176.65	-3.6	-11.1	143.5	139.1	4.41	32.554		
1,400.0	1,378.0	1,413.9	1,410.6	4.1	2.6	176.17	-20.6	-21.9	153.6	148.8	4.78	32.117		
1,500.0	1,473.9	1,520.1	1,513.8	4.6	3.0	175.42	-42.2	-35.6	158.3	153.2	5.16	30.670		
1,600.0	1,569.8	1,620.0	1,610.4	5.2	3.4	174.65	-63.7	-49.3	161.6	156.1	5.54	29.177		
1,700.0	1,665.7	1,720.0	1,707.0	5.7	3.8	173.91	-85.3	-63.0	164.9	159.0	5.92	27.844		
1,800.0	1,761.5	1,819.9	1,803.6	6.2	4.2	173.21	-106.9	-76.6	168.2	161.9	6.31	26.644		
1,900.0	1,857.4	1,919.8	1,900.2	6.7	4.6	172.53	-128.4	-90.3	171.6	164.8	6.71	25.556		
2,000.0	1,953.3	2,019.7	1,996.8	7.2	5.1	171.87	-150.0	-104.0	174.9	167.8	7.12	24.564		
2,100.0	2,049.2	2,119.7	2,093.4	7.8	5.5	171.24	-171.6	-117.6	178.3	170.8	7.54	23.654		
2,200.0	2,145.1	2,219.6	2,190.0	8.3	6.0	170.64	-193.1	-131.3	181.7	173.8	7.96	22.816		
2,300.0	2,241.0	2,319.5	2,286.6	8.8	6.4	170.05	-214.7	-145.0	185.2	176.8	8.40	22.042		
2,400.0	2,336.8	2,419.4	2,383.2	9.3	6.9	169.49	-236.3	-158.6	188.6	179.8	8.84	21.325		
2,500.0	2,432.7	2,519.4	2,479.8	9.9	7.4	168.95	-257.8	-172.3	192.1	182.8	9.30	20.658		
2,600.0	2,528.6	2,619.3	2,576.4	10.4	7.8	168.42	-279.4	-186.0	195.6	185.8	9.76	20.037		
2,700.0	2,624.5	2,719.2	2,673.0	10.9	8.3	167.92	-301.0	-199.7	199.0	188.8	10.23	19.458		
2,800.0	2,720.4	2,819.1	2,769.6	11.4	8.8	167.43	-322.5	-213.3	202.6	191.9	10.71	18.916		
2,900.0	2,816.3	2,919.1	2,866.3	12.0	9.3	166.96	-344.1	-227.0	206.1	194.9	11.20	18.409		
3,000.0	2,912.1	3,019.0	2,962.9	12.5	9.7	166.51	-365.7	-240.7	209.6	197.9	11.69	17.933		
3,100.0	3,008.0	3,118.9	3,059.5	13.0	10.2	166.07	-387.2	-254.3	213.2	201.0	12.19	17.486		
3,200.0	3,103.9	3,218.8	3,156.1	13.5	10.7	165.64	-408.8	-268.0	216.7	204.0	12.70	17.065		
3,300.0	3,199.8	3,318.7	3,252.7	14.1	11.1	165.23	-430.4	-281.7	220.3	207.1	13.22	16.669		
3,400.0	3,295.7	3,418.7	3,349.3	14.6	11.6	164.83	-451.9	-295.3	223.9	210.2	13.74	16.295		
3,500.0	3,391.5	3,518.6	3,445.9	15.1	12.1	164.45	-473.5	-309.0	227.5	213.2	14.27	15.943		
3,600.0	3,487.4	3,618.5	3,542.5	15.7	12.6	164.07	-495.1	-322.7	231.1	216.3	14.81	15.609		
3,700.0	3,583.3	3,718.4	3,639.1	16.2	13.1	163.71	-516.6	-336.4	234.7	219.4	15.35	15.294		
3,800.0	3,679.2	3,818.4	3,735.7	16.7	13.5	163.36	-538.2	-350.0	238.4	222.5	15.90	14.995		
3,900.0	3,775.1	3,918.3	3,832.3	17.2	14.0	163.02	-559.8	-363.7	242.0	225.5	16.45	14.712		
4,000.0	3,871.0	4,018.2	3,928.9	17.8	14.5	162.69	-581.3	-377.4	245.6	228.6	17.01	14.443		
4,100.0	3,966.8	4,118.1	4,025.5	18.3	15.0	162.37	-602.9	-391.0	249.3	231.7	17.57	14.188		
4,200.0	4,062.7	4,218.1	4,122.1	18.8	15.4	162.06	-624.5	-404.7	253.0	234.8	18.14	13.945		
4,300.0	4,158.6	4,318.0	4,218.7	19.4	15.9	161.75	-646.0	-418.4	256.6	237.9	18.71	13.714		
4,400.0	4,254.5	4,417.9	4,315.3	19.9	16.4	161.46	-667.6	-432.0	260.3	241.0	19.29	13.494		
4,500.0	4,350.4	4,517.8	4,412.0	20.4	16.9	161.17	-689.2	-445.7	264.0	244.1	19.87	13.284		
4,600.0	4,446.3	4,617.8	4,508.6	20.9	17.4	160.89	-710.7	-459.4	267.7	247.2	20.46	13.083		
4,700.0	4,542.1	4,717.7	4,605.2	21.5	17.8	160.62	-732.3	-473.1	271.4	250.3	21.05	12.892		
4,800.0	4,638.0	4,817.6	4,701.8	22.0	18.3	160.36	-753.9	-486.7	275.1	253.4	21.64	12.710		
4,900.0	4,733.9	4,917.5	4,798.4	22.5	18.8	160.10	-775.4	-500.4	278.8	256.5	22.24	12.535		
5,000.0	4,829.8	5,017.5	4,895.0	23.1	19.3	159.85	-797.0	-514.1	282.5	259.6	22.84	12.368		
5,100.0	4,925.7	5,117.4	4,991.6	23.6	19.8	159.61	-818.6	-527.7	286.2	262.7	23.44	12.208		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-14D2 - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Separation Factor		
5,200.0	5,021.5	5,217.3	5,088.2	24.1	20.2	159.37	-840.1	-541.4	289.9	265.8	24.05	12.054		
5,300.0	5,117.4	5,317.2	5,184.8	24.6	20.7	159.14	-861.7	-555.1	293.6	269.0	24.66	11.907		
5,400.0	5,213.3	5,417.1	5,281.4	25.2	21.2	158.92	-883.3	-568.7	297.4	272.1	25.27	11.766		
5,500.0	5,309.2	5,517.1	5,378.0	25.7	21.7	158.70	-904.8	-582.4	301.1	275.2	25.89	11.630		
5,600.0	5,405.1	5,617.0	5,474.6	26.2	22.2	158.49	-926.4	-596.1	304.8	278.3	26.51	11.499		
5,700.0	5,501.0	5,716.9	5,571.2	26.8	22.6	158.28	-948.0	-609.8	308.6	281.4	27.13	11.374		
5,800.0	5,596.8	5,816.8	5,667.8	27.3	23.1	158.07	-969.5	-623.4	312.3	284.6	27.75	11.253		
5,900.0	5,692.7	5,916.8	5,764.4	27.8	23.6	157.87	-991.1	-637.1	316.1	287.7	28.38	11.137		
6,000.0	5,788.6	6,016.7	5,861.1	28.3	24.1	157.68	-1,012.6	-650.8	319.8	290.8	29.01	11.025		
6,100.0	5,884.5	6,116.6	5,957.7	28.9	24.6	157.49	-1,034.2	-664.4	323.6	293.9	29.64	10.917		
6,200.0	5,980.4	6,216.5	6,054.3	29.4	25.0	157.30	-1,055.8	-678.1	327.3	297.1	30.27	10.813		
6,300.0	6,076.2	6,316.5	6,150.9	29.9	25.5	157.12	-1,077.3	-691.8	331.1	300.2	30.91	10.713		
6,400.0	6,172.1	6,416.4	6,247.5	30.5	26.0	156.95	-1,098.9	-705.4	334.9	303.3	31.54	10.616		
6,500.0	6,268.0	6,516.3	6,344.1	31.0	26.5	156.77	-1,120.5	-719.1	338.6	306.5	32.18	10.523		
6,600.0	6,363.9	6,616.2	6,440.7	31.5	27.0	156.60	-1,142.0	-732.8	342.4	309.6	32.82	10.432		
6,700.0	6,459.8	6,716.2	6,537.3	32.0	27.5	156.44	-1,163.6	-746.5	346.2	312.7	33.47	10.345		
6,800.0	6,555.7	6,816.1	6,633.9	32.6	27.9	156.27	-1,185.2	-760.1	350.0	315.9	34.11	10.260		
6,900.0	6,651.5	6,916.0	6,730.5	33.1	28.4	156.12	-1,206.7	-773.8	353.7	319.0	34.76	10.178		
7,000.0	6,747.6	7,015.9	6,827.1	33.6	28.9	155.93	-1,228.3	-787.5	356.9	321.5	35.44	10.071		
7,100.0	6,844.5	7,113.9	6,921.9	34.0	29.4	155.53	-1,249.4	-800.8	357.1	320.9	36.23	9.858		
7,200.0	6,942.3	7,200.0	7,005.5	34.4	29.7	155.12	-1,266.5	-811.7	356.1	319.1	36.96	9.635		
7,300.0	7,040.7	7,294.4	7,098.0	34.8	30.1	154.68	-1,282.7	-822.0	354.6	316.9	37.68	9.410		
7,400.0	7,139.6	7,384.8	7,187.0	35.0	30.4	154.26	-1,295.9	-830.3	352.7	314.4	38.33	9.202		
7,500.0	7,239.1	7,475.2	7,276.5	35.2	30.6	153.86	-1,306.7	-837.1	350.4	311.4	38.92	9.002		
7,600.0	7,338.8	7,565.8	7,366.5	35.4	30.8	153.46	-1,315.1	-842.5	347.6	308.2	39.46	8.809		
7,700.0	7,438.7	7,656.4	7,456.9	35.5	31.0	153.07	-1,321.1	-846.3	344.5	304.5	39.95	8.622		
7,800.0	7,538.7	7,747.2	7,547.6	35.6	31.1	-0.35	-1,324.6	-848.5	341.1	300.7	40.39	8.444		
7,900.0	7,638.7	7,838.4	7,638.7	35.6	31.1	-0.47	-1,325.8	-849.3	339.8	299.1	40.71	8.348		
8,000.0	7,738.7	7,938.4	7,738.7	35.7	31.2	-0.47	-1,325.8	-849.3	339.8	298.9	40.94	8.300		
8,100.0	7,838.7	8,038.4	7,838.7	35.8	31.3	-0.47	-1,325.8	-849.3	339.8	298.7	41.18	8.252		
8,200.0	7,938.7	8,138.4	7,938.7	35.8	31.4	-0.47	-1,325.8	-849.3	339.8	298.4	41.42	8.205		
8,300.0	8,038.7	8,238.4	8,038.7	35.9	31.5	-0.47	-1,325.8	-849.3	339.8	298.2	41.66	8.157		
8,400.0	8,138.7	8,338.4	8,138.7	36.0	31.5	-0.47	-1,325.8	-849.3	339.8	297.9	41.90	8.110		
8,500.0	8,238.7	8,438.4	8,238.7	36.0	31.6	-0.47	-1,325.8	-849.3	339.8	297.7	42.15	8.063		
8,600.0	8,338.7	8,538.4	8,338.7	36.1	31.7	-0.47	-1,325.8	-849.3	339.8	297.5	42.39	8.017		
8,700.0	8,438.7	8,638.4	8,438.7	36.2	31.8	-0.47	-1,325.8	-849.3	339.8	297.2	42.64	7.971		
8,800.0	8,538.7	8,738.4	8,538.7	36.3	31.9	-0.47	-1,325.8	-849.3	339.8	297.0	42.89	7.924		
8,900.0	8,638.7	8,838.4	8,638.7	36.3	31.9	-0.47	-1,325.8	-849.3	339.8	296.7	43.13	7.879		
9,000.0	8,738.7	8,938.4	8,738.7	36.4	32.0	-0.47	-1,325.8	-849.3	339.8	296.5	43.39	7.833		
9,100.0	8,838.7	9,038.4	8,838.7	36.5	32.1	-0.47	-1,325.8	-849.3	339.8	296.2	43.64	7.788		
9,200.0	8,938.7	9,138.4	8,938.7	36.6	32.2	-0.47	-1,325.8	-849.3	339.8	296.0	43.89	7.743		
9,300.0	9,038.7	9,238.4	9,038.7	36.6	32.3	-0.47	-1,325.8	-849.3	339.8	295.7	44.14	7.698		
9,400.0	9,138.7	9,338.4	9,138.7	36.7	32.4	-0.47	-1,325.8	-849.3	339.8	295.4	44.40	7.654		
9,500.0	9,238.7	9,438.4	9,238.7	36.8	32.5	-0.47	-1,325.8	-849.3	339.8	295.2	44.66	7.610		
9,600.0	9,338.7	9,538.4	9,338.7	36.9	32.6	-0.47	-1,325.8	-849.3	339.8	294.9	44.92	7.566		
9,700.0	9,438.7	9,638.4	9,438.7	36.9	32.6	-0.47	-1,325.8	-849.3	339.8	294.7	45.18	7.523		
9,800.0	9,538.7	9,738.4	9,538.7	37.0	32.7	-0.47	-1,325.8	-849.3	339.8	294.4	45.44	7.479		
9,900.0	9,638.7	9,838.4	9,638.7	37.1	32.8	-0.47	-1,325.8	-849.3	339.8	294.1	45.70	7.437		
10,000.0	9,738.7	9,938.4	9,738.7	37.2	32.9	-0.47	-1,325.8	-849.3	339.8	293.9	45.96	7.394		
10,100.0	9,838.7	10,038.4	9,838.7	37.3	33.0	-0.47	-1,325.8	-849.3	339.8	293.6	46.23	7.352		
10,200.0	9,938.7	10,138.4	9,938.7	37.4	33.1	-0.47	-1,325.8	-849.3	339.8	293.4	46.49	7.310		
10,300.0	10,038.7	10,238.4	10,038.7	37.4	33.2	-0.47	-1,325.8	-849.3	339.8	293.1	46.76	7.268 SF		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 16-14D2 - DD - Plan #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
10,368.3	10,107.0	10,251.7	10,052.0	37.5	33.2	-0.47	-1,325.8	-849.3	344.3	297.4	46.87	7.346		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-16B - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: O-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Total Uncertainty Axis	Separation Factor	Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
0.0	0.0	0.0	0.0	0.0	0.0	23.43	24.8	10.7	27.0					
100.0	100.0	100.0	100.0	0.1	0.1	23.43	24.8	10.7	27.0	26.7	0.27	99.125		
200.0	200.0	200.0	200.0	0.3	0.3	23.43	24.8	10.7	27.0	26.4	0.62	43.437		
300.0	300.0	300.2	300.2	0.5	0.5	28.98	23.2	12.9	26.5	25.6	0.98	27.176		
348.5	348.5	348.6	348.5	0.6	0.6	35.80	21.4	15.4	26.3	25.2	1.16	22.631 CC, ES		
400.0	400.0	400.0	399.6	0.7	0.7	45.88	18.6	19.2	26.7	25.4	1.37	19.529		
500.0	500.0	498.5	497.3	0.8	1.0	69.43	11.1	29.6	31.7	29.9	1.83	17.321 SF		
600.0	600.0	597.1	594.7	1.0	1.3	-122.10	1.9	42.3	44.0	41.9	2.15	20.455		
700.0	699.6	695.7	692.0	1.2	1.6	-117.99	-7.4	55.1	60.3	57.8	2.55	23.624		
800.0	798.8	793.9	788.9	1.5	1.9	-118.83	-16.6	67.8	79.1	76.1	3.02	26.217		
900.0	897.1	891.4	885.2	1.8	2.2	-121.73	-25.7	80.4	100.6	97.1	3.55	28.320		
1,000.0	994.3	988.0	980.5	2.2	2.6	-125.37	-34.8	92.8	125.3	121.1	4.15	30.212		
1,100.0	1,090.4	1,083.5	1,074.8	2.6	2.9	-129.28	-43.8	105.2	153.1	148.4	4.77	32.091		
1,200.0	1,186.3	1,178.9	1,168.9	3.1	3.2	-132.37	-52.7	117.5	182.0	176.6	5.40	33.686		
1,300.0	1,282.1	1,274.2	1,263.1	3.6	3.5	-134.62	-61.6	129.9	211.1	205.1	6.02	35.045		
1,400.0	1,378.0	1,369.6	1,357.2	4.1	3.8	-136.32	-70.6	142.2	240.6	233.9	6.64	36.207		
1,500.0	1,473.9	1,465.0	1,451.3	4.6	4.1	-137.66	-79.5	154.5	270.1	262.9	7.26	37.210		
1,600.0	1,569.8	1,560.3	1,545.5	5.2	4.4	-138.73	-88.5	166.8	299.8	291.9	7.87	38.081		
1,700.0	1,665.7	1,655.7	1,639.6	5.7	4.8	-139.61	-97.4	179.2	329.5	321.0	8.48	38.844		
1,800.0	1,761.5	1,751.0	1,733.8	6.2	5.1	-140.34	-106.3	191.5	359.3	350.2	9.09	39.516		
1,900.0	1,857.4	1,846.4	1,827.9	6.7	5.4	-140.96	-115.3	203.8	389.2	379.5	9.70	40.113		
2,000.0	1,953.3	1,941.8	1,922.0	7.2	5.7	-141.49	-124.2	216.2	419.1	408.8	10.31	40.647		
2,100.0	2,049.2	2,037.1	2,016.2	7.8	6.0	-141.95	-133.2	228.5	449.0	438.1	10.92	41.126		
2,200.0	2,145.1	2,132.5	2,110.3	8.3	6.3	-142.36	-142.1	240.8	478.9	467.4	11.52	41.558		
2,300.0	2,241.0	2,227.9	2,204.4	8.8	6.6	-142.71	-151.1	253.1	508.9	496.7	12.13	41.951		
2,400.0	2,336.8	2,323.2	2,298.6	9.3	7.0	-143.03	-160.0	265.5	538.9	526.1	12.74	42.308		
2,500.0	2,432.7	2,418.6	2,392.7	9.9	7.3	-143.31	-168.9	277.8	568.8	555.5	13.34	42.635		
2,600.0	2,528.6	2,513.9	2,486.9	10.4	7.6	-143.57	-177.9	290.1	598.8	584.9	13.95	42.936		
2,700.0	2,624.5	2,609.3	2,581.0	10.9	7.9	-143.80	-186.8	302.5	628.8	614.3	14.55	43.212		
2,800.0	2,720.4	2,704.7	2,675.1	11.4	8.2	-144.01	-195.8	314.8	658.9	643.7	15.16	43.468		
2,900.0	2,816.3	2,800.0	2,769.3	12.0	8.5	-144.20	-204.7	327.1	688.9	673.1	15.76	43.705		
3,000.0	2,912.1	2,895.4	2,863.4	12.5	8.8	-144.38	-213.6	339.4	718.9	702.5	16.37	43.925		
3,100.0	3,008.0	2,990.8	2,957.6	13.0	9.2	-144.54	-222.6	351.8	749.0	732.0	16.97	44.130		
3,200.0	3,103.9	3,086.1	3,051.7	13.5	9.5	-144.69	-231.5	364.1	779.0	761.4	17.58	44.322		
3,300.0	3,199.8	3,181.5	3,145.8	14.1	9.8	-144.83	-240.5	376.4	809.0	790.9	18.18	44.501		
3,400.0	3,295.7	3,276.8	3,240.0	14.6	10.1	-144.95	-249.4	388.8	839.1	820.3	18.78	44.670		
3,500.0	3,391.5	3,372.2	3,334.1	15.1	10.4	-145.07	-258.4	401.1	869.1	849.8	19.39	44.828		
3,600.0	3,487.4	3,467.6	3,428.2	15.7	10.7	-145.18	-267.3	413.4	899.2	879.2	19.99	44.977		
3,700.0	3,583.3	3,562.9	3,522.4	16.2	11.1	-145.29	-276.2	425.7	929.3	908.7	20.60	45.117		
3,800.0	3,679.2	3,658.3	3,616.5	16.7	11.4	-145.39	-285.2	438.1	959.3	938.1	21.20	45.250		
3,900.0	3,775.1	3,753.7	3,710.7	17.2	11.7	-145.48	-294.1	450.4	989.4	967.6	21.80	45.375		
4,000.0	3,871.0	3,849.0	3,804.8	17.8	12.0	-145.56	-303.1	462.7	1,019.4	997.0	22.41	45.494		
4,100.0	3,966.8	3,944.4	3,898.9	18.3	12.3	-145.64	-312.0	475.1	1,049.5	1,026.5	23.01	45.607		
4,200.0	4,062.7	4,039.7	3,993.1	18.8	12.6	-145.72	-321.0	487.4	1,079.6	1,056.0	23.62	45.715		
4,300.0	4,158.6	4,135.1	4,087.2	19.4	12.9	-145.79	-329.9	499.7	1,109.7	1,085.4	24.22	45.817		
4,400.0	4,254.5	4,230.5	4,181.4	19.9	13.3	-145.86	-338.8	512.0	1,139.7	1,114.9	24.82	45.914		
4,500.0	4,350.4	4,325.8	4,275.5	20.4	13.6	-145.93	-347.8	524.4	1,169.8	1,144.4	25.43	46.007		
4,600.0	4,446.3	4,421.2	4,369.6	20.9	13.9	-145.99	-356.7	536.7	1,199.9	1,173.9	26.03	46.095		
4,700.0	4,542.1	4,516.6	4,463.8	21.5	14.2	-146.05	-365.7	549.0	1,230.0	1,203.3	26.63	46.180		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-6C - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Total Uncertainty Axis	Separation Factor	Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
0.0	0.0	0.0	0.0	0.0	0.0	48.44	8.0	9.0	12.1					
100.0	100.0	100.0	100.0	0.1	0.1	48.44	8.0	9.0	12.1	11.8	0.27	44.361		
200.0	200.0	200.0	200.0	0.3	0.3	48.44	8.0	9.0	12.1	11.5	0.62	19.439		
300.0	300.0	300.0	300.0	0.5	0.5	48.44	8.0	9.0	12.1	11.1	0.97	12.447		
359.9	359.9	359.9	359.9	0.6	0.6	52.90	7.3	9.6	12.0	10.8	1.18	10.178 CC		
400.0	400.0	400.0	400.0	0.7	0.7	60.85	5.9	10.6	12.1	10.8	1.33	9.152 ES		
500.0	500.0	499.4	499.0	0.8	0.9	91.33	-0.4	15.2	15.2	13.5	1.71	8.918 SF		
600.0	600.0	597.9	596.7	1.0	1.1	-97.44	-10.6	22.8	25.6	23.5	2.06	12.408		
700.0	699.6	695.1	692.3	1.2	1.5	-93.72	-24.8	33.2	41.6	39.2	2.47	16.828		
800.0	798.8	791.9	786.6	1.5	1.9	-94.51	-42.3	46.1	61.9	58.9	2.96	20.886		
900.0	897.1	889.5	881.5	1.8	2.3	-97.95	-60.5	59.6	83.3	79.8	3.56	23.377		
1,000.0	994.3	986.5	975.9	2.2	2.7	-102.51	-78.6	72.9	106.1	101.8	4.29	24.747		
1,100.0	1,090.4	1,082.8	1,069.6	2.6	3.1	-107.50	-96.6	86.2	130.7	125.6	5.09	25.681		
1,200.0	1,186.3	1,179.0	1,163.2	3.1	3.5	-111.37	-114.5	99.5	156.3	150.3	5.91	26.455		
1,300.0	1,282.1	1,275.2	1,256.7	3.6	3.9	-114.16	-132.5	112.7	182.3	175.6	6.72	27.115		
1,400.0	1,378.0	1,371.4	1,350.3	4.1	4.4	-116.24	-150.5	126.0	208.7	201.1	7.54	27.676		
1,500.0	1,473.9	1,467.7	1,443.9	4.6	4.8	-117.86	-168.4	139.2	235.2	226.9	8.35	28.157		
1,600.0	1,569.8	1,563.9	1,537.5	5.2	5.2	-119.16	-186.4	152.5	261.9	252.7	9.17	28.572		
1,700.0	1,665.7	1,660.1	1,631.1	5.7	5.6	-120.21	-204.3	165.7	288.7	278.7	9.98	28.931		
1,800.0	1,761.5	1,756.3	1,724.7	6.2	6.0	-121.08	-222.3	179.0	315.6	304.8	10.79	29.245		
1,900.0	1,857.4	1,852.5	1,818.3	6.7	6.5	-121.82	-240.3	192.3	342.5	330.9	11.60	29.522		
2,000.0	1,953.3	1,948.8	1,911.9	7.2	6.9	-122.45	-258.2	205.5	369.5	357.0	12.41	29.767		
2,100.0	2,049.2	2,045.0	2,005.5	7.8	7.3	-123.00	-276.2	218.8	396.5	383.2	13.22	29.986		
2,200.0	2,145.1	2,141.2	2,099.1	8.3	7.7	-123.47	-294.2	232.0	423.5	409.5	14.03	30.182		
2,300.0	2,241.0	2,237.4	2,192.7	8.8	8.2	-123.89	-312.1	245.3	450.6	435.7	14.84	30.359		
2,400.0	2,336.8	2,333.6	2,286.3	9.3	8.6	-124.26	-330.1	258.5	477.6	462.0	15.65	30.520		
2,500.0	2,432.7	2,429.9	2,379.9	9.9	9.0	-124.59	-348.0	271.8	504.7	488.3	16.46	30.665		
2,600.0	2,528.6	2,526.1	2,473.5	10.4	9.4	-124.89	-366.0	285.0	531.9	514.6	17.27	30.799		
2,700.0	2,624.5	2,622.3	2,567.1	10.9	9.9	-125.16	-384.0	298.3	559.0	540.9	18.08	30.921		
2,800.0	2,720.4	2,718.5	2,660.7	11.4	10.3	-125.40	-401.9	311.5	586.1	567.2	18.89	31.033		
2,900.0	2,816.3	2,814.7	2,754.3	12.0	10.7	-125.62	-419.9	324.8	613.3	593.6	19.70	31.137		
3,000.0	2,912.1	2,911.0	2,847.9	12.5	11.2	-125.82	-437.9	338.1	640.4	619.9	20.50	31.233		
3,100.0	3,008.0	3,007.2	2,941.4	13.0	11.6	-126.01	-455.8	351.3	667.6	646.2	21.31	31.322		
3,200.0	3,103.9	3,103.4	3,035.0	13.5	12.0	-126.18	-473.8	364.6	694.7	672.6	22.12	31.405		
3,300.0	3,199.8	3,199.6	3,128.6	14.1	12.4	-126.34	-491.7	377.8	721.9	699.0	22.93	31.483		
3,400.0	3,295.7	3,295.8	3,222.2	14.6	12.9	-126.49	-509.7	391.1	749.1	725.3	23.74	31.555		
3,500.0	3,391.5	3,392.1	3,315.8	15.1	13.3	-126.63	-527.7	404.3	776.2	751.7	24.55	31.623		
3,600.0	3,487.4	3,488.3	3,409.4	15.7	13.7	-126.75	-545.6	417.6	803.4	778.1	25.35	31.687		
3,700.0	3,583.3	3,584.5	3,503.0	16.2	14.1	-126.87	-563.6	430.8	830.6	804.4	26.16	31.747		
3,800.0	3,679.2	3,680.7	3,596.6	16.7	14.6	-126.99	-581.6	444.1	857.8	830.8	26.97	31.804		
3,900.0	3,775.1	3,777.0	3,690.2	17.2	15.0	-127.09	-599.5	457.4	885.0	857.2	27.78	31.857		
4,000.0	3,871.0	3,873.2	3,783.8	17.8	15.4	-127.19	-617.5	470.6	912.2	883.6	28.59	31.908		
4,100.0	3,966.8	3,969.4	3,877.4	18.3	15.9	-127.28	-635.4	483.9	939.4	910.0	29.40	31.955		
4,200.0	4,062.7	4,065.6	3,971.0	18.8	16.3	-127.37	-653.4	497.1	966.6	936.4	30.20	32.001		
4,300.0	4,158.6	4,161.8	4,064.6	19.4	16.7	-127.45	-671.4	510.4	993.8	962.8	31.01	32.044		
4,400.0	4,254.5	4,258.1	4,158.2	19.9	17.1	-127.53	-689.3	523.6	1,021.0	989.2	31.82	32.085		
4,500.0	4,350.4	4,354.3	4,251.8	20.4	17.6	-127.61	-707.3	536.9	1,048.2	1,015.5	32.63	32.124		
4,600.0	4,446.3	4,450.5	4,345.4	20.9	18.0	-127.68	-725.2	550.1	1,075.4	1,041.9	33.44	32.161		
4,700.0	4,542.1	4,546.7	4,439.0	21.5	18.4	-127.75	-743.2	563.4	1,102.6	1,068.3	34.25	32.197		
4,800.0	4,638.0	4,642.9	4,532.6	22.0	18.8	-127.81	-761.2	576.7	1,129.8	1,094.7	35.05	32.230		
4,900.0	4,733.9	4,739.2	4,626.2	22.5	19.3	-127.87	-779.1	589.9	1,157.0	1,121.1	35.86	32.263		
5,000.0	4,829.8	4,835.4	4,719.7	23.1	19.7	-127.93	-797.1	603.2	1,184.2	1,147.5	36.67	32.294		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 16-6C - DD - Plan #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre +N/-S	+E/-W	Between Centres	Between Ellipses	Total Uncertainty Axis	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)				
5,100.0	4,925.7	4,931.6	4,813.3	23.6	20.1	-127.98	-815.1	616.4	1,211.4	1,173.9	37.48	32.324		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-6C2 - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total	Separation	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	141.12	-9.1	7.3	11.7					
100.0	100.0	100.0	100.0	0.1	0.1	141.12	-9.1	7.3	11.7	11.4	0.27	42.963		
200.0	200.0	200.0	200.0	0.3	0.3	141.12	-9.1	7.3	11.7	11.1	0.62	18.826 CC, ES		
300.0	300.0	299.3	299.3	0.5	0.5	142.71	-11.3	8.6	14.3	13.3	0.97	14.685 SF		
400.0	400.0	398.1	397.7	0.7	0.7	145.24	-18.0	12.5	22.0	20.7	1.33	16.533		
500.0	500.0	495.8	494.6	0.8	1.0	146.96	-28.9	18.8	34.9	33.2	1.70	20.474		
600.0	600.0	592.2	589.5	1.0	1.3	-61.02	-43.8	27.4	51.5	49.5	2.01	25.622		
700.0	699.6	687.3	682.0	1.2	1.8	-64.59	-62.6	38.3	70.7	68.4	2.39	29.655		
800.0	798.8	784.2	775.6	1.5	2.2	-69.09	-84.5	50.9	91.5	88.6	2.83	32.265		
900.0	897.1	881.7	869.7	1.8	2.7	-74.31	-106.5	63.7	111.2	107.8	3.41	32.628		
1,000.0	994.3	978.8	963.5	2.2	3.1	-79.99	-128.5	76.4	130.9	126.7	4.15	31.562		
1,100.0	1,090.4	1,075.5	1,056.8	2.6	3.6	-86.00	-150.3	89.1	151.3	146.2	5.02	30.110		
1,200.0	1,186.3	1,172.1	1,150.0	3.1	4.1	-91.02	-172.1	101.7	173.0	167.1	5.95	29.093		
1,300.0	1,282.1	1,268.7	1,243.3	3.6	4.5	-94.91	-194.0	114.3	195.8	188.9	6.88	28.455		
1,400.0	1,378.0	1,365.3	1,336.5	4.1	5.0	-97.99	-215.8	127.0	219.3	211.5	7.82	28.058		
1,500.0	1,473.9	1,461.9	1,429.8	4.6	5.5	-100.48	-237.6	139.6	243.2	234.5	8.75	27.813		
1,600.0	1,569.8	1,558.5	1,523.0	5.2	6.0	-102.52	-259.5	152.2	267.6	257.9	9.67	27.665		
1,700.0	1,665.7	1,655.1	1,616.2	5.7	6.4	-104.22	-281.3	164.9	292.1	281.5	10.59	27.581		
1,800.0	1,761.5	1,751.7	1,709.5	6.2	6.9	-105.66	-303.1	177.5	316.9	305.4	11.51	27.537		
1,900.0	1,857.4	1,848.3	1,802.7	6.7	7.4	-106.89	-325.0	190.1	341.9	329.4	12.42	27.522		
2,000.0	1,953.3	1,944.9	1,896.0	7.2	7.8	-107.95	-346.8	202.8	366.9	353.6	13.33	27.524		
2,100.0	2,049.2	2,041.5	1,989.2	7.8	8.3	-108.88	-368.6	215.4	392.1	377.9	14.24	27.539		
2,200.0	2,145.1	2,138.1	2,082.5	8.3	8.8	-109.69	-390.5	228.0	417.4	402.2	15.14	27.561		
2,300.0	2,241.0	2,234.7	2,175.7	8.8	9.3	-110.41	-412.3	240.7	442.7	426.7	16.05	27.589		
2,400.0	2,336.8	2,331.2	2,268.9	9.3	9.7	-111.06	-434.1	253.3	468.1	451.2	16.95	27.620		
2,500.0	2,432.7	2,427.8	2,362.2	9.9	10.2	-111.64	-456.0	265.9	493.6	475.7	17.85	27.653		
2,600.0	2,528.6	2,524.4	2,455.4	10.4	10.7	-112.16	-477.8	278.6	519.0	500.3	18.75	27.687		
2,700.0	2,624.5	2,621.0	2,548.7	10.9	11.2	-112.63	-499.6	291.2	544.6	524.9	19.64	27.722		
2,800.0	2,720.4	2,717.6	2,641.9	11.4	11.6	-113.06	-521.5	303.8	570.1	549.6	20.54	27.756		
2,900.0	2,816.3	2,814.2	2,735.2	12.0	12.1	-113.46	-543.3	316.5	595.7	574.3	21.44	27.790		
3,000.0	2,912.1	2,910.8	2,828.4	12.5	12.6	-113.82	-565.1	329.1	621.3	599.0	22.33	27.823		
3,100.0	3,008.0	3,007.4	2,921.6	13.0	13.1	-114.15	-587.0	341.7	646.9	623.7	23.22	27.855		
3,200.0	3,103.9	3,104.0	3,014.9	13.5	13.5	-114.46	-608.8	354.4	672.6	648.5	24.12	27.887		
3,300.0	3,199.8	3,200.6	3,108.1	14.1	14.0	-114.74	-630.6	367.0	698.2	673.2	25.01	27.917		
3,400.0	3,295.7	3,297.2	3,201.4	14.6	14.5	-115.01	-652.5	379.6	723.9	698.0	25.90	27.947		
3,500.0	3,391.5	3,393.8	3,294.6	15.1	15.0	-115.25	-674.3	392.3	749.6	722.8	26.80	27.975		
3,600.0	3,487.4	3,490.4	3,387.9	15.7	15.4	-115.48	-696.1	404.9	775.3	747.6	27.69	28.003		
3,700.0	3,583.3	3,587.0	3,481.1	16.2	15.9	-115.70	-718.0	417.6	801.0	772.5	28.58	28.029		
3,800.0	3,679.2	3,683.6	3,574.3	16.7	16.4	-115.90	-739.8	430.2	826.8	797.3	29.47	28.055		
3,900.0	3,775.1	3,780.2	3,667.6	17.2	16.9	-116.09	-761.6	442.8	852.5	822.1	30.36	28.080		
4,000.0	3,871.0	3,876.8	3,760.8	17.8	17.3	-116.27	-783.5	455.5	878.2	847.0	31.25	28.103		
4,100.0	3,966.8	3,973.4	3,854.1	18.3	17.8	-116.44	-805.3	468.1	904.0	871.8	32.14	28.126		
4,200.0	4,062.7	4,070.0	3,947.3	18.8	18.3	-116.60	-827.1	480.7	929.7	896.7	33.03	28.148		
4,300.0	4,158.6	4,166.5	4,040.6	19.4	18.8	-116.75	-849.0	493.4	955.5	921.6	33.92	28.170		
4,400.0	4,254.5	4,263.1	4,133.8	19.9	19.2	-116.89	-870.8	506.0	981.3	946.5	34.81	28.190		
4,500.0	4,350.4	4,359.7	4,227.0	20.4	19.7	-117.03	-892.7	518.6	1,007.0	971.3	35.70	28.210		
4,600.0	4,446.3	4,456.3	4,320.3	20.9	20.2	-117.15	-914.5	531.3	1,032.8	996.2	36.59	28.229		
4,700.0	4,542.1	4,552.9	4,413.5	21.5	20.7	-117.28	-936.3	543.9	1,058.6	1,021.1	37.48	28.248		
4,800.0	4,638.0	4,649.5	4,506.8	22.0	21.1	-117.39	-958.2	556.5	1,084.4	1,046.0	38.36	28.265		
4,900.0	4,733.9	4,746.1	4,600.0	22.5	21.6	-117.50	-980.0	569.2	1,110.2	1,070.9	39.25	28.283		
5,000.0	4,829.8	4,842.7	4,693.3	23.1	22.1	-117.61	-1,001.8	581.8	1,136.0	1,095.8	40.14	28.299		
5,100.0	4,925.7	4,939.3	4,786.5	23.6	22.6	-117.71	-1,023.7	594.4	1,161.8	1,120.7	41.03	28.315		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 16-6C2 - DD - Plan #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
5,200.0	5,021.5	5,035.9	4,879.7	24.1	23.0	-117.81	-1,045.5	607.1	1,187.6	1,145.7	41.92	28.331		
5,300.0	5,117.4	5,132.5	4,973.0	24.6	23.5	-117.90	-1,067.3	619.7	1,213.4	1,170.6	42.81	28.346		



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 16-9C - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total	Separation	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	16.80	41.2	12.4	43.0					
100.0	100.0	100.0	100.0	0.1	0.1	16.80	41.2	12.4	43.0	42.7	0.27	157.906		
200.0	200.0	200.0	200.0	0.3	0.3	16.80	41.2	12.4	43.0	42.4	0.62	69.195		
300.0	300.0	300.0	300.0	0.5	0.5	16.80	41.2	12.4	43.0	42.0	0.97	44.305 CC, ES		
400.0	400.0	399.5	399.5	0.7	0.7	20.16	40.9	15.0	43.5	42.2	1.32	32.863		
500.0	500.0	498.5	498.1	0.8	0.9	29.55	40.0	22.7	46.0	44.3	1.71	26.904		
600.0	600.0	597.3	596.2	1.0	1.1	-165.94	38.6	34.3	54.3	52.2	2.09	26.030 SF		
700.0	699.6	695.9	694.1	1.2	1.4	-159.04	37.2	46.3	69.3	66.8	2.46	28.116		
800.0	798.8	793.7	791.2	1.5	1.6	-155.91	35.8	58.2	89.5	86.7	2.85	31.455		
900.0	897.1	890.5	887.2	1.8	1.9	-154.93	34.5	69.9	114.5	111.3	3.24	35.338		
1,000.0	994.3	986.0	982.0	2.2	2.1	-155.05	33.1	81.5	144.1	140.5	3.65	39.502		
1,100.0	1,090.4	1,080.2	1,075.5	2.6	2.4	-155.82	31.8	92.9	177.7	173.6	4.08	43.593		
1,200.0	1,186.3	1,174.1	1,168.8	3.1	2.6	-156.56	30.5	104.3	211.8	207.3	4.52	46.847		
1,300.0	1,282.1	1,268.1	1,262.0	3.6	2.9	-157.10	29.2	115.7	246.0	241.0	4.97	49.496		
1,400.0	1,378.0	1,362.1	1,355.3	4.1	3.2	-157.51	27.8	127.1	280.2	274.7	5.42	51.692		
1,500.0	1,473.9	1,456.0	1,448.5	4.6	3.4	-157.83	26.5	138.5	314.3	308.5	5.87	53.541		
1,600.0	1,569.8	1,550.0	1,541.8	5.2	3.7	-158.09	25.2	149.9	348.5	342.2	6.32	55.117		
1,700.0	1,665.7	1,643.9	1,635.0	5.7	3.9	-158.30	23.9	161.3	382.7	376.0	6.78	56.477		
1,800.0	1,761.5	1,737.9	1,728.3	6.2	4.2	-158.48	22.5	172.7	416.9	409.7	7.23	57.661		
1,900.0	1,857.4	1,831.9	1,821.6	6.7	4.4	-158.63	21.2	184.1	451.2	443.5	7.69	58.701		
2,000.0	1,953.3	1,925.8	1,914.8	7.2	4.7	-158.75	19.9	195.5	485.4	477.2	8.14	59.622		
2,100.0	2,049.2	2,019.8	2,008.1	7.8	5.0	-158.87	18.6	206.9	519.6	511.0	8.60	60.443		
2,200.0	2,145.1	2,113.7	2,101.3	8.3	5.2	-158.96	17.2	218.3	553.8	544.7	9.05	61.179		
2,300.0	2,241.0	2,207.7	2,194.6	8.8	5.5	-159.05	15.9	229.7	588.0	578.5	9.51	61.843		
2,400.0	2,336.8	2,301.7	2,287.8	9.3	5.7	-159.13	14.6	241.1	622.2	612.3	9.96	62.445		
2,500.0	2,432.7	2,395.6	2,381.1	9.9	6.0	-159.20	13.3	252.5	656.4	646.0	10.42	62.993		
2,600.0	2,528.6	2,489.6	2,474.4	10.4	6.3	-159.26	11.9	263.9	690.7	679.8	10.88	63.494		
2,700.0	2,624.5	2,583.5	2,567.6	10.9	6.5	-159.31	10.6	275.3	724.9	713.6	11.33	63.954		
2,800.0	2,720.4	2,677.5	2,660.9	11.4	6.8	-159.37	9.3	286.7	759.1	747.3	11.79	64.377		
2,900.0	2,816.3	2,771.5	2,754.1	12.0	7.0	-159.41	8.0	298.1	793.3	781.1	12.25	64.768		
3,000.0	2,912.1	2,865.4	2,847.4	12.5	7.3	-159.45	6.6	309.5	827.5	814.8	12.71	65.131		
3,100.0	3,008.0	2,959.4	2,940.7	13.0	7.6	-159.49	5.3	320.9	861.8	848.6	13.16	65.468		
3,200.0	3,103.9	3,053.4	3,033.9	13.5	7.8	-159.53	4.0	332.3	896.0	882.4	13.62	65.781		
3,300.0	3,199.8	3,147.3	3,127.2	14.1	8.1	-159.56	2.7	343.7	930.2	916.1	14.08	66.074		
3,400.0	3,295.7	3,241.3	3,220.4	14.6	8.3	-159.60	1.3	355.1	964.4	949.9	14.54	66.349		
3,500.0	3,391.5	3,335.2	3,313.7	15.1	8.6	-159.63	0.0	366.5	998.7	983.7	14.99	66.606		
3,600.0	3,487.4	3,429.2	3,406.9	15.7	8.9	-159.65	-1.3	377.9	1,032.9	1,017.4	15.45	66.848		
3,700.0	3,583.3	3,523.2	3,500.2	16.2	9.1	-159.68	-2.6	389.3	1,067.1	1,051.2	15.91	67.075		
3,800.0	3,679.2	3,617.1	3,593.5	16.7	9.4	-159.70	-4.0	400.7	1,101.3	1,085.0	16.37	67.290		
3,900.0	3,775.1	3,711.1	3,686.7	17.2	9.6	-159.72	-5.3	412.1	1,135.5	1,118.7	16.82	67.493		
4,000.0	3,871.0	3,805.0	3,780.0	17.8	9.9	-159.75	-6.6	423.5	1,169.8	1,152.5	17.28	67.685		
4,100.0	3,966.8	3,899.0	3,873.2	18.3	10.2	-159.77	-7.9	434.9	1,204.0	1,186.2	17.74	67.867		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 21-1B - DD - Plan #1													Offset Site Error: 0.0 ft	
Survey Program: 0-MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	167.68	-25.9	5.6	26.5					
100.0	100.0	100.0	100.0	0.1	0.1	167.68	-25.9	5.6	26.5	26.2	0.27	97.220		
200.0	200.0	200.0	200.0	0.3	0.3	167.68	-25.9	5.6	26.5	25.8	0.62	42.602		
300.0	300.0	300.0	300.0	0.5	0.5	167.68	-25.9	5.6	26.5	25.5	0.97	27.278	CC, ES	
400.0	400.0	398.6	398.5	0.7	0.7	166.41	-28.1	6.8	29.0	27.7	1.32	21.995		
500.0	500.0	496.7	496.3	0.8	0.9	163.67	-34.9	10.2	36.5	34.9	1.67	21.927	SF	
600.0	600.0	593.9	592.7	1.0	1.1	-47.94	-46.0	15.8	47.4	45.4	2.01	23.580		
700.0	699.6	690.1	687.4	1.2	1.5	-54.67	-61.3	23.6	60.4	58.1	2.37	25.487		
800.0	798.8	785.0	779.8	1.5	1.9	-61.65	-80.5	33.3	76.4	73.6	2.79	27.424		
900.0	897.1	878.4	869.6	1.8	2.3	-67.97	-103.4	44.9	96.0	92.7	3.31	28.961		
1,000.0	994.3	974.1	960.6	2.2	2.9	-73.84	-129.7	58.2	118.2	114.2	4.00	29.512		
1,100.0	1,090.4	1,070.5	1,052.3	2.6	3.4	-79.80	-156.3	71.7	140.7	135.9	4.85	28.995		
1,200.0	1,186.3	1,166.9	1,143.9	3.1	3.9	-84.57	-182.9	85.2	164.4	158.6	5.77	28.490		
1,300.0	1,282.1	1,263.2	1,235.6	3.6	4.5	-88.13	-209.5	98.7	188.9	182.1	6.71	28.132		
1,400.0	1,378.0	1,359.6	1,327.2	4.1	5.0	-90.88	-236.1	112.1	213.9	206.2	7.67	27.886		
1,500.0	1,473.9	1,456.0	1,418.9	4.6	5.5	-93.05	-262.7	125.6	239.2	230.6	8.63	27.716		
1,600.0	1,569.8	1,552.3	1,510.5	5.2	6.1	-94.81	-289.3	139.1	264.9	255.3	9.60	27.598		
1,700.0	1,665.7	1,648.7	1,602.1	5.7	6.6	-96.26	-315.9	152.5	290.7	280.1	10.56	27.517		
1,800.0	1,761.5	1,745.1	1,693.8	6.2	7.2	-97.47	-342.5	166.0	316.7	305.2	11.53	27.460		
1,900.0	1,857.4	1,841.4	1,785.4	6.7	7.7	-98.49	-369.1	179.5	342.8	330.3	12.50	27.420		
2,000.0	1,953.3	1,937.8	1,877.0	7.2	8.3	-99.38	-395.7	193.0	369.0	355.5	13.47	27.393		
2,100.0	2,049.2	2,034.2	1,968.7	7.8	8.8	-100.14	-422.3	206.4	395.2	380.8	14.44	27.375		
2,200.0	2,145.1	2,130.5	2,060.3	8.3	9.4	-100.81	-448.9	219.9	421.5	406.1	15.40	27.364		
2,300.0	2,241.0	2,226.9	2,152.0	8.8	9.9	-101.41	-475.5	233.4	447.9	431.5	16.37	27.357		
2,400.0	2,336.8	2,323.3	2,243.6	9.3	10.5	-101.93	-502.1	246.8	474.3	456.9	17.34	27.353		
2,500.0	2,432.7	2,419.6	2,335.2	9.9	11.0	-102.40	-528.7	260.3	500.7	482.4	18.31	27.352		
2,600.0	2,528.6	2,516.0	2,426.9	10.4	11.6	-102.83	-555.3	273.8	527.1	507.9	19.27	27.353		
2,700.0	2,624.5	2,612.4	2,518.5	10.9	12.1	-103.21	-581.9	287.3	553.6	533.4	20.24	27.355		
2,800.0	2,720.4	2,708.7	2,610.2	11.4	12.7	-103.56	-608.5	300.7	580.1	558.9	21.20	27.358		
2,900.0	2,816.3	2,805.1	2,701.8	12.0	13.2	-103.88	-635.1	314.2	606.6	584.5	22.17	27.363		
3,000.0	2,912.1	2,901.5	2,793.4	12.5	13.8	-104.17	-661.7	327.7	633.2	610.0	23.14	27.367		
3,100.0	3,008.0	2,997.8	2,885.1	13.0	14.3	-104.44	-688.3	341.1	659.7	635.6	24.10	27.372		
3,200.0	3,103.9	3,094.2	2,976.7	13.5	14.9	-104.68	-714.9	354.6	686.3	661.2	25.07	27.377		
3,300.0	3,199.8	3,190.6	3,068.3	14.1	15.4	-104.91	-741.5	368.1	712.9	686.8	26.03	27.383		
3,400.0	3,295.7	3,286.9	3,160.0	14.6	16.0	-105.12	-768.1	381.6	739.4	712.4	27.00	27.388		
3,500.0	3,391.5	3,383.3	3,251.6	15.1	16.5	-105.32	-794.7	395.0	766.0	738.1	27.96	27.394		
3,600.0	3,487.4	3,479.7	3,343.3	15.7	17.1	-105.51	-821.3	408.5	792.6	763.7	28.93	27.400		
3,700.0	3,583.3	3,576.0	3,434.9	16.2	17.6	-105.68	-847.9	422.0	819.2	789.3	29.89	27.405		
3,800.0	3,679.2	3,672.4	3,526.5	16.7	18.2	-105.84	-874.5	435.4	845.9	815.0	30.86	27.411		
3,900.0	3,775.1	3,768.8	3,618.2	17.2	18.7	-105.99	-901.1	448.9	872.5	840.6	31.82	27.416		
4,000.0	3,871.0	3,865.1	3,709.8	17.8	19.3	-106.13	-927.7	462.4	899.1	866.3	32.79	27.421		
4,100.0	3,966.8	3,961.5	3,801.5	18.3	19.8	-106.27	-954.3	475.9	925.7	892.0	33.75	27.426		
4,200.0	4,062.7	4,057.9	3,893.1	18.8	20.4	-106.39	-980.9	489.3	952.4	917.6	34.72	27.431		
4,300.0	4,158.6	4,154.2	3,984.7	19.4	20.9	-106.52	-1,007.5	502.8	979.0	943.3	35.68	27.436		
4,400.0	4,254.5	4,250.6	4,076.4	19.9	21.5	-106.63	-1,034.1	516.3	1,005.6	969.0	36.65	27.441		
4,500.0	4,350.4	4,347.0	4,168.0	20.4	22.0	-106.74	-1,060.7	529.7	1,032.3	994.7	37.61	27.446		
4,600.0	4,446.3	4,443.3	4,259.6	20.9	22.6	-106.84	-1,087.3	543.2	1,058.9	1,020.3	38.58	27.451		
4,700.0	4,542.1	4,539.7	4,351.3	21.5	23.1	-106.94	-1,113.9	556.7	1,085.6	1,046.0	39.54	27.455		
4,800.0	4,638.0	4,636.1	4,442.9	22.0	23.7	-107.03	-1,140.5	570.2	1,112.2	1,071.7	40.50	27.460		
4,900.0	4,733.9	4,732.4	4,534.6	22.5	24.2	-107.12	-1,167.1	583.6	1,138.9	1,097.4	41.47	27.464		
5,000.0	4,829.8	4,828.8	4,626.2	23.1	24.8	-107.20	-1,193.7	597.1	1,165.5	1,123.1	42.43	27.468		
5,100.0	4,925.7	4,925.2	4,717.8	23.6	25.3	-107.28	-1,220.3	610.6	1,192.2	1,148.8	43.40	27.472		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 21-1B - DD - Plan #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre +N/-S	+E/-W	Between Centres	Between Ellipses	Total Uncertainty Axis	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)				
5,200.0	5,021.5	5,021.5	4,809.5	24.1	25.9	-107.36	-1,246.9	624.0	1,218.9	1,174.5	44.36	27.476		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 21-3A - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total Uncertainty Axis	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
0.0	0.0	0.0	0.0	0.0	0.0	-175.18	-16.8	-1.4	16.8					
100.0	100.0	100.0	100.0	0.1	0.1	-175.18	-16.8	-1.4	16.8	16.5	0.27	61.755		
200.0	200.0	200.0	200.0	0.3	0.3	-175.18	-16.8	-1.4	16.8	16.2	0.62	27.061	CC, ES	
300.0	300.0	299.1	299.0	0.5	0.5	-172.79	-19.1	-2.4	19.3	18.3	0.97	19.836		
400.0	400.0	397.6	397.3	0.7	0.7	-168.30	-26.2	-5.4	26.8	25.5	1.34	20.089		
500.0	500.0	495.1	494.0	0.8	1.0	-164.68	-37.7	-10.3	39.5	37.8	1.71	23.068		
600.0	600.0	591.6	588.9	1.0	1.3	-9.61	-53.6	-17.1	54.8	52.8	2.01	27.286		
700.0	699.6	687.3	682.1	1.2	1.7	-8.75	-73.6	-25.6	69.9	67.5	2.35	29.740		
800.0	798.8	782.4	773.4	1.5	2.2	-8.42	-97.8	-35.9	84.8	82.1	2.69	31.515		
900.0	897.1	880.9	867.2	1.8	2.8	-8.48	-125.6	-47.8	97.7	94.7	3.04	32.159		
1,000.0	994.3	980.6	962.0	2.2	3.3	-8.95	-153.8	-59.8	105.5	102.1	3.39	31.110		
1,100.0	1,090.4	1,080.5	1,057.1	2.6	3.9	-9.77	-182.1	-71.8	108.9	105.1	3.77	28.905		
1,200.0	1,186.3	1,180.4	1,152.2	3.1	4.4	-10.61	-210.3	-83.8	111.6	107.4	4.16	26.813		
1,300.0	1,282.1	1,280.4	1,247.3	3.6	5.0	-11.42	-238.6	-95.9	114.3	109.7	4.57	25.025		
1,400.0	1,378.0	1,380.3	1,342.4	4.1	5.6	-12.18	-266.9	-107.9	117.0	112.1	4.99	23.478		
1,500.0	1,473.9	1,480.3	1,437.6	4.6	6.1	-12.91	-295.1	-119.9	119.8	114.4	5.42	22.123		
1,600.0	1,569.8	1,580.2	1,532.7	5.2	6.7	-13.61	-323.4	-132.0	122.6	116.7	5.86	20.928		
1,700.0	1,665.7	1,680.2	1,627.8	5.7	7.3	-14.28	-351.6	-144.0	125.4	119.1	6.31	19.864		
1,800.0	1,761.5	1,780.2	1,722.9	6.2	7.8	-14.92	-379.9	-156.1	128.2	121.4	6.78	18.912		
1,900.0	1,857.4	1,880.1	1,818.0	6.7	8.4	-15.53	-408.2	-168.1	131.1	123.8	7.26	18.056		
2,000.0	1,953.3	1,980.1	1,913.1	7.2	9.0	-16.11	-436.4	-180.1	133.9	126.2	7.75	17.283		
2,100.0	2,049.2	2,080.0	2,008.2	7.8	9.5	-16.67	-464.7	-192.2	136.8	128.5	8.25	16.581		
2,200.0	2,145.1	2,180.0	2,103.3	8.3	10.1	-17.21	-492.9	-204.2	139.6	130.9	8.76	15.942		
2,300.0	2,241.0	2,279.9	2,198.5	8.8	10.7	-17.72	-521.2	-216.2	142.5	133.3	9.28	15.359		
2,400.0	2,336.8	2,379.9	2,293.6	9.3	11.2	-18.21	-549.5	-228.3	145.4	135.6	9.81	14.824		
2,500.0	2,432.7	2,479.8	2,388.7	9.9	11.8	-18.69	-577.7	-240.3	148.3	138.0	10.35	14.332		
2,600.0	2,528.6	2,579.8	2,483.8	10.4	12.4	-19.15	-606.0	-252.3	151.3	140.4	10.90	13.879		
2,700.0	2,624.5	2,679.7	2,578.9	10.9	12.9	-19.59	-634.3	-264.4	154.2	142.7	11.45	13.460		
2,800.0	2,720.4	2,779.7	2,674.0	11.4	13.5	-20.01	-662.5	-276.4	157.1	145.1	12.02	13.073		
2,900.0	2,816.3	2,879.6	2,769.1	12.0	14.1	-20.42	-690.8	-288.4	160.1	147.5	12.59	12.713		
3,000.0	2,912.1	2,979.6	2,864.3	12.5	14.6	-20.81	-719.0	-300.5	163.0	149.9	13.17	12.379		
3,100.0	3,008.0	3,079.5	2,959.4	13.0	15.2	-21.19	-747.3	-312.5	166.0	152.2	13.75	12.067		
3,200.0	3,103.9	3,179.5	3,054.5	13.5	15.8	-21.55	-775.6	-324.5	168.9	154.6	14.35	11.777		
3,300.0	3,199.8	3,279.4	3,149.6	14.1	16.3	-21.91	-803.8	-336.6	171.9	157.0	14.94	11.505		
3,400.0	3,295.7	3,379.4	3,244.7	14.6	16.9	-22.25	-832.1	-348.6	174.9	159.4	15.55	11.250		
3,500.0	3,391.5	3,479.3	3,339.8	15.1	17.5	-22.58	-860.3	-360.6	177.9	161.7	16.16	11.011		
3,600.0	3,487.4	3,579.3	3,434.9	15.7	18.0	-22.89	-888.6	-372.7	180.9	164.1	16.77	10.786		
3,700.0	3,583.3	3,679.2	3,530.0	16.2	18.6	-23.20	-916.9	-384.7	183.9	166.5	17.39	10.575		
3,800.0	3,679.2	3,779.2	3,625.2	16.7	19.2	-23.50	-945.1	-396.8	186.9	168.9	18.01	10.376		
3,900.0	3,775.1	3,879.1	3,720.3	17.2	19.7	-23.79	-973.4	-408.8	189.9	171.2	18.64	10.188		
4,000.0	3,871.0	3,979.1	3,815.4	17.8	20.3	-24.07	-1,001.7	-420.8	192.9	173.6	19.27	10.010		
4,100.0	3,966.8	4,079.0	3,910.5	18.3	20.9	-24.34	-1,029.9	-432.9	195.9	176.0	19.91	9.842		
4,200.0	4,062.7	4,179.0	4,005.6	18.8	21.4	-24.60	-1,058.2	-444.9	198.9	178.4	20.55	9.682		
4,300.0	4,158.6	4,278.9	4,100.7	19.4	22.0	-24.86	-1,086.4	-456.9	202.0	180.8	21.19	9.531		
4,400.0	4,254.5	4,378.9	4,195.8	19.9	22.6	-25.11	-1,114.7	-469.0	205.0	183.2	21.84	9.387		
4,500.0	4,350.4	4,478.8	4,290.9	20.4	23.1	-25.35	-1,143.0	-481.0	208.0	185.5	22.49	9.251		
4,600.0	4,446.3	4,578.8	4,386.1	20.9	23.7	-25.58	-1,171.2	-493.0	211.1	187.9	23.14	9.121		
4,700.0	4,542.1	4,678.7	4,481.2	21.5	24.3	-25.81	-1,199.5	-505.1	214.1	190.3	23.80	8.997		
4,800.0	4,638.0	4,778.7	4,576.3	22.0	24.8	-26.03	-1,227.7	-517.1	217.1	192.7	24.46	8.879		
4,900.0	4,733.9	4,878.6	4,671.4	22.5	25.4	-26.24	-1,256.0	-529.1	220.2	195.1	25.12	8.766		
5,000.0	4,829.8	4,978.6	4,766.5	23.1	26.0	-26.45	-1,284.3	-541.2	223.2	197.5	25.78	8.659		
5,100.0	4,925.7	5,078.5	4,861.6	23.6	26.5	-26.65	-1,312.5	-553.2	226.3	199.8	26.45	8.556		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Federal 21-3A - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total Uncertainty Axis	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
5,200.0	5,021.5	5,178.5	4,956.7	24.1	27.1	-26.85	-1,340.8	-565.2	229.3	202.2	27.12	8.457		
5,300.0	5,117.4	5,278.4	5,051.9	24.6	27.7	-27.04	-1,369.1	-577.3	232.4	204.6	27.79	8.363		
5,400.0	5,213.3	5,378.4	5,147.0	25.2	28.2	-27.23	-1,397.3	-589.3	235.5	207.0	28.46	8.272		
5,500.0	5,309.2	5,478.3	5,242.1	25.7	28.8	-27.41	-1,425.6	-601.3	238.5	209.4	29.14	8.186		
5,600.0	5,405.1	5,578.3	5,337.2	26.2	29.4	-27.59	-1,453.8	-613.4	241.6	211.8	29.82	8.102		
5,700.0	5,501.0	5,678.2	5,432.3	26.8	29.9	-27.76	-1,482.1	-625.4	244.6	214.1	30.50	8.022		
5,800.0	5,596.8	5,778.2	5,527.4	27.3	30.5	-27.93	-1,510.4	-637.4	247.7	216.5	31.18	7.945		
5,900.0	5,692.7	5,878.1	5,622.5	27.8	31.1	-28.10	-1,538.6	-649.5	250.8	218.9	31.86	7.871		
6,000.0	5,788.6	5,978.1	5,717.6	28.3	31.6	-28.26	-1,566.9	-661.5	253.9	221.3	32.55	7.800		
6,100.0	5,884.5	6,078.0	5,812.8	28.9	32.2	-28.41	-1,595.1	-673.6	256.9	223.7	33.23	7.731		
6,200.0	5,980.4	6,178.0	5,907.9	29.4	32.8	-28.57	-1,623.4	-685.6	260.0	226.1	33.92	7.665		
6,300.0	6,076.2	6,277.9	6,003.0	29.9	33.3	-28.72	-1,651.7	-697.6	263.1	228.5	34.61	7.601		
6,400.0	6,172.1	6,377.9	6,098.1	30.5	33.9	-28.86	-1,679.9	-709.7	266.2	230.9	35.30	7.540		
6,500.0	6,268.0	6,477.8	6,193.2	31.0	34.5	-29.01	-1,708.2	-721.7	269.2	233.3	36.00	7.480		
6,600.0	6,363.9	6,577.8	6,288.3	31.5	35.0	-29.15	-1,736.4	-733.7	272.3	235.6	36.69	7.423		
6,700.0	6,459.8	6,677.7	6,383.4	32.0	35.6	-29.28	-1,764.7	-745.8	275.4	238.0	37.38	7.367		
6,800.0	6,555.7	6,777.7	6,478.6	32.6	36.2	-29.42	-1,793.0	-757.8	278.5	240.4	38.08	7.313		
6,900.0	6,651.5	6,877.6	6,573.7	33.1	36.7	-29.55	-1,821.2	-769.8	281.6	242.8	38.78	7.261		
7,000.0	6,747.6	6,977.5	6,668.8	33.6	37.3	-29.63	-1,849.5	-781.9	285.3	245.9	39.42	7.237 SF		
7,100.0	6,844.5	7,077.3	6,763.7	34.0	37.9	-29.43	-1,877.7	-793.9	291.8	252.0	39.80	7.333		
7,200.0	6,942.3	7,187.0	6,868.7	34.4	38.4	-29.04	-1,906.9	-806.3	299.8	259.8	39.98	7.497		
7,300.0	7,040.7	7,297.3	6,975.4	34.8	38.9	-28.66	-1,932.6	-817.3	307.3	267.2	40.11	7.660		
7,400.0	7,139.6	7,407.9	7,083.4	35.0	39.4	-28.28	-1,954.5	-826.6	314.4	274.2	40.19	7.823		
7,500.0	7,239.1	7,518.9	7,192.6	35.2	39.7	-27.90	-1,972.6	-834.3	321.0	280.8	40.20	7.985		
7,600.0	7,338.8	7,630.2	7,302.9	35.4	40.0	-27.52	-1,986.8	-840.4	327.3	287.1	40.17	8.148		
7,700.0	7,438.7	7,741.8	7,413.9	35.5	40.2	-27.14	-1,997.2	-844.7	333.0	293.0	40.08	8.310		
7,800.0	7,538.7	7,853.8	7,525.6	35.6	40.4	-179.83	-2,003.5	-847.4	338.1	298.1	39.99	8.456		
7,900.0	7,638.7	7,966.0	7,637.8	35.6	40.4	-179.67	-2,005.8	-848.4	340.2	300.1	40.11	8.482		
8,000.0	7,738.7	8,066.9	7,738.7	35.7	40.5	-179.67	-2,005.8	-848.4	340.2	299.9	40.35	8.431		
8,100.0	7,838.7	8,166.9	7,838.7	35.8	40.6	-179.67	-2,005.8	-848.4	340.2	299.6	40.59	8.381		
8,200.0	7,938.7	8,266.9	7,938.7	35.8	40.6	-179.67	-2,005.8	-848.4	340.2	299.4	40.84	8.331		
8,300.0	8,038.7	8,366.9	8,038.7	35.9	40.7	-179.67	-2,005.8	-848.4	340.2	299.1	41.08	8.281		
8,400.0	8,138.7	8,466.9	8,138.7	36.0	40.8	-179.67	-2,005.8	-848.4	340.2	298.9	41.33	8.231		
8,500.0	8,238.7	8,566.9	8,238.7	36.0	40.8	-179.67	-2,005.8	-848.4	340.2	298.6	41.58	8.182		
8,600.0	8,338.7	8,666.9	8,338.7	36.1	40.9	-179.67	-2,005.8	-848.4	340.2	298.4	41.83	8.133		
8,700.0	8,438.7	8,766.9	8,438.7	36.2	40.9	-179.67	-2,005.8	-848.4	340.2	298.1	42.08	8.085		
8,800.0	8,538.7	8,866.9	8,538.7	36.3	41.0	-179.67	-2,005.8	-848.4	340.2	297.9	42.33	8.036		
8,900.0	8,638.7	8,966.9	8,638.7	36.3	41.1	-179.67	-2,005.8	-848.4	340.2	297.6	42.59	7.988		
9,000.0	8,738.7	9,066.9	8,738.7	36.4	41.1	-179.67	-2,005.8	-848.4	340.2	297.4	42.84	7.941		
9,100.0	8,838.7	9,166.9	8,838.7	36.5	41.2	-179.67	-2,005.8	-848.4	340.2	297.1	43.10	7.893		
9,200.0	8,938.7	9,266.9	8,938.7	36.6	41.3	-179.67	-2,005.8	-848.4	340.2	296.8	43.36	7.846		
9,300.0	9,038.7	9,366.9	9,038.7	36.6	41.3	-179.67	-2,005.8	-848.4	340.2	296.6	43.62	7.800		
9,400.0	9,138.7	9,466.9	9,138.7	36.7	41.4	-179.67	-2,005.8	-848.4	340.2	296.3	43.88	7.753		
9,500.0	9,238.7	9,566.9	9,238.7	36.8	41.5	-179.67	-2,005.8	-848.4	340.2	296.1	44.14	7.707		
9,600.0	9,338.7	9,666.9	9,338.7	36.9	41.6	-179.67	-2,005.8	-848.4	340.2	295.8	44.40	7.662		
9,700.0	9,438.7	9,766.9	9,438.7	36.9	41.6	-179.67	-2,005.8	-848.4	340.2	295.5	44.67	7.616		
9,800.0	9,538.7	9,866.9	9,538.7	37.0	41.7	-179.67	-2,005.8	-848.4	340.2	295.3	44.93	7.571		
9,900.0	9,638.7	9,966.9	9,638.7	37.1	41.8	-179.67	-2,005.8	-848.4	340.2	295.0	45.20	7.527		
10,000.0	9,738.7	10,066.9	9,738.7	37.2	41.8	-179.67	-2,005.8	-848.4	340.2	294.7	45.47	7.482		
10,100.0	9,838.7	10,166.9	9,838.7	37.3	41.9	-179.67	-2,005.8	-848.4	340.2	294.5	45.74	7.438		
10,200.0	9,938.7	10,266.9	9,938.7	37.4	42.0	-179.67	-2,005.8	-848.4	340.2	294.2	46.01	7.395		
10,300.0	10,038.7	10,366.9	10,038.7	37.4	42.1	-179.67	-2,005.8	-848.4	340.2	293.9	46.28	7.351		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> (J16W) - HMU Federal 21-3A - DD - Plan #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-MWD													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
10,368.3	10,107.0	10,435.2	10,107.0	37.5	42.1	-179.67	-2,005.8	-848.4	340.2	293.7	46.46	7.322		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well HMU Federal 16-14D3
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Reference Site:</b>	(J16W)	<b>MD Reference:</b>	KBE @ 7667.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HMU Federal 16-14D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	DD	<b>Database:</b>	EDM 5000.1 US Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design (J16W) - HMU Fee 16-8D - DD - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Separation Factor			
0.0	0.0	0.0	0.0	0.0	0.0	13.28	58.6	13.8	60.2						
100.0	100.0	100.0	100.0	0.1	0.1	13.28	58.6	13.8	60.2	60.0	0.27	221.280			
200.0	200.0	200.0	200.0	0.3	0.3	13.28	58.6	13.8	60.2	59.6	0.62	96.965 CC, ES			
300.0	300.0	297.5	297.4	0.5	0.5	14.66	60.2	15.8	62.3	61.3	0.97	64.063			
400.0	400.0	394.4	394.1	0.7	0.7	18.28	64.9	21.5	68.7	67.3	1.35	50.911			
500.0	500.0	490.4	489.3	0.8	1.0	22.97	72.7	30.8	79.7	77.9	1.76	45.366 SF			
600.0	600.0	584.4	581.8	1.0	1.3	-179.34	83.2	43.5	98.2	96.2	2.04	48.090			
700.0	699.6	678.2	673.4	1.2	1.7	-175.62	96.1	59.1	126.0	123.7	2.38	52.913			
800.0	798.8	772.3	765.2	1.5	2.1	-173.30	109.3	75.0	159.5	156.8	2.71	58.795			
900.0	897.1	864.5	855.2	1.8	2.4	-171.91	122.2	90.7	198.0	194.9	3.03	65.239			
1,000.0	994.3	954.7	943.1	2.2	2.8	-171.07	134.9	105.9	241.2	237.8	3.35	72.049			
1,100.0	1,090.4	1,042.8	1,029.0	2.6	3.2	-170.68	147.2	120.8	288.4	284.8	3.67	78.519			
1,200.0	1,186.3	1,130.6	1,114.7	3.1	3.6	-170.51	159.5	135.7	336.3	332.3	4.02	83.632			
1,300.0	1,282.1	1,218.4	1,200.4	3.6	3.9	-170.38	171.9	150.6	384.1	379.8	4.37	87.902			
1,400.0	1,378.0	1,306.2	1,286.0	4.1	4.3	-170.28	184.2	165.4	432.0	427.3	4.72	91.517			
1,500.0	1,473.9	1,394.0	1,371.7	4.6	4.7	-170.20	196.5	180.3	479.8	474.7	5.07	94.614			
1,600.0	1,569.8	1,481.8	1,457.4	5.2	5.0	-170.13	208.8	195.2	527.7	522.2	5.42	97.296			
1,700.0	1,665.7	1,569.6	1,543.0	5.7	5.4	-170.08	221.1	210.0	575.5	569.7	5.78	99.641			
1,800.0	1,761.5	1,657.4	1,628.7	6.2	5.8	-170.03	233.4	224.9	623.4	617.2	6.13	101.708			
1,900.0	1,857.4	1,745.2	1,714.3	6.7	6.2	-169.99	245.7	239.8	671.2	664.7	6.48	103.543			
2,000.0	1,953.3	1,833.1	1,800.0	7.2	6.5	-169.96	258.0	254.6	719.0	712.2	6.84	105.182			
2,100.0	2,049.2	1,920.9	1,885.7	7.8	6.9	-169.93	270.3	269.5	766.9	759.7	7.19	106.656			
2,200.0	2,145.1	2,008.7	1,971.3	8.3	7.3	-169.90	282.6	284.4	814.7	807.2	7.54	107.988			
2,300.0	2,241.0	2,096.5	2,057.0	8.8	7.6	-169.88	295.0	299.2	862.6	854.7	7.90	109.197			
2,400.0	2,336.8	2,184.3	2,142.7	9.3	8.0	-169.86	307.3	314.1	910.4	902.2	8.25	110.299			
2,500.0	2,432.7	2,272.1	2,228.3	9.9	8.4	-169.84	319.6	329.0	958.3	949.7	8.61	111.309			
2,600.0	2,528.6	2,359.9	2,314.0	10.4	8.8	-169.82	331.9	343.8	1,006.1	997.2	8.96	112.236			
2,700.0	2,624.5	2,447.7	2,399.6	10.9	9.1	-169.80	344.2	358.7	1,054.0	1,044.7	9.32	113.091			
2,800.0	2,720.4	2,535.5	2,485.3	11.4	9.5	-169.79	356.5	373.6	1,101.8	1,092.1	9.68	113.882			
2,900.0	2,816.3	2,623.3	2,571.0	12.0	9.9	-169.78	368.8	388.4	1,149.7	1,139.6	10.03	114.616			
3,000.0	2,912.1	2,711.2	2,656.6	12.5	10.3	-169.76	381.1	403.3	1,197.5	1,187.1	10.39	115.298			

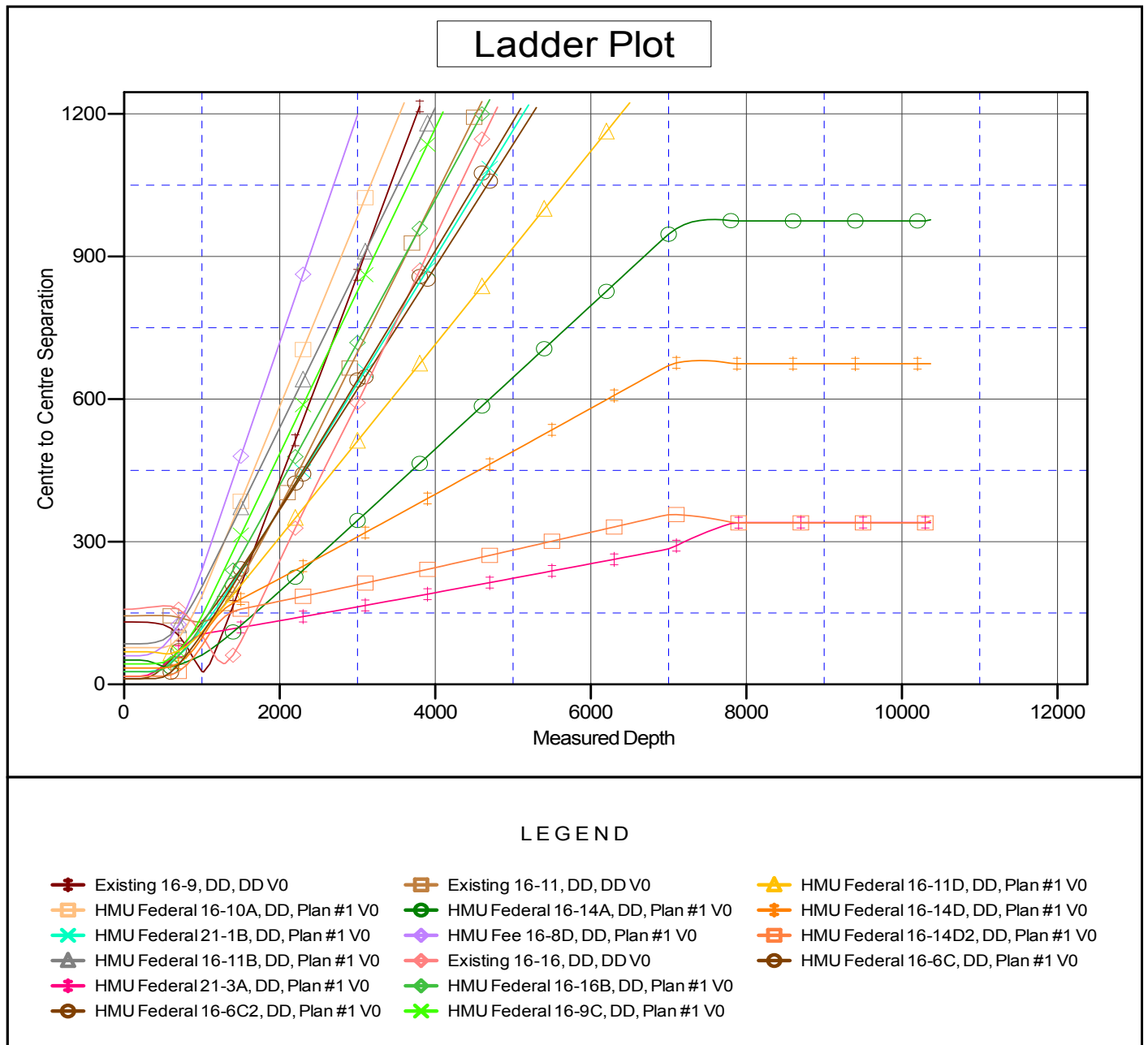
# Cathedral Energy Services

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Reference Depths are relative to KBE @ 7667.0ft (Original Well Elev)  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000 °

Coordinates are relative to: HMU Federal 16-14D3  
Coordinate System is US State Plane 1983, Colorado Central Zone  
Grid Convergence at Surface is: -1.44°



CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation