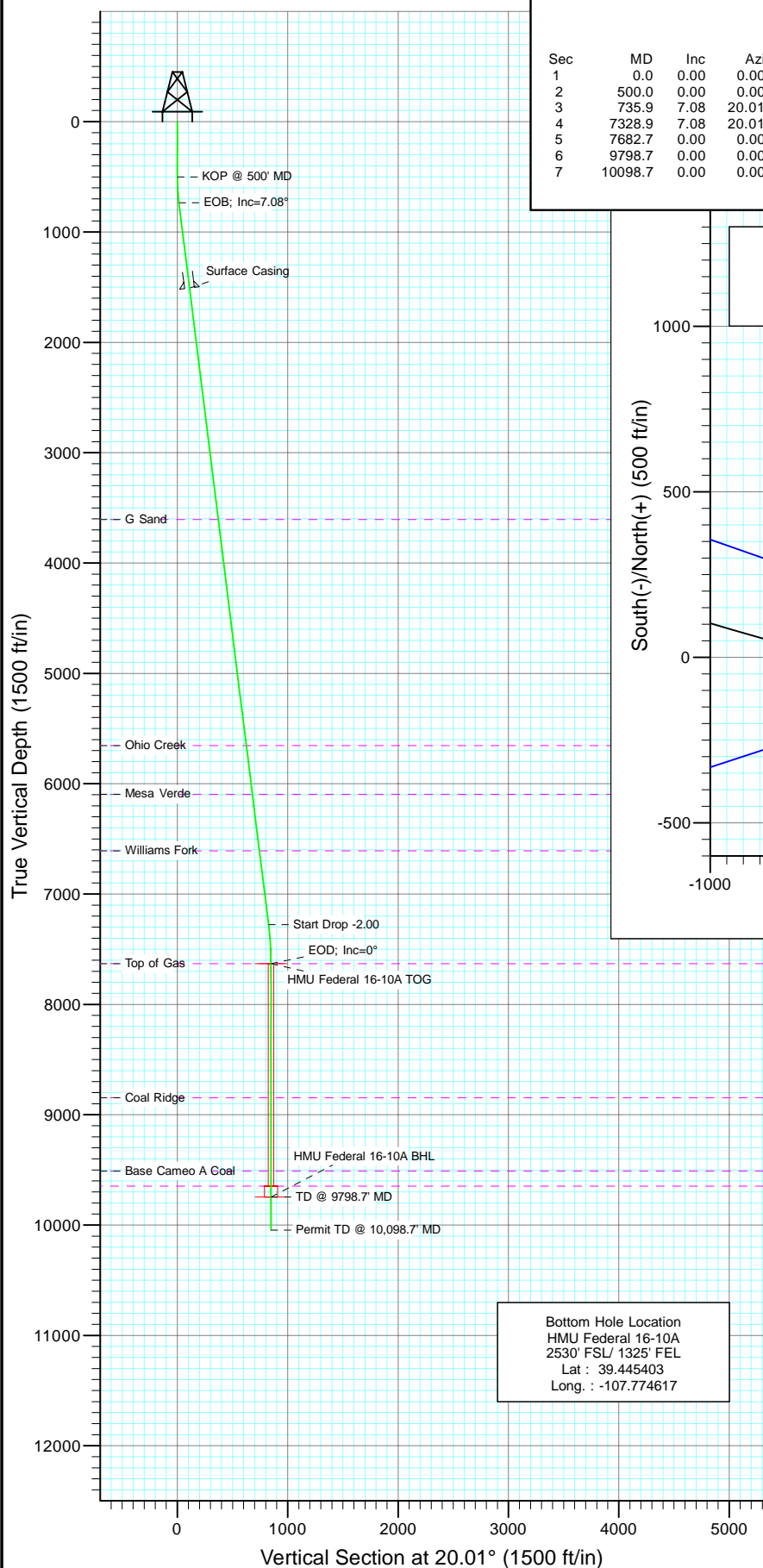
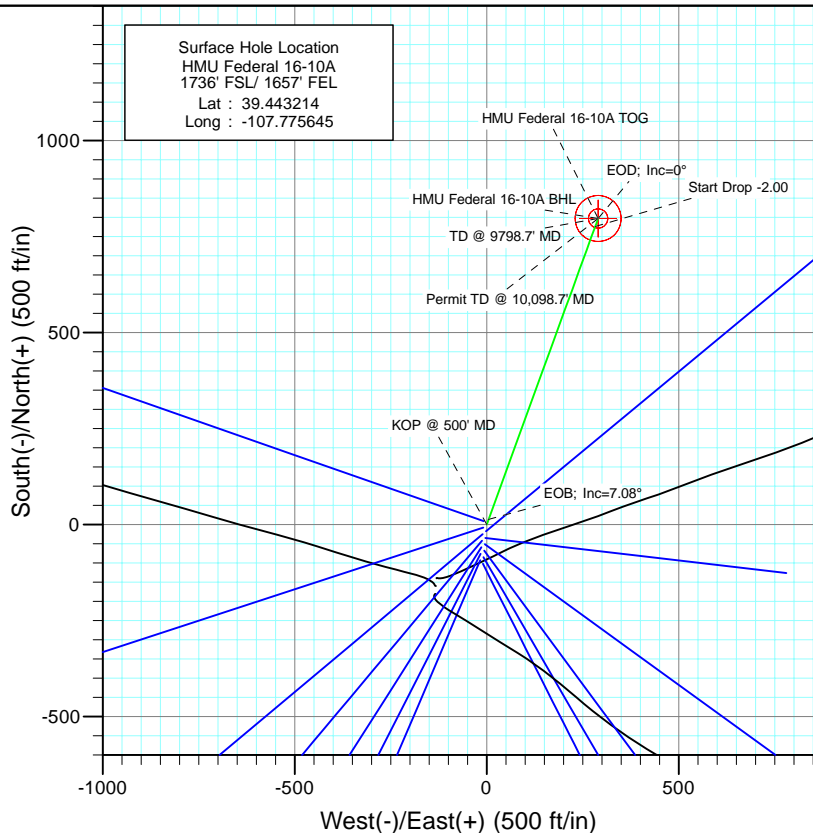




Project: Mamm Creek
Site: (J16W)
Well: HMU Federal 16-10A
Wellbore: DD
Design: Plan #1



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	735.9	7.08	20.01	735.3	13.7	5.0	3.00	20.01	14.5	
4	7328.9	7.08	20.01	7278.1	776.8	282.8	0.00	0.00	826.7	
5	7682.7	0.00	0.00	7631.0	797.3	290.3	2.00	180.00	848.5	HMU Federal 16-10A TOG
6	9798.7	0.00	0.00	9747.0	797.3	290.3	0.00	0.00	848.5	HMU Federal 16-10A BHL
7	10098.7	0.00	0.00	10047.0	797.3	290.3	0.00	0.00	848.5	



Azimuths to True North
Magnetic North: 10.30°

Magnetic Field
Strength: 52331.8snT
Dip Angle: 65.77°
Date: 10/25/2010
Model: IGRF200510

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3605.0	3627.6	G Sand
5655.0	5693.4	Ohio Creek
6096.0	6137.7	Mesa Verde
6608.0	6653.7	Williams Fork
7631.0	7682.7	Top of Gas
8847.0	8898.7	Coal Ridge
9511.0	9562.7	Base Cameo A Coal
9647.0	9698.7	Rollins

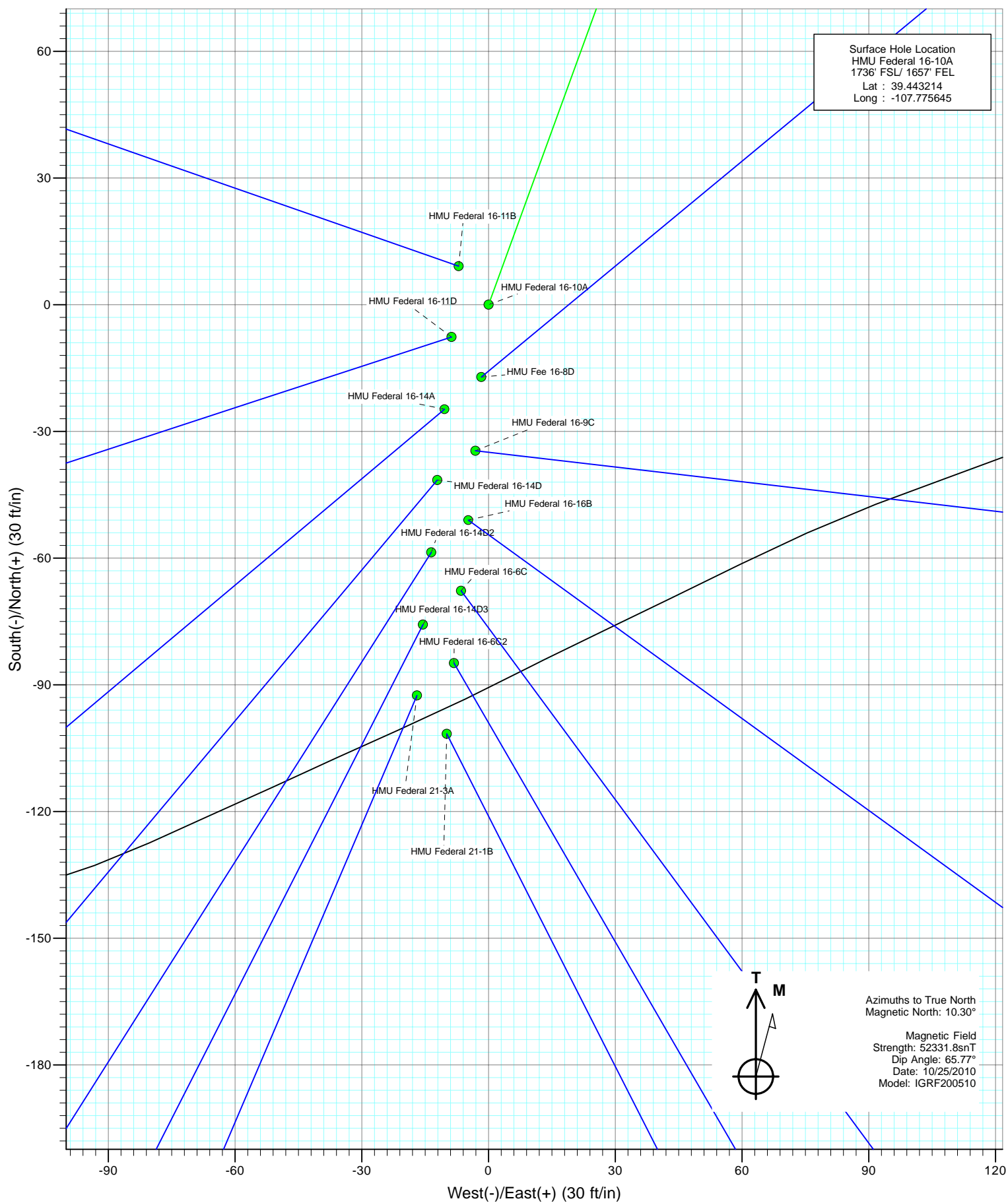
DESIGN DETAILS: Plan #1

WELL @ 7667.0ft (Original Well Elev)

Target	Azimuth	Origin	N/S	E/W	From TVD
HMU Federal 16-10A BHL	20.01	Slot	0.0	0.0	0.0

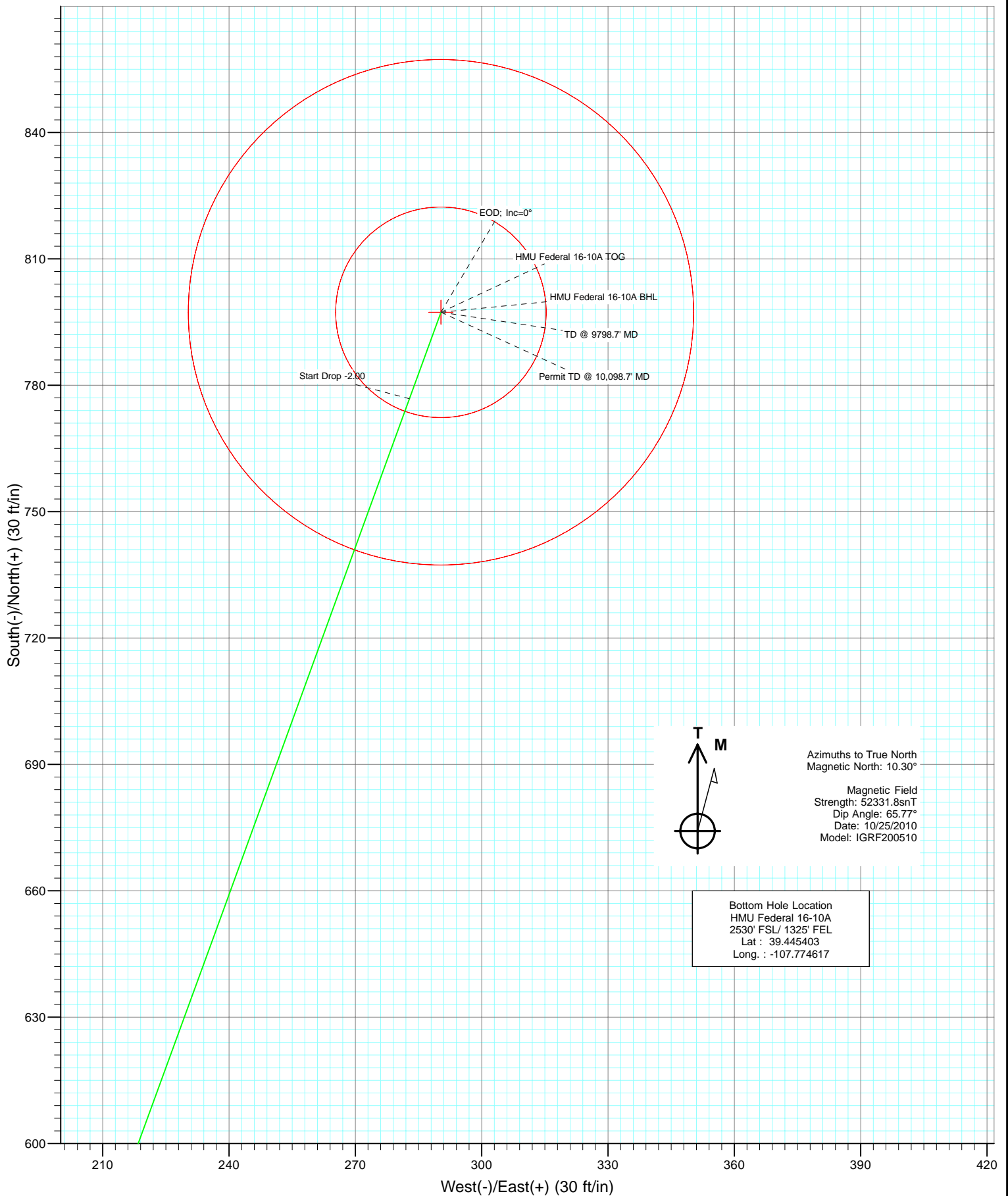


Project: Mamm Creek
Site: (J16W)
Well: HMU Federal 16-10A
Wellbore: DD
Design: Plan #1





Project: Mamm Creek
Site: (J16W)
Well: HMU Federal 16-10A
Wellbore: DD
Design: Plan #1



Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site:	(J16W)	North Reference:	True
Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	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 16-10A					
Well Position	+N/-S	0.0 ft	Northing:	1,594,372.23 ft	Latitude:	39.443214
	+E/-W	0.0 ft	Easting:	2,357,402.22 ft	Longitude:	-107.775645
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	10/25/2010	10.30	65.77	52,332

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	20.01	

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	
735.9	7.08	20.01	735.3	13.7	5.0	3.00	3.00	0.00	20.01	
7,328.9	7.08	20.01	7,278.1	776.8	282.8	0.00	0.00	0.00	0.00	
7,682.7	0.00	0.00	7,631.0	797.3	290.3	2.00	-2.00	0.00	180.00	HMU Federal 16-10A
9,798.7	0.00	0.00	9,747.0	797.3	290.3	0.00	0.00	0.00	0.00	HMU Federal 16-10A
10,098.7	0.00	0.00	10,047.0	797.3	290.3	0.00	0.00	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site:	(J16W)	North Reference:	True
Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	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	20.01	510.0	0.0	0.0	0.0	3.00	3.00	
540.0	1.20	20.01	540.0	0.4	0.1	0.4	3.00	3.00	
570.0	2.10	20.01	570.0	1.2	0.4	1.3	3.00	3.00	
600.0	3.00	20.01	600.0	2.5	0.9	2.6	3.00	3.00	
630.0	3.90	20.01	629.9	4.2	1.5	4.4	3.00	3.00	
660.0	4.80	20.01	659.8	6.3	2.3	6.7	3.00	3.00	
690.0	5.70	20.01	689.7	8.9	3.2	9.4	3.00	3.00	
720.0	6.60	20.01	719.5	11.9	4.3	12.7	3.00	3.00	
735.9	7.08	20.01	735.3	13.7	5.0	14.5	3.00	3.00	EOB; Inc=7.08°
750.0	7.08	20.01	749.3	15.3	5.6	16.3	0.00	0.00	
780.0	7.08	20.01	779.1	18.8	6.8	20.0	0.00	0.00	
810.0	7.08	20.01	808.8	22.2	8.1	23.7	0.00	0.00	
840.0	7.08	20.01	838.6	25.7	9.4	27.4	0.00	0.00	
870.0	7.08	20.01	868.4	29.2	10.6	31.1	0.00	0.00	
900.0	7.08	20.01	898.2	32.7	11.9	34.8	0.00	0.00	
930.0	7.08	20.01	927.9	36.1	13.2	38.5	0.00	0.00	
960.0	7.08	20.01	957.7	39.6	14.4	42.2	0.00	0.00	
990.0	7.08	20.01	987.5	43.1	15.7	45.9	0.00	0.00	
1,020.0	7.08	20.01	1,017.2	46.6	17.0	49.5	0.00	0.00	
1,050.0	7.08	20.01	1,047.0	50.0	18.2	53.2	0.00	0.00	
1,080.0	7.08	20.01	1,076.8	53.5	19.5	56.9	0.00	0.00	
1,110.0	7.08	20.01	1,106.6	57.0	20.7	60.6	0.00	0.00	
1,140.0	7.08	20.01	1,136.3	60.4	22.0	64.3	0.00	0.00	
1,170.0	7.08	20.01	1,166.1	63.9	23.3	68.0	0.00	0.00	
1,200.0	7.08	20.01	1,195.9	67.4	24.5	71.7	0.00	0.00	
1,230.0	7.08	20.01	1,225.6	70.9	25.8	75.4	0.00	0.00	
1,260.0	7.08	20.01	1,255.4	74.3	27.1	79.1	0.00	0.00	
1,290.0	7.08	20.01	1,285.2	77.8	28.3	82.8	0.00	0.00	
1,320.0	7.08	20.01	1,315.0	81.3	29.6	86.5	0.00	0.00	
1,350.0	7.08	20.01	1,344.7	84.8	30.9	90.2	0.00	0.00	
1,380.0	7.08	20.01	1,374.5	88.2	32.1	93.9	0.00	0.00	
1,410.0	7.08	20.01	1,404.3	91.7	33.4	97.6	0.00	0.00	
1,440.0	7.08	20.01	1,434.0	95.2	34.7	101.3	0.00	0.00	
1,470.0	7.08	20.01	1,463.8	98.6	35.9	105.0	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site:	(J16W)	North Reference:	True
Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	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
1,500.0	7.08	20.01	1,493.6	102.1	37.2	108.7	0.00	0.00	
1,514.8	7.08	20.01	1,508.3	103.8	37.8	110.5	0.00	0.00	Surface Casing
1,530.0	7.08	20.01	1,523.4	105.6	38.4	112.4	0.00	0.00	
1,560.0	7.08	20.01	1,553.1	109.1	39.7	116.1	0.00	0.00	
1,590.0	7.08	20.01	1,582.9	112.5	41.0	119.8	0.00	0.00	
1,620.0	7.08	20.01	1,612.7	116.0	42.2	123.5	0.00	0.00	
1,650.0	7.08	20.01	1,642.4	119.5	43.5	127.2	0.00	0.00	
1,680.0	7.08	20.01	1,672.2	123.0	44.8	130.8	0.00	0.00	
1,710.0	7.08	20.01	1,702.0	126.4	46.0	134.5	0.00	0.00	
1,740.0	7.08	20.01	1,731.8	129.9	47.3	138.2	0.00	0.00	
1,770.0	7.08	20.01	1,761.5	133.4	48.6	141.9	0.00	0.00	
1,800.0	7.08	20.01	1,791.3	136.8	49.8	145.6	0.00	0.00	
1,830.0	7.08	20.01	1,821.1	140.3	51.1	149.3	0.00	0.00	
1,860.0	7.08	20.01	1,850.8	143.8	52.4	153.0	0.00	0.00	
1,890.0	7.08	20.01	1,880.6	147.3	53.6	156.7	0.00	0.00	
1,920.0	7.08	20.01	1,910.4	150.7	54.9	160.4	0.00	0.00	
1,950.0	7.08	20.01	1,940.2	154.2	56.1	164.1	0.00	0.00	
1,980.0	7.08	20.01	1,969.9	157.7	57.4	167.8	0.00	0.00	
2,010.0	7.08	20.01	1,999.7	161.2	58.7	171.5	0.00	0.00	
2,040.0	7.08	20.01	2,029.5	164.6	59.9	175.2	0.00	0.00	
2,070.0	7.08	20.01	2,059.2	168.1	61.2	178.9	0.00	0.00	
2,100.0	7.08	20.01	2,089.0	171.6	62.5	182.6	0.00	0.00	
2,130.0	7.08	20.01	2,118.8	175.0	63.7	186.3	0.00	0.00	
2,160.0	7.08	20.01	2,148.6	178.5	65.0	190.0	0.00	0.00	
2,190.0	7.08	20.01	2,178.3	182.0	66.3	193.7	0.00	0.00	
2,220.0	7.08	20.01	2,208.1	185.5	67.5	197.4	0.00	0.00	
2,250.0	7.08	20.01	2,237.9	188.9	68.8	201.1	0.00	0.00	
2,280.0	7.08	20.01	2,267.6	192.4	70.1	204.8	0.00	0.00	
2,310.0	7.08	20.01	2,297.4	195.9	71.3	208.5	0.00	0.00	
2,340.0	7.08	20.01	2,327.2	199.3	72.6	212.2	0.00	0.00	
2,370.0	7.08	20.01	2,357.0	202.8	73.8	215.8	0.00	0.00	
2,400.0	7.08	20.01	2,386.7	206.3	75.1	219.5	0.00	0.00	
2,430.0	7.08	20.01	2,416.5	209.8	76.4	223.2	0.00	0.00	
2,460.0	7.08	20.01	2,446.3	213.2	77.6	226.9	0.00	0.00	
2,490.0	7.08	20.01	2,476.0	216.7	78.9	230.6	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 16-10A BH	0.00	0.00	9,747.0	797.3	290.3	1,595,162.03	2,357,712.41	39.445403	-107.774617
- plan misses target center by 7297.2ft at 2490.0ft MD (2476.0 TVD, 216.7 N, 78.9 E)									
- Circle (radius 60.0)									
HMU Federal 16-10A TC	0.00	0.00	7,631.0	797.3	290.3	1,595,162.03	2,357,712.41	39.445403	-107.774617
- plan misses target center by 5191.9ft at 2490.0ft MD (2476.0 TVD, 216.7 N, 78.9 E)									
- Circle (radius 25.0)									

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site:	(J16W)	North Reference:	True
Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	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	7.08	20.01	2,486.0	217.9	79.3	231.9	0.00	0.00	
2,600.0	7.08	20.01	2,585.2	229.4	83.5	244.2	0.00	0.00	
2,700.0	7.08	20.01	2,684.4	241.0	87.8	256.5	0.00	0.00	
2,800.0	7.08	20.01	2,783.7	252.6	92.0	268.8	0.00	0.00	
2,900.0	7.08	20.01	2,882.9	264.2	96.2	281.1	0.00	0.00	
3,000.0	7.08	20.01	2,982.2	275.7	100.4	293.5	0.00	0.00	
3,100.0	7.08	20.01	3,081.4	287.3	104.6	305.8	0.00	0.00	
3,200.0	7.08	20.01	3,180.6	298.9	108.8	318.1	0.00	0.00	
3,300.0	7.08	20.01	3,279.9	310.5	113.0	330.4	0.00	0.00	
3,400.0	7.08	20.01	3,379.1	322.0	117.3	342.7	0.00	0.00	
3,500.0	7.08	20.01	3,478.3	333.6	121.5	355.0	0.00	0.00	
3,600.0	7.08	20.01	3,577.6	345.2	125.7	367.4	0.00	0.00	
3,627.6	7.08	20.01	3,605.0	348.4	126.9	370.8	0.00	0.00	G Sand
3,700.0	7.08	20.01	3,676.8	356.8	129.9	379.7	0.00	0.00	
3,800.0	7.08	20.01	3,776.1	368.3	134.1	392.0	0.00	0.00	
3,900.0	7.08	20.01	3,875.3	379.9	138.3	404.3	0.00	0.00	
4,000.0	7.08	20.01	3,974.5	391.5	142.5	416.6	0.00	0.00	
4,100.0	7.08	20.01	4,073.8	403.1	146.8	429.0	0.00	0.00	
4,200.0	7.08	20.01	4,173.0	414.6	151.0	441.3	0.00	0.00	
4,300.0	7.08	20.01	4,272.3	426.2	155.2	453.6	0.00	0.00	
4,400.0	7.08	20.01	4,371.5	437.8	159.4	465.9	0.00	0.00	
4,500.0	7.08	20.01	4,470.7	449.4	163.6	478.2	0.00	0.00	
4,600.0	7.08	20.01	4,570.0	460.9	167.8	490.5	0.00	0.00	
4,700.0	7.08	20.01	4,669.2	472.5	172.0	502.9	0.00	0.00	
4,800.0	7.08	20.01	4,768.4	484.1	176.3	515.2	0.00	0.00	
4,900.0	7.08	20.01	4,867.7	495.7	180.5	527.5	0.00	0.00	
5,000.0	7.08	20.01	4,966.9	507.2	184.7	539.8	0.00	0.00	
5,100.0	7.08	20.01	5,066.2	518.8	188.9	552.1	0.00	0.00	
5,200.0	7.08	20.01	5,165.4	530.4	193.1	564.5	0.00	0.00	
5,300.0	7.08	20.01	5,264.6	542.0	197.3	576.8	0.00	0.00	
5,400.0	7.08	20.01	5,363.9	553.5	201.6	589.1	0.00	0.00	
5,500.0	7.08	20.01	5,463.1	565.1	205.8	601.4	0.00	0.00	
5,600.0	7.08	20.01	5,562.4	576.7	210.0	613.7	0.00	0.00	
5,693.4	7.08	20.01	5,655.0	587.5	213.9	625.2	0.00	0.00	Ohio Creek
5,700.0	7.08	20.01	5,661.6	588.3	214.2	626.1	0.00	0.00	
5,800.0	7.08	20.01	5,760.8	599.8	218.4	638.4	0.00	0.00	
5,900.0	7.08	20.01	5,860.1	611.4	222.6	650.7	0.00	0.00	
6,000.0	7.08	20.01	5,959.3	623.0	226.8	663.0	0.00	0.00	
6,100.0	7.08	20.01	6,058.5	634.6	231.1	675.3	0.00	0.00	
6,137.7	7.08	20.01	6,096.0	638.9	232.6	680.0	0.00	0.00	Mesa Verde
6,200.0	7.08	20.01	6,157.8	646.1	235.3	687.6	0.00	0.00	
6,300.0	7.08	20.01	6,257.0	657.7	239.5	700.0	0.00	0.00	
6,400.0	7.08	20.01	6,356.3	669.3	243.7	712.3	0.00	0.00	
6,500.0	7.08	20.01	6,455.5	680.9	247.9	724.6	0.00	0.00	
6,600.0	7.08	20.01	6,554.7	692.4	252.1	736.9	0.00	0.00	
6,653.7	7.08	20.01	6,608.0	698.7	254.4	743.5	0.00	0.00	Williams Fork
6,700.0	7.08	20.01	6,654.0	704.0	256.3	749.2	0.00	0.00	
6,800.0	7.08	20.01	6,753.2	715.6	260.6	761.6	0.00	0.00	
6,900.0	7.08	20.01	6,852.5	727.2	264.8	773.9	0.00	0.00	
7,000.0	7.08	20.01	6,951.7	738.7	269.0	786.2	0.00	0.00	
7,100.0	7.08	20.01	7,050.9	750.3	273.2	798.5	0.00	0.00	
7,200.0	7.08	20.01	7,150.2	761.9	277.4	810.8	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site:	(J16W)	North Reference:	True
Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	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
7,300.0	7.08	20.01	7,249.4	773.5	281.6	823.1	0.00	0.00	
7,328.9	7.08	20.01	7,278.1	776.8	282.8	826.7	0.00	0.00	Start Drop -2.00
7,400.0	5.65	20.01	7,348.7	784.2	285.5	834.6	2.00	-2.00	
7,500.0	3.65	20.01	7,448.4	791.8	288.3	842.7	2.00	-2.00	
7,600.0	1.65	20.01	7,548.3	796.2	289.9	847.3	2.00	-2.00	
7,682.7	0.00	0.00	7,631.0	797.3	290.3	848.5	2.00	-2.00	EOD; Inc=0° - Top of Gas - HMU Federal 16-10
7,700.0	0.00	0.00	7,648.3	797.3	290.3	848.5	0.00	0.00	
7,800.0	0.00	0.00	7,748.3	797.3	290.3	848.5	0.00	0.00	
7,900.0	0.00	0.00	7,848.3	797.3	290.3	848.5	0.00	0.00	
8,000.0	0.00	0.00	7,948.3	797.3	290.3	848.5	0.00	0.00	
8,100.0	0.00	0.00	8,048.3	797.3	290.3	848.5	0.00	0.00	
8,200.0	0.00	0.00	8,148.3	797.3	290.3	848.5	0.00	0.00	
8,300.0	0.00	0.00	8,248.3	797.3	290.3	848.5	0.00	0.00	
8,400.0	0.00	0.00	8,348.3	797.3	290.3	848.5	0.00	0.00	
8,500.0	0.00	0.00	8,448.3	797.3	290.3	848.5	0.00	0.00	
8,600.0	0.00	0.00	8,548.3	797.3	290.3	848.5	0.00	0.00	
8,700.0	0.00	0.00	8,648.3	797.3	290.3	848.5	0.00	0.00	
8,800.0	0.00	0.00	8,748.3	797.3	290.3	848.5	0.00	0.00	
8,898.7	0.00	0.00	8,847.0	797.3	290.3	848.5	0.00	0.00	Coal Ridge
8,900.0	0.00	0.00	8,848.3	797.3	290.3	848.5	0.00	0.00	
9,000.0	0.00	0.00	8,948.3	797.3	290.3	848.5	0.00	0.00	
9,100.0	0.00	0.00	9,048.3	797.3	290.3	848.5	0.00	0.00	
9,200.0	0.00	0.00	9,148.3	797.3	290.3	848.5	0.00	0.00	
9,300.0	0.00	0.00	9,248.3	797.3	290.3	848.5	0.00	0.00	
9,400.0	0.00	0.00	9,348.3	797.3	290.3	848.5	0.00	0.00	
9,500.0	0.00	0.00	9,448.3	797.3	290.3	848.5	0.00	0.00	
9,562.7	0.00	0.00	9,511.0	797.3	290.3	848.5	0.00	0.00	Base Cameo A Coal
9,600.0	0.00	0.00	9,548.3	797.3	290.3	848.5	0.00	0.00	
9,698.7	0.00	0.00	9,647.0	797.3	290.3	848.5	0.00	0.00	Rollins
9,700.0	0.00	0.00	9,648.3	797.3	290.3	848.5	0.00	0.00	
9,798.7	0.00	0.00	9,747.0	797.3	290.3	848.5	0.00	0.00	TD @ 9798.7' MD - HMU Federal 16-10A BHL
9,800.0	0.00	0.00	9,748.3	797.3	290.3	848.5	0.00	0.00	
9,900.0	0.00	0.00	9,848.3	797.3	290.3	848.5	0.00	0.00	
10,000.0	0.00	0.00	9,948.3	797.3	290.3	848.5	0.00	0.00	
10,098.7	0.00	0.00	10,047.0	797.3	290.3	848.5	0.00	0.00	Permit TD @ 10,098.7' MD

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 16-10A BH - plan hits target center - Circle (radius 60.0)	0.00	0.00	9,747.0	797.3	290.3	1,595,162.03	2,357,712.41	39.445403	-107.774617
HMU Federal 16-10A TC - plan hits target center - Circle (radius 25.0)	0.00	0.00	7,631.0	797.3	290.3	1,595,162.03	2,357,712.41	39.445403	-107.774617

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site:	(J16W)	North Reference:	True
Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,514.8	1,508.3	Surface Casing	5.500	6.000

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,627.6	3,605.0	G Sand			
5,693.4	5,655.0	Ohio Creek			
6,137.7	6,096.0	Mesa Verde			
6,653.7	6,608.0	Williams Fork			
7,682.7	7,631.0	Top of Gas			
8,898.7	8,847.0	Coal Ridge			
9,562.7	9,511.0	Base Cameo A Coal			
9,698.7	9,647.0	Rollins			

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
500.0	500.0	0.0	0.0	KOP @ 500' MD
735.9	735.3	13.7	5.0	EOB; Inc=7.08°
7,328.9	7,278.1	776.8	282.8	Start Drop -2.00
7,682.7	7,631.0	797.3	290.3	EOD; Inc=0°
9,798.7	9,747.0	797.3	290.3	TD @ 9798.7' MD
10,098.7	10,047.0	797.3	290.3	Permit TD @ 10,098.7' MD

EnCana Oil & Gas (USA) Inc

Mamm Creek

(J16W)

HMU Federal 16-10A

DD

Plan #1

Anticollision Report

01 November, 2010

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
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 1,291.2ft	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	10,098.7	Plan #1 (DD)	MWD	Geolink MWD

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (ft)	Measured Depth (ft)	Between Centres (ft)	Between Ellipses (ft)		
(J16W)						
Existing 16-11 - DD - DD	508.9	509.9	205.8	204.0	118.743	CC, ES
Existing 16-11 - DD - DD	4,300.0	4,143.2	1,126.9	1,106.4	54.853	SF
Existing 16-16 - DD - DD	0.0	0.0	224.5			
Existing 16-16 - DD - DD	2,400.0	2,323.9	604.8	594.2	56.894	SF
Existing 16-9 - DD - DD	1,170.5	1,196.2	184.0	179.5	40.882	CC
Existing 16-9 - DD - DD	1,300.0	1,325.7	184.5	179.3	35.680	ES
Existing 16-9 - DD - DD	9,800.0	9,855.0	867.6	820.8	18.546	SF
HMU Federal 16-11B - DD - Plan #1	200.0	200.0	11.5	10.9	18.550	CC, ES
HMU Federal 16-11B - DD - Plan #1	300.0	299.4	13.8	12.8	14.216	SF
HMU Federal 16-11D - DD - Plan #1	300.0	300.0	11.6	10.7	11.980	CC, ES
HMU Federal 16-11D - DD - Plan #1	400.0	399.4	14.1	12.7	10.642	SF
HMU Federal 16-14A - DD - Plan #1	200.0	200.0	26.9	26.3	43.265	CC, ES
HMU Federal 16-14A - DD - Plan #1	400.0	396.8	36.4	35.0	27.216	SF
HMU Federal 16-14D - DD - Plan #1	500.0	500.0	43.3	41.6	25.928	CC, ES
HMU Federal 16-14D - DD - Plan #1	600.0	600.0	45.9	43.9	22.758	SF
HMU Federal 16-14D2 - DD - Plan #1	500.0	500.0	60.2	58.5	36.073	CC, ES
HMU Federal 16-14D2 - DD - Plan #1	700.0	699.6	70.6	68.2	29.924	SF
HMU Federal 16-14D3 - DD - Plan #1	500.0	500.0	77.3	75.7	46.350	CC, ES
HMU Federal 16-14D3 - DD - Plan #1	600.0	596.0	82.4	80.3	40.990	SF
HMU Federal 16-16B - DD - Plan #1	200.0	200.0	51.2	50.6	82.440	CC, ES
HMU Federal 16-16B - DD - Plan #1	600.0	591.9	80.6	78.5	38.244	SF
HMU Federal 16-6C - DD - Plan #1	300.0	300.0	68.1	67.1	70.134	CC, ES
HMU Federal 16-6C - DD - Plan #1	600.0	589.7	88.8	86.7	43.568	SF
HMU Federal 16-6C2 - DD - Plan #1	200.0	200.0	85.3	84.6	137.222	CC, ES
HMU Federal 16-6C2 - DD - Plan #1	600.0	580.5	122.4	120.4	59.857	SF
HMU Federal 16-9C - DD - Plan #1	300.0	300.0	34.7	33.8	35.801	CC
HMU Federal 16-9C - DD - Plan #1	400.0	399.9	34.9	33.6	26.359	ES
HMU Federal 16-9C - DD - Plan #1	600.0	598.3	43.6	41.5	20.792	SF
HMU Federal 21-1B - DD - Plan #1	300.0	300.0	102.1	101.1	105.215	CC, ES
HMU Federal 21-1B - DD - Plan #1	600.0	584.6	124.1	122.0	61.532	SF
HMU Federal 21-3A - DD - Plan #1	200.0	200.0	94.1	93.4	151.374	CC, ES
HMU Federal 21-3A - DD - Plan #1	600.0	576.2	135.5	133.5	68.372	SF
HMU Fee 16-8D - DD - Plan #1	415.8	416.2	12.1	10.7	8.415	CC, ES, SF
NWNE S16-T7S-R93W (B16W Pad)						
HMU 16-7 - DD - DD	9,798.1	9,645.0	980.7	938.6	23.307	CC
HMU 16-7 - DD - DD	9,800.0	9,645.0	980.7	938.6	23.306	ES, SF

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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			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	-140.37	-159.9	-132.4	207.6					
100.0	100.0	99.9	99.9	0.1	0.2	-140.28	-159.7	-132.7	207.6	207.3	0.29	706.687		
200.0	200.0	199.8	199.8	0.3	0.3	-140.01	-159.1	-133.5	207.7	207.1	0.63	331.781		
300.0	300.0	300.9	300.9	0.5	0.5	-139.50	-157.8	-134.8	207.6	206.6	0.98	212.221		
400.0	400.0	402.7	402.6	0.7	0.7	-138.67	-155.2	-136.5	206.7	205.3	1.34	154.647		
500.0	500.0	501.2	501.1	0.8	0.9	-137.58	-151.9	-138.8	205.8	204.1	1.69	121.452		
508.9	508.9	509.9	509.7	0.8	0.9	-157.48	-151.6	-139.1	205.8	204.0	1.73	118.743	CC, ES	
600.0	600.0	599.1	598.8	1.0	1.1	-156.40	-148.3	-142.6	208.2	206.1	2.07	100.628		
700.0	699.6	696.0	695.5	1.2	1.3	-155.41	-144.8	-148.0	216.5	214.1	2.45	88.471		
800.0	798.9	792.6	791.8	1.4	1.5	-154.69	-141.3	-155.0	230.0	227.1	2.84	80.965		
900.0	898.2	888.2	886.9	1.7	1.7	-153.67	-137.1	-164.0	244.7	241.4	3.26	75.146		
1,000.0	997.4	980.7	978.6	1.9	2.0	-152.45	-133.2	-175.1	261.6	257.9	3.68	70.992		
1,100.0	1,096.6	1,072.7	1,069.4	2.2	2.2	-150.99	-129.4	-189.0	280.8	276.7	4.14	67.884		
1,200.0	1,195.9	1,165.1	1,160.2	2.5	2.6	-149.31	-125.2	-205.7	302.3	297.7	4.62	65.488		
1,300.0	1,295.1	1,259.1	1,252.1	2.7	2.9	-147.41	-119.9	-224.8	325.1	320.0	5.12	63.475		
1,400.0	1,394.3	1,352.5	1,343.1	3.0	3.3	-145.58	-114.3	-245.2	349.3	343.7	5.64	61.978		
1,500.0	1,493.6	1,446.3	1,434.3	3.3	3.7	-143.91	-108.8	-266.5	374.5	368.3	6.15	60.858		
1,600.0	1,592.8	1,542.6	1,527.7	3.5	4.1	-142.35	-103.0	-288.9	400.4	393.7	6.68	59.933		
1,700.0	1,692.1	1,641.0	1,623.3	3.8	4.6	-140.93	-96.8	-311.5	426.1	418.9	7.21	59.064		
1,800.0	1,791.3	1,738.7	1,718.2	4.1	5.0	-139.65	-90.1	-333.7	451.6	443.9	7.74	58.322		
1,900.0	1,890.5	1,839.2	1,816.0	4.3	5.4	-138.54	-83.4	-355.9	476.8	468.5	8.27	57.633		
2,000.0	1,989.8	1,934.1	1,908.4	4.6	5.8	-137.62	-77.1	-376.3	501.7	492.9	8.79	57.091		
2,100.0	2,089.0	2,035.4	2,007.1	4.9	6.3	-136.71	-70.1	-398.2	526.6	517.3	9.32	56.512		
2,200.0	2,188.2	2,128.1	2,097.4	5.2	6.7	-135.93	-63.5	-418.0	551.4	541.5	9.83	56.097		
2,300.0	2,287.5	2,216.0	2,182.8	5.4	7.1	-135.21	-57.2	-437.9	577.3	567.0	10.33	55.902		
2,400.0	2,386.7	2,312.5	2,276.4	5.7	7.5	-134.47	-50.6	-460.6	604.3	593.4	10.85	55.715		
2,500.0	2,486.0	2,402.2	2,363.4	6.0	8.0	-133.83	-44.5	-481.8	631.5	620.1	11.35	55.616		
2,600.0	2,585.2	2,498.1	2,456.0	6.3	8.4	-133.14	-37.6	-505.4	659.5	647.6	11.88	55.527		
2,700.0	2,684.4	2,597.4	2,552.1	6.5	8.9	-132.52	-30.6	-529.4	687.2	674.8	12.40	55.415		
2,800.0	2,783.7	2,692.4	2,644.2	6.8	9.3	-132.00	-24.2	-552.0	714.7	701.7	12.92	55.334		
2,900.0	2,882.9	2,782.6	2,731.4	7.1	9.8	-131.53	-18.1	-573.8	742.7	729.3	13.41	55.375		
3,000.0	2,982.2	2,882.3	2,827.9	7.4	10.3	-131.07	-11.7	-598.2	771.0	757.1	13.93	55.344		
3,100.0	3,081.4	2,983.6	2,926.2	7.6	10.7	-130.66	-5.4	-622.1	798.7	784.2	14.45	55.275		
3,200.0	3,180.6	3,073.4	3,013.3	7.9	11.1	-130.34	0.1	-643.2	826.4	811.4	14.94	55.307		
3,300.0	3,279.9	3,172.9	3,109.7	8.2	11.6	-129.98	6.5	-667.1	854.4	838.9	15.46	55.267		
3,400.0	3,379.1	3,276.8	3,210.5	8.5	12.1	-129.62	13.4	-691.3	881.7	865.7	15.99	55.146		
3,500.0	3,478.3	3,381.1	3,311.9	8.7	12.6	-129.30	20.6	-714.5	908.1	891.6	16.51	54.988		
3,600.0	3,577.6	3,469.0	3,397.3	9.0	13.0	-129.02	26.8	-734.6	934.9	917.9	17.01	54.973		
3,700.0	3,676.8	3,557.9	3,483.5	9.3	13.4	-128.74	33.1	-755.6	962.4	945.0	17.49	55.014		
3,800.0	3,776.1	3,652.8	3,575.4	9.6	13.8	-128.47	39.5	-778.1	990.2	972.2	18.00	55.026		
3,900.0	3,875.3	3,747.4	3,667.1	9.9	14.3	-128.23	45.6	-800.5	1,018.1	999.6	18.50	55.043		
4,000.0	3,974.5	3,850.9	3,767.5	10.1	14.8	-127.99	52.2	-824.8	1,045.8	1,026.8	19.02	54.992		
4,100.0	4,073.8	3,954.6	3,868.2	10.4	15.2	-127.77	59.1	-848.2	1,072.7	1,053.1	19.54	54.891		
4,200.0	4,173.0	4,041.0	3,952.2	10.7	15.6	-127.58	65.0	-868.1	1,099.8	1,079.7	20.02	54.928		
4,300.0	4,272.3	4,143.2	4,051.4	11.0	16.1	-127.36	72.1	-891.6	1,126.9	1,106.4	20.54	54.853	SF	
4,400.0	4,371.5	4,230.0	4,135.5	11.2	16.5	-127.18	78.0	-912.0	1,154.5	1,133.5	21.02	54.915		
4,500.0	4,470.7	4,326.3	4,228.9	11.5	17.0	-127.00	84.3	-934.8	1,182.5	1,161.0	21.53	54.935		
4,600.0	4,570.0	4,428.8	4,328.3	11.8	17.4	-126.82	91.0	-958.6	1,210.0	1,187.9	22.04	54.889		
4,700.0	4,669.2	4,517.3	4,414.2	12.1	17.9	-126.67	96.8	-979.2	1,237.6	1,215.0	22.53	54.934		
4,800.0	4,768.4	4,609.0	4,503.0	12.3	18.3	-126.49	103.3	-1,001.3	1,265.7	1,242.7	23.03	54.959		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		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	-143.36	-180.1	-134.0	224.5					
100.0	100.0	97.8	97.8	0.1	0.2	-143.35	-180.5	-134.3	225.0	224.7	0.29	776.496		
200.0	200.0	195.6	195.6	0.3	0.3	-143.32	-181.6	-135.2	226.4	225.8	0.62	366.480		
300.0	300.0	295.9	295.8	0.5	0.5	-143.32	-183.1	-136.4	228.4	227.4	0.96	236.840		
400.0	400.0	395.4	395.4	0.7	0.7	-143.47	-185.0	-137.0	230.2	228.9	1.31	175.475		
500.0	500.0	494.1	494.0	0.8	0.8	-144.00	-188.1	-136.6	232.5	230.9	1.66	140.204		
600.0	600.0	595.1	594.9	1.0	1.0	-165.06	-192.3	-135.0	237.5	235.5	2.02	117.688		
700.0	699.6	695.5	695.1	1.2	1.2	-166.66	-196.7	-131.9	247.1	244.7	2.38	104.005		
800.0	798.9	795.1	794.5	1.4	1.4	-168.73	-201.8	-127.1	260.5	257.8	2.75	94.879		
900.0	898.2	895.2	894.1	1.7	1.6	-171.22	-207.8	-119.7	274.1	271.0	3.14	87.329		
1,000.0	997.4	993.0	991.2	1.9	1.9	-174.09	-215.1	-109.6	288.3	284.7	3.55	81.130		
1,100.0	1,096.6	1,090.1	1,086.8	2.2	2.2	-177.46	-224.1	-95.7	303.2	299.2	4.01	75.593		
1,200.0	1,195.9	1,185.9	1,180.5	2.5	2.5	178.81	-234.6	-78.5	319.4	314.9	4.50	70.957		
1,300.0	1,295.1	1,280.4	1,272.5	2.7	2.9	175.23	-245.7	-60.2	337.4	332.4	5.01	67.400		
1,400.0	1,394.3	1,374.0	1,363.4	3.0	3.3	171.89	-257.6	-41.3	357.3	351.8	5.52	64.733		
1,500.0	1,493.6	1,468.9	1,455.4	3.3	3.7	168.78	-270.0	-21.8	378.7	372.7	6.04	62.688		
1,600.0	1,592.8	1,563.8	1,547.3	3.5	4.1	165.92	-282.7	-1.8	401.3	394.7	6.57	61.046		
1,700.0	1,692.1	1,659.8	1,640.1	3.8	4.6	163.23	-295.5	19.1	424.8	417.7	7.11	59.786		
1,800.0	1,791.3	1,755.4	1,732.7	4.1	5.0	160.89	-308.2	39.4	449.0	441.4	7.63	58.853		
1,900.0	1,890.5	1,852.1	1,826.5	4.3	5.5	158.82	-320.9	59.6	473.7	465.6	8.15	58.125		
2,000.0	1,989.8	1,950.0	1,921.4	4.6	5.9	156.98	-333.5	79.6	498.6	489.9	8.67	57.523		
2,100.0	2,089.0	2,041.3	2,010.0	4.9	6.3	155.43	-345.3	98.1	524.1	514.9	9.16	57.204		
2,200.0	2,188.2	2,139.6	2,105.5	5.2	6.7	153.97	-358.4	117.7	550.2	540.5	9.67	56.918		
2,300.0	2,287.5	2,225.8	2,189.2	5.4	7.1	152.84	-370.3	134.5	577.0	566.8	10.13	56.946		
2,400.0	2,386.7	2,323.9	2,284.3	5.7	7.6	151.66	-384.6	153.7	604.8	594.2	10.63	56.894 SF		
2,500.0	2,486.0	2,415.9	2,373.6	6.0	8.0	150.68	-397.9	171.4	632.7	621.6	11.10	56.980		
2,600.0	2,585.2	2,503.3	2,458.3	6.3	8.4	149.84	-411.3	188.2	661.6	650.0	11.56	57.212		
2,700.0	2,684.4	2,599.0	2,551.0	6.5	8.9	149.00	-426.8	206.5	691.3	679.3	12.04	57.426		
2,800.0	2,783.7	2,696.9	2,645.9	6.8	9.3	148.26	-442.3	224.7	720.8	708.3	12.52	57.587		
2,900.0	2,882.9	2,794.5	2,740.7	7.1	9.8	147.59	-457.5	242.7	750.0	737.0	12.99	57.735		
3,000.0	2,982.2	2,884.0	2,827.4	7.4	10.2	147.00	-471.5	259.5	779.5	766.0	13.46	57.929		
3,100.0	3,081.4	2,979.8	2,920.1	7.6	10.6	146.34	-486.7	278.4	809.5	795.6	13.93	58.098		
3,200.0	3,180.6	3,071.2	3,008.4	7.9	11.1	145.74	-501.1	296.7	839.6	825.2	14.42	58.246		
3,300.0	3,279.9	3,166.3	3,100.2	8.2	11.6	145.07	-516.2	317.1	870.2	855.3	14.90	58.383		
3,400.0	3,379.1	3,263.7	3,194.1	8.5	12.1	144.44	-531.3	337.7	900.6	885.2	15.40	58.492		
3,500.0	3,478.3	3,366.0	3,292.8	8.7	12.6	143.82	-546.8	359.3	930.6	914.7	15.91	58.495		
3,600.0	3,577.6	3,465.8	3,389.3	9.0	13.0	143.21	-561.0	380.8	960.1	943.7	16.42	58.482		
3,700.0	3,676.8	3,565.8	3,486.0	9.3	13.5	142.64	-574.8	402.3	989.2	972.2	16.92	58.451		
3,800.0	3,776.1	3,669.1	3,586.0	9.6	14.0	142.08	-588.4	424.3	1,017.7	1,000.3	17.44	58.371		
3,900.0	3,875.3	3,770.0	3,683.9	9.9	14.5	141.58	-601.1	445.5	1,045.6	1,027.7	17.94	58.282		
4,000.0	3,974.5	3,853.0	3,764.3	10.1	14.9	141.20	-611.8	462.7	1,073.9	1,055.5	18.39	58.398		
4,100.0	4,073.8	3,937.4	3,846.1	10.4	15.3	140.85	-623.8	480.1	1,103.4	1,084.5	18.84	58.571		
4,200.0	4,173.0	4,033.1	3,938.6	10.7	15.7	140.51	-638.0	499.5	1,133.4	1,114.1	19.31	58.684		
4,300.0	4,272.3	4,127.8	4,030.3	11.0	16.2	140.18	-652.1	518.7	1,163.4	1,143.6	19.79	58.789		
4,400.0	4,371.5	4,225.3	4,124.7	11.2	16.6	139.87	-666.6	538.4	1,193.4	1,173.1	20.27	58.879		
4,500.0	4,470.7	4,321.3	4,217.7	11.5	17.1	139.59	-680.8	557.6	1,223.3	1,202.5	20.74	58.975		
4,600.0	4,570.0	4,423.3	4,316.6	11.8	17.6	139.32	-695.6	577.6	1,252.9	1,231.7	21.23	59.017		
4,700.0	4,669.2	4,520.8	4,411.2	12.1	18.0	139.07	-709.6	596.5	1,282.2	1,260.5	21.70	59.077		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		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	-137.04	-139.7	-130.1	190.9					
100.0	100.0	100.4	100.4	0.1	0.2	-136.99	-139.5	-130.1	190.8	190.5	0.29	653.959		
200.0	200.0	200.7	200.7	0.3	0.3	-136.86	-139.0	-130.2	190.5	189.8	0.62	305.804		
300.0	300.0	301.1	301.1	0.5	0.5	-136.87	-138.7	-130.0	190.1	189.1	0.97	195.449		
400.0	400.0	403.1	403.1	0.7	0.7	-137.44	-139.2	-127.8	189.0	187.6	1.33	142.289		
500.0	500.0	506.0	505.9	0.8	0.9	-138.53	-139.8	-123.6	186.7	185.0	1.69	110.323		
600.0	600.0	610.6	610.3	1.0	1.1	-160.37	-139.5	-116.9	184.8	182.7	2.06	89.774		
624.5	624.4	636.2	635.8	1.1	1.1	-160.92	-139.2	-114.9	184.7	182.6	2.15	85.896		
700.0	699.6	716.0	715.3	1.2	1.3	-162.97	-137.5	-107.8	185.3	182.9	2.44	75.979		
800.0	798.9	821.1	819.5	1.4	1.6	-166.38	-133.6	-95.5	187.1	184.2	2.84	65.873		
900.0	898.2	925.2	922.4	1.7	1.9	-170.00	-127.8	-81.1	187.1	183.8	3.26	57.421		
1,000.0	997.4	1,027.0	1,022.8	1.9	2.2	-173.73	-120.8	-65.6	185.9	182.2	3.70	50.254		
1,100.0	1,096.6	1,127.4	1,121.5	2.2	2.5	-177.74	-113.3	-49.0	184.5	180.3	4.17	44.263		
1,170.5	1,166.6	1,196.2	1,189.3	2.4	2.8	179.53	-108.1	-37.8	184.0	179.5	4.50	40.882 CC		
1,200.0	1,195.9	1,225.5	1,218.1	2.5	2.9	178.40	-106.0	-33.1	184.1	179.4	4.65	39.606		
1,300.0	1,295.1	1,325.7	1,316.7	2.7	3.2	174.34	-98.6	-16.5	184.5	179.3	5.17	35.680 ES		
1,400.0	1,394.3	1,426.5	1,415.7	3.0	3.6	170.24	-90.4	0.5	185.1	179.4	5.73	32.322		
1,500.0	1,493.6	1,526.2	1,513.4	3.3	4.0	166.08	-81.7	17.8	185.9	179.6	6.32	29.424		
1,600.0	1,592.8	1,625.0	1,610.3	3.5	4.3	161.84	-73.2	35.6	187.8	180.9	6.94	27.059		
1,700.0	1,692.1	1,723.5	1,706.9	3.8	4.7	157.90	-64.8	52.7	190.8	183.2	7.57	25.198		
1,800.0	1,791.3	1,821.7	1,803.4	4.1	5.1	154.31	-56.9	69.2	195.1	186.9	8.21	23.776		
1,900.0	1,890.5	1,919.0	1,899.0	4.3	5.4	150.95	-49.7	85.4	200.8	191.9	8.85	22.687		
2,000.0	1,989.8	2,016.9	1,995.3	4.6	5.8	147.66	-43.3	102.3	208.1	198.6	9.51	21.881		
2,100.0	2,089.0	2,115.9	2,092.5	4.9	6.1	144.47	-36.9	119.8	216.2	206.0	10.19	21.223		
2,200.0	2,188.2	2,215.0	2,189.8	5.2	6.5	141.39	-30.3	137.7	224.9	214.1	10.87	20.701		
2,300.0	2,287.5	2,313.4	2,286.4	5.4	6.9	138.67	-23.8	155.2	234.2	222.7	11.53	20.323		
2,400.0	2,386.7	2,411.2	2,382.3	5.7	7.3	136.14	-17.8	172.7	244.5	232.3	12.19	20.057		
2,500.0	2,486.0	2,510.8	2,480.1	6.0	7.6	133.67	-11.6	191.2	255.3	242.5	12.85	19.864		
2,600.0	2,585.2	2,608.2	2,575.5	6.3	8.0	131.35	-5.3	209.5	266.6	253.0	13.52	19.720		
2,700.0	2,684.4	2,706.9	2,672.1	6.5	8.4	129.08	1.1	228.8	278.6	264.5	14.18	19.655		
2,800.0	2,783.7	2,805.5	2,768.6	6.8	8.8	126.92	7.6	248.4	291.1	276.2	14.85	19.605		
2,900.0	2,882.9	2,905.3	2,865.9	7.1	9.2	124.78	14.8	268.7	303.7	288.2	15.51	19.586		
3,000.0	2,982.2	3,004.9	2,963.3	7.4	9.6	122.91	22.0	288.4	316.4	300.3	16.15	19.592		
3,100.0	3,081.4	3,104.4	3,060.7	7.6	10.0	121.24	29.1	307.6	329.1	312.3	16.78	19.615		
3,200.0	3,180.6	3,203.6	3,157.9	7.9	10.4	119.76	36.2	326.4	341.9	324.5	17.39	19.655		
3,300.0	3,279.9	3,303.2	3,255.5	8.2	10.8	118.45	43.1	344.8	354.7	336.7	18.00	19.707		
3,400.0	3,379.1	3,401.7	3,352.1	8.5	11.2	117.34	49.7	362.5	367.5	348.9	18.59	19.766		
3,500.0	3,478.3	3,497.0	3,445.5	8.7	11.6	116.24	55.9	380.6	381.2	362.1	19.18	19.873		
3,600.0	3,577.6	3,597.5	3,544.0	9.0	12.0	115.16	62.5	399.7	395.2	375.4	19.78	19.979		
3,700.0	3,676.8	3,696.4	3,641.0	9.3	12.3	114.28	68.6	417.9	409.0	388.6	20.36	20.085		
3,800.0	3,776.1	3,794.6	3,737.2	9.6	12.7	113.40	74.9	436.2	423.0	402.0	20.95	20.192		
3,900.0	3,875.3	3,893.9	3,834.5	9.9	13.1	112.48	81.6	455.3	437.1	415.6	21.54	20.294		
4,000.0	3,974.5	3,994.9	3,933.4	10.1	13.5	111.61	88.7	474.4	451.1	429.0	22.13	20.388		
4,100.0	4,073.8	4,094.4	4,031.1	10.4	13.9	110.89	95.5	492.4	464.6	441.9	22.70	20.469		
4,200.0	4,173.0	4,193.1	4,127.9	10.7	14.3	110.28	101.8	510.1	478.4	455.2	23.27	20.557		
4,300.0	4,272.3	4,293.3	4,226.2	11.0	14.7	109.61	108.8	528.4	492.1	468.2	23.85	20.631		
4,400.0	4,371.5	4,392.5	4,323.5	11.2	15.0	109.02	115.6	546.1	505.6	481.2	24.42	20.705		
4,500.0	4,470.7	4,492.4	4,421.6	11.5	15.4	108.49	122.2	563.7	519.2	494.2	24.99	20.778		
4,600.0	4,570.0	4,588.2	4,515.8	11.8	15.8	108.03	128.4	580.6	532.8	507.2	25.55	20.855		
4,700.0	4,669.2	4,685.6	4,611.3	12.1	16.2	107.53	134.7	598.5	547.1	521.0	26.11	20.953		
4,800.0	4,768.4	4,783.6	4,707.5	12.3	16.5	107.08	140.8	616.4	561.5	534.8	26.67	21.056		
4,900.0	4,867.7	4,882.8	4,804.8	12.6	16.9	106.66	146.8	634.5	576.1	548.8	27.23	21.152		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		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		
5,000.0	4,966.9	4,981.3	4,901.4	12.9	17.3	106.22	153.1	652.8	590.6	562.8	27.80	21.246	
5,100.0	5,066.2	5,082.6	5,000.8	13.2	17.7	105.78	159.8	671.6	605.1	576.7	28.37	21.328	
5,200.0	5,165.4	5,181.2	5,097.4	13.4	18.1	105.39	166.2	689.4	619.3	590.4	28.93	21.409	
5,300.0	5,264.6	5,280.2	5,194.6	13.7	18.4	105.06	172.3	707.2	633.7	604.2	29.49	21.490	
5,400.0	5,363.9	5,378.5	5,291.2	14.0	18.8	104.76	178.2	724.8	648.0	618.0	30.04	21.572	
5,500.0	5,463.1	5,475.8	5,386.7	14.3	19.2	104.47	184.0	742.3	662.6	632.0	30.60	21.655	
5,600.0	5,562.4	5,571.1	5,480.2	14.6	19.6	104.14	190.0	760.2	677.6	646.4	31.15	21.748	
5,700.0	5,661.6	5,668.1	5,575.1	14.8	20.0	103.76	196.5	779.2	693.0	661.2	31.72	21.847	
5,800.0	5,760.8	5,773.5	5,678.1	15.1	20.4	103.27	204.8	800.0	707.9	675.6	32.31	21.907	
5,900.0	5,860.1	5,873.2	5,775.4	15.4	20.8	102.80	213.1	819.4	722.5	689.6	32.88	21.973	
6,000.0	5,959.3	5,975.1	5,875.2	15.7	21.2	102.41	221.0	838.6	736.9	703.4	33.45	22.031	
6,100.0	6,058.5	6,076.4	5,974.6	15.9	21.6	102.14	228.1	856.6	750.8	716.8	34.00	22.078	
6,200.0	6,157.8	6,173.0	6,069.6	16.2	21.9	101.94	234.1	873.5	764.7	730.2	34.55	22.133	
6,300.0	6,257.0	6,270.6	6,165.5	16.5	22.3	101.74	240.2	890.8	779.1	744.0	35.10	22.193	
6,400.0	6,356.3	6,372.4	6,265.4	16.8	22.7	101.53	246.7	908.9	793.3	757.6	35.67	22.242	
6,500.0	6,455.5	6,483.3	6,374.6	17.0	23.1	101.37	253.6	927.4	806.7	770.5	36.24	22.260	
6,600.0	6,554.7	6,596.7	6,486.6	17.3	23.4	101.32	260.4	943.8	818.4	781.5	36.82	22.225	
6,700.0	6,654.0	6,704.0	6,592.9	17.6	23.7	101.38	266.3	957.3	828.7	791.3	37.37	22.174	
6,800.0	6,753.2	6,814.2	6,702.3	17.9	24.0	101.60	271.0	969.0	837.9	800.0	37.92	22.100	
6,900.0	6,852.5	6,927.7	6,815.4	18.2	24.2	101.98	274.7	978.3	845.7	807.2	38.46	21.990	
7,000.0	6,951.7	7,039.2	6,926.6	18.4	24.4	102.51	277.3	984.8	852.0	813.0	38.98	21.856	
7,100.0	7,050.9	7,155.6	7,043.0	18.7	24.6	103.24	278.5	988.4	856.8	817.3	39.50	21.693	
7,200.0	7,150.2	7,258.2	7,145.5	19.0	24.7	104.03	278.6	989.1	860.3	820.3	39.99	21.515	
7,300.0	7,249.4	7,358.8	7,246.2	19.3	24.8	104.78	278.9	989.9	863.9	823.4	40.47	21.349	
7,400.0	7,348.7	7,460.4	7,347.8	19.5	24.9	105.51	279.5	990.6	867.1	826.2	40.93	21.185	
7,500.0	7,448.4	7,560.6	7,447.9	19.7	25.0	106.01	280.2	991.3	869.4	828.1	41.32	21.042	
7,600.0	7,548.3	7,661.7	7,549.1	19.9	25.1	106.25	281.2	991.9	870.7	829.1	41.63	20.914	
7,700.0	7,648.3	7,763.1	7,650.4	20.0	25.2	126.26	282.3	992.5	870.9	829.0	41.88	20.795	
7,800.0	7,748.3	7,862.6	7,750.0	20.1	25.3	126.16	283.6	993.2	870.6	828.5	42.11	20.672	
7,837.4	7,785.7	7,898.4	7,785.7	20.1	25.3	126.13	284.1	993.5	870.5	828.4	42.20	20.630	
7,900.0	7,848.3	7,959.2	7,846.5	20.2	25.4	126.09	284.5	993.9	870.6	828.3	42.34	20.563	
8,000.0	7,948.3	8,059.5	7,946.8	20.3	25.5	126.05	284.8	994.4	870.8	828.3	42.57	20.455	
8,100.0	8,048.3	8,159.7	8,047.0	20.5	25.6	126.02	285.1	994.8	871.0	828.2	42.81	20.347	
8,200.0	8,148.3	8,260.9	8,148.2	20.6	25.7	125.99	285.4	995.2	871.1	828.1	43.04	20.239	
8,300.0	8,248.3	8,361.0	8,248.3	20.7	25.8	126.00	285.4	995.0	871.0	827.7	43.27	20.129	
8,300.8	8,249.1	8,361.8	8,249.1	20.7	25.8	126.00	285.4	995.0	871.0	827.7	43.27	20.129	
8,400.0	8,348.3	8,458.5	8,345.8	20.8	25.9	126.04	284.8	994.8	871.2	827.7	43.50	20.028	
8,500.0	8,448.3	8,558.3	8,445.6	20.9	26.0	126.08	284.1	994.6	871.5	827.8	43.73	19.929	
8,600.0	8,548.3	8,659.9	8,547.3	21.1	26.1	126.14	283.2	994.3	871.7	827.8	43.96	19.828	
8,700.0	8,648.3	8,761.7	8,649.0	21.2	26.2	126.20	282.4	993.7	871.7	827.5	44.20	19.722	
8,797.1	8,745.4	8,858.1	8,745.4	21.3	26.3	126.26	281.8	993.2	871.7	827.2	44.43	19.619	
8,800.0	8,748.3	8,860.9	8,748.2	21.3	26.3	126.26	281.7	993.1	871.7	827.2	44.44	19.616	
8,900.0	8,848.3	8,959.3	8,846.6	21.4	26.3	126.33	280.8	992.6	871.8	827.1	44.67	19.516	
9,000.0	8,948.3	9,057.1	8,944.4	21.6	26.4	126.41	279.7	992.1	872.1	827.2	44.90	19.421	
9,100.0	9,048.3	9,155.0	9,042.3	21.7	26.5	126.50	278.3	991.8	872.6	827.5	45.14	19.333	
9,200.0	9,148.3	9,255.1	9,142.3	21.8	26.6	126.60	276.7	991.5	873.3	828.0	45.37	19.248	
9,300.0	9,248.3	9,359.4	9,246.6	22.0	26.7	126.73	274.8	990.7	873.8	828.2	45.61	19.157	
9,400.0	9,348.3	9,468.5	9,355.7	22.1	26.8	126.87	273.2	989.1	873.5	827.6	45.86	19.046	
9,500.0	9,448.3	9,573.8	9,461.0	22.2	26.9	127.03	272.1	986.6	872.3	826.2	46.10	18.922	
9,600.0	9,548.3	9,676.7	9,563.9	22.3	26.9	127.24	270.6	983.3	870.6	824.3	46.33	18.791	
9,700.0	9,648.3	9,775.5	9,662.6	22.5	27.0	127.45	269.0	980.0	868.9	822.3	46.56	18.660	
9,793.7	9,742.0	9,855.0	9,742.0	22.6	27.0	127.63	267.7	977.4	867.5	820.8	46.77	18.549	

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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						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		
9,800.0	9,748.3	9,855.0	9,742.0	22.6	27.0	127.63	267.7	977.4	867.6	820.8	46.78	18.546 SF		
9,900.0	9,848.3	9,855.0	9,742.0	22.7	27.0	127.63	267.7	977.4	874.0	827.1	46.91	18.631		
10,000.0	9,948.3	9,855.0	9,742.0	22.9	27.0	127.63	267.7	977.4	891.7	844.7	47.05	18.953		
10,098.7	10,047.0	9,855.0	9,742.0	23.0	27.0	127.63	267.7	977.4	919.6	872.4	47.18	19.490		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design (J16W) - HMU Federal 16-11B - DD - Plan #1													Offset Site Error:	0.0 ft
Survey Program: O-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	-37.78	9.1	-7.1	11.5					
100.0	100.0	100.0	100.0	0.1	0.1	-37.78	9.1	-7.1	11.5	11.3	0.27	42.332		
200.0	200.0	200.0	200.0	0.3	0.3	-37.78	9.1	-7.1	11.5	10.9	0.62	18.550 CC, ES		
300.0	300.0	299.4	299.4	0.5	0.5	-43.64	10.0	-9.5	13.8	12.8	0.97	14.216 SF		
400.0	400.0	398.3	397.9	0.7	0.7	-53.30	12.5	-16.8	21.0	19.7	1.32	15.963		
500.0	500.0	496.1	494.9	0.8	1.0	-59.85	16.7	-28.7	33.6	31.9	1.67	20.143		
600.0	600.0	592.3	589.6	1.0	1.3	-85.95	22.3	-45.0	51.1	49.0	2.01	25.386		
700.0	699.6	687.8	682.6	1.2	1.7	-92.67	29.4	-65.2	73.5	71.1	2.38	30.915		
800.0	798.9	784.3	776.5	1.4	2.1	-98.81	36.8	-86.3	97.9	95.1	2.79	35.095		
900.0	898.2	880.8	870.4	1.7	2.6	-102.81	44.2	-107.4	123.0	119.8	3.23	38.061		
1,000.0	997.4	977.3	964.3	1.9	3.0	-105.44	51.5	-128.5	148.6	144.9	3.69	40.214		
1,100.0	1,096.6	1,073.8	1,058.1	2.2	3.4	-107.30	58.9	-149.7	174.3	170.1	4.17	41.827		
1,200.0	1,195.9	1,170.3	1,152.0	2.5	3.8	-108.69	66.3	-170.8	200.2	195.5	4.65	43.072		
1,300.0	1,295.1	1,266.8	1,245.9	2.7	4.3	-109.75	73.7	-191.9	226.1	221.0	5.13	44.058		
1,400.0	1,394.3	1,363.3	1,339.7	3.0	4.7	-110.60	81.0	-213.0	252.2	246.5	5.62	44.856		
1,500.0	1,493.6	1,459.8	1,433.6	3.3	5.1	-111.29	88.4	-234.1	278.2	272.1	6.11	45.514		
1,600.0	1,592.8	1,556.3	1,527.5	3.5	5.6	-111.86	95.8	-255.3	304.3	297.7	6.61	46.065		
1,700.0	1,692.1	1,652.8	1,621.3	3.8	6.0	-112.34	103.2	-276.4	330.4	323.3	7.10	46.532		
1,800.0	1,791.3	1,749.3	1,715.2	4.1	6.4	-112.75	110.5	-297.5	356.5	348.9	7.60	46.934		
1,900.0	1,890.5	1,845.8	1,809.1	4.3	6.9	-113.10	117.9	-318.6	382.7	374.6	8.09	47.283		
2,000.0	1,989.8	1,942.3	1,902.9	4.6	7.3	-113.41	125.3	-339.8	408.8	400.3	8.59	47.588		
2,100.0	2,089.0	2,038.8	1,996.8	4.9	7.7	-113.68	132.7	-360.9	435.0	425.9	9.09	47.858		
2,200.0	2,188.2	2,135.3	2,090.7	5.2	8.2	-113.93	140.0	-382.0	461.2	451.6	9.59	48.098		
2,300.0	2,287.5	2,231.8	2,184.5	5.4	8.6	-114.14	147.4	-403.1	487.4	477.3	10.09	48.312		
2,400.0	2,386.7	2,328.3	2,278.4	5.7	9.0	-114.33	154.8	-424.2	513.6	503.0	10.59	48.505		
2,500.0	2,486.0	2,424.8	2,372.3	6.0	9.5	-114.51	162.2	-445.4	539.8	528.7	11.09	48.680		
2,600.0	2,585.2	2,521.3	2,466.1	6.3	9.9	-114.67	169.5	-466.5	566.0	554.4	11.59	48.838		
2,700.0	2,684.4	2,617.8	2,560.0	6.5	10.3	-114.81	176.9	-487.6	592.2	580.1	12.09	48.983		
2,800.0	2,783.7	2,714.3	2,653.9	6.8	10.8	-114.94	184.3	-508.7	618.4	605.8	12.59	49.116		
2,900.0	2,882.9	2,810.8	2,747.7	7.1	11.2	-115.06	191.7	-529.9	644.6	631.5	13.09	49.238		
3,000.0	2,982.2	2,907.3	2,841.6	7.4	11.6	-115.18	199.1	-551.0	670.8	657.2	13.59	49.350		
3,100.0	3,081.4	3,003.8	2,935.5	7.6	12.1	-115.28	206.4	-572.1	697.0	682.9	14.09	49.454		
3,200.0	3,180.6	3,100.3	3,029.3	7.9	12.5	-115.37	213.8	-593.2	723.2	708.6	14.59	49.551		
3,300.0	3,279.9	3,196.8	3,123.2	8.2	12.9	-115.46	221.2	-614.3	749.4	734.3	15.10	49.641		
3,400.0	3,379.1	3,293.3	3,217.1	8.5	13.4	-115.55	228.6	-635.5	775.6	760.0	15.60	49.725		
3,500.0	3,478.3	3,389.7	3,310.9	8.7	13.8	-115.62	235.9	-656.6	801.8	785.7	16.10	49.803		
3,600.0	3,577.6	3,486.2	3,404.8	9.0	14.2	-115.70	243.3	-677.7	828.1	811.5	16.60	49.877		
3,700.0	3,676.8	3,582.7	3,498.7	9.3	14.7	-115.77	250.7	-698.8	854.3	837.2	17.10	49.946		
3,800.0	3,776.1	3,679.2	3,592.5	9.6	15.1	-115.83	258.1	-720.0	880.5	862.9	17.61	50.011		
3,900.0	3,875.3	3,775.7	3,686.4	9.9	15.5	-115.89	265.4	-741.1	906.7	888.6	18.11	50.072		
4,000.0	3,974.5	3,872.2	3,780.3	10.1	16.0	-115.95	272.8	-762.2	933.0	914.3	18.61	50.130		
4,100.0	4,073.8	3,968.7	3,874.1	10.4	16.4	-116.00	280.2	-783.3	959.2	940.1	19.11	50.184		
4,200.0	4,173.0	4,065.2	3,968.0	10.7	16.8	-116.05	287.6	-804.5	985.4	965.8	19.62	50.236		
4,300.0	4,272.3	4,161.7	4,061.9	11.0	17.3	-116.10	294.9	-825.6	1,011.6	991.5	20.12	50.285		
4,400.0	4,371.5	4,258.2	4,155.7	11.2	17.7	-116.15	302.3	-846.7	1,037.9	1,017.2	20.62	50.331		
4,500.0	4,470.7	4,354.7	4,249.6	11.5	18.1	-116.19	309.7	-867.8	1,064.1	1,043.0	21.12	50.376		
4,600.0	4,570.0	4,451.2	4,343.5	11.8	18.6	-116.23	317.1	-888.9	1,090.3	1,068.7	21.63	50.418		
4,700.0	4,669.2	4,547.7	4,437.3	12.1	19.0	-116.27	324.5	-910.1	1,116.5	1,094.4	22.13	50.458		
4,800.0	4,768.4	4,644.2	4,531.2	12.3	19.4	-116.31	331.8	-931.2	1,142.8	1,120.1	22.63	50.496		
4,900.0	4,867.7	4,740.7	4,625.1	12.6	19.9	-116.35	339.2	-952.3	1,169.0	1,145.9	23.13	50.533		
5,000.0	4,966.9	4,837.2	4,718.9	12.9	20.3	-116.38	346.6	-973.4	1,195.2	1,171.6	23.64	50.568		
5,100.0	5,066.2	4,933.7	4,812.8	13.2	20.7	-116.41	354.0	-994.6	1,221.5	1,197.3	24.14	50.602		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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						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	5,165.4	5,030.2	4,906.7	13.4	21.2	-116.45	361.3	-1,015.7	1,247.7	1,223.0	24.64	50.634		
5,300.0	5,264.6	5,126.7	5,000.5	13.7	21.6	-116.48	368.7	-1,036.8	1,273.9	1,248.8	25.14	50.664		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		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	-131.14	-7.6	-8.8	11.6					
100.0	100.0	100.0	100.0	0.1	0.1	-131.14	-7.6	-8.8	11.6	11.4	0.27	42.698		
200.0	200.0	200.0	200.0	0.3	0.3	-131.14	-7.6	-8.8	11.6	11.0	0.62	18.710		
300.0	300.0	300.0	300.0	0.5	0.5	-131.14	-7.6	-8.8	11.6	10.7	0.97	11.980 CC, ES		
400.0	400.0	399.4	399.3	0.7	0.7	-127.01	-8.5	-11.2	14.1	12.7	1.32	10.642 SF		
500.0	500.0	498.2	497.8	0.8	0.9	-120.35	-10.8	-18.5	21.6	19.9	1.68	12.854		
600.0	600.0	595.6	594.5	1.0	1.1	-138.42	-14.7	-30.5	36.2	34.2	2.01	17.960		
700.0	699.6	692.4	689.9	1.2	1.4	-140.10	-19.8	-45.9	58.5	56.2	2.37	24.687		
800.0	798.9	789.0	785.0	1.4	1.7	-142.67	-24.9	-61.6	84.4	81.6	2.74	30.748		
900.0	898.2	885.4	880.0	1.7	2.1	-144.23	-30.1	-77.3	110.6	107.4	3.13	35.362		
1,000.0	997.4	981.9	975.1	1.9	2.4	-145.19	-35.2	-93.0	136.8	133.3	3.51	38.936		
1,100.0	1,096.6	1,078.4	1,070.1	2.2	2.7	-145.84	-40.3	-108.7	163.1	159.2	3.90	41.774		
1,200.0	1,195.9	1,174.9	1,165.2	2.5	3.0	-146.32	-45.5	-124.4	189.4	185.1	4.30	44.078		
1,300.0	1,295.1	1,271.3	1,260.2	2.7	3.4	-146.67	-50.6	-140.1	215.6	211.0	4.69	45.983		
1,400.0	1,394.3	1,367.8	1,355.3	3.0	3.7	-146.95	-55.7	-155.8	241.9	236.9	5.08	47.583		
1,500.0	1,493.6	1,464.3	1,450.4	3.3	4.0	-147.18	-60.9	-171.5	268.2	262.8	5.48	48.945		
1,600.0	1,592.8	1,560.8	1,545.4	3.5	4.4	-147.36	-66.0	-187.1	294.6	288.7	5.88	50.117		
1,700.0	1,692.1	1,657.2	1,640.5	3.8	4.7	-147.52	-71.1	-202.8	320.9	314.6	6.27	51.137		
1,800.0	1,791.3	1,753.7	1,735.5	4.1	5.0	-147.65	-76.2	-218.5	347.2	340.5	6.67	52.032		
1,900.0	1,890.5	1,850.2	1,830.6	4.3	5.4	-147.76	-81.4	-234.2	373.5	366.4	7.07	52.823		
2,000.0	1,989.8	1,946.7	1,925.6	4.6	5.7	-147.86	-86.5	-249.9	399.8	392.3	7.47	53.527		
2,100.0	2,089.0	2,043.1	2,020.7	4.9	6.1	-147.94	-91.6	-265.6	426.1	418.2	7.87	54.159		
2,200.0	2,188.2	2,139.6	2,115.7	5.2	6.4	-148.02	-96.8	-281.3	452.4	444.2	8.27	54.727		
2,300.0	2,287.5	2,236.1	2,210.8	5.4	6.7	-148.08	-101.9	-297.0	478.7	470.1	8.67	55.243		
2,400.0	2,386.7	2,332.6	2,305.8	5.7	7.1	-148.14	-107.0	-312.6	505.0	496.0	9.07	55.711		
2,500.0	2,486.0	2,429.0	2,400.9	6.0	7.4	-148.20	-112.2	-328.3	531.4	521.9	9.47	56.139		
2,600.0	2,585.2	2,525.5	2,495.9	6.3	7.7	-148.25	-117.3	-344.0	557.7	547.8	9.86	56.532		
2,700.0	2,684.4	2,622.0	2,591.0	6.5	8.1	-148.29	-122.4	-359.7	584.0	573.7	10.26	56.894		
2,800.0	2,783.7	2,718.5	2,686.0	6.8	8.4	-148.33	-127.6	-375.4	610.3	599.6	10.66	57.227		
2,900.0	2,882.9	2,814.9	2,781.1	7.1	8.7	-148.37	-132.7	-391.1	636.6	625.6	11.06	57.537		
3,000.0	2,982.2	2,911.4	2,876.1	7.4	9.1	-148.41	-137.8	-406.8	662.9	651.5	11.46	57.824		
3,100.0	3,081.4	3,007.9	2,971.2	7.6	9.4	-148.44	-142.9	-422.5	689.3	677.4	11.87	58.091		
3,200.0	3,180.6	3,104.4	3,066.2	7.9	9.7	-148.47	-148.1	-438.1	715.6	703.3	12.27	58.341		
3,300.0	3,279.9	3,200.8	3,161.3	8.2	10.1	-148.49	-153.2	-453.8	741.9	729.2	12.67	58.574		
3,400.0	3,379.1	3,297.3	3,256.3	8.5	10.4	-148.52	-158.3	-469.5	768.2	755.1	13.07	58.793		
3,500.0	3,478.3	3,393.8	3,351.4	8.7	10.8	-148.54	-163.5	-485.2	794.5	781.1	13.47	58.999		
3,600.0	3,577.6	3,490.3	3,446.4	9.0	11.1	-148.57	-168.6	-500.9	820.8	807.0	13.87	59.193		
3,700.0	3,676.8	3,586.7	3,541.5	9.3	11.4	-148.59	-173.7	-516.6	847.2	832.9	14.27	59.376		
3,800.0	3,776.1	3,683.2	3,636.5	9.6	11.8	-148.61	-178.9	-532.3	873.5	858.8	14.67	59.548		
3,900.0	3,875.3	3,779.7	3,731.6	9.9	12.1	-148.63	-184.0	-548.0	899.8	884.7	15.07	59.711		
4,000.0	3,974.5	3,876.1	3,826.6	10.1	12.4	-148.64	-189.1	-563.7	926.1	910.7	15.47	59.866		
4,100.0	4,073.8	3,972.6	3,921.7	10.4	12.8	-148.66	-194.2	-579.3	952.4	936.6	15.87	60.012		
4,200.0	4,173.0	4,069.1	4,016.7	10.7	13.1	-148.68	-199.4	-595.0	978.8	962.5	16.27	60.152		
4,300.0	4,272.3	4,165.6	4,111.8	11.0	13.4	-148.69	-204.5	-610.7	1,005.1	988.4	16.67	60.284		
4,400.0	4,371.5	4,262.0	4,206.9	11.2	13.8	-148.70	-209.6	-626.4	1,031.4	1,014.3	17.07	60.410		
4,500.0	4,470.7	4,358.5	4,301.9	11.5	14.1	-148.72	-214.8	-642.1	1,057.7	1,040.2	17.47	60.531		
4,600.0	4,570.0	4,455.0	4,397.0	11.8	14.5	-148.73	-219.9	-657.8	1,084.0	1,066.2	17.87	60.646		
4,700.0	4,669.2	4,551.5	4,492.0	12.1	14.8	-148.74	-225.0	-673.5	1,110.3	1,092.1	18.28	60.755		
4,800.0	4,768.4	4,647.9	4,587.1	12.3	15.1	-148.75	-230.2	-689.2	1,136.7	1,118.0	18.68	60.860		
4,900.0	4,867.7	4,744.4	4,682.1	12.6	15.5	-148.76	-235.3	-704.8	1,163.0	1,143.9	19.08	60.961		
5,000.0	4,966.9	4,840.9	4,777.2	12.9	15.8	-148.78	-240.4	-720.5	1,189.3	1,169.8	19.48	61.057		
5,100.0	5,066.2	4,937.4	4,872.2	13.2	16.1	-148.79	-245.6	-736.2	1,215.6	1,195.7	19.88	61.150		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		
5,200.0	5,165.4	5,033.8	4,967.3	13.4	16.5	-148.80	-250.7	-751.9	1,241.9	1,221.7	20.28	61.238		
5,300.0	5,264.6	5,130.3	5,062.3	13.7	16.8	-148.80	-255.8	-767.6	1,268.3	1,247.6	20.68	61.324		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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	-157.13	-24.8	-10.4	26.9					
100.0	100.0	100.0	100.0	0.1	0.1	-157.13	-24.8	-10.4	26.9	26.6	0.27	98.732		
200.0	200.0	200.0	200.0	0.3	0.3	-157.13	-24.8	-10.4	26.9	26.3	0.62	43.265 CC, ES		
300.0	300.0	298.7	298.6	0.5	0.5	-154.85	-26.4	-12.4	29.2	28.2	0.97	30.038		
400.0	400.0	396.8	396.5	0.7	0.7	-149.81	-31.3	-18.2	36.4	35.0	1.34	27.216 SF		
500.0	500.0	493.9	492.8	0.8	1.0	-144.79	-39.3	-27.7	48.6	46.9	1.71	28.396		
600.0	600.0	591.8	589.4	1.0	1.3	-161.73	-49.4	-39.8	66.8	64.8	2.01	33.177		
700.0	699.6	689.1	685.3	1.2	1.6	-160.98	-59.6	-51.9	90.0	87.6	2.36	38.194		
800.0	798.9	785.4	780.4	1.4	1.9	-161.27	-69.6	-63.8	117.0	114.2	2.70	43.240		
900.0	898.2	881.6	875.3	1.7	2.2	-161.56	-79.6	-75.7	144.2	141.2	3.06	47.139		
1,000.0	997.4	977.8	970.2	1.9	2.5	-161.75	-89.6	-87.6	171.5	168.1	3.42	50.210		
1,100.0	1,096.6	1,074.0	1,065.2	2.2	2.9	-161.89	-99.7	-99.6	198.8	195.1	3.77	52.689		
1,200.0	1,195.9	1,170.2	1,160.1	2.5	3.2	-162.00	-109.7	-111.5	226.1	222.0	4.13	54.732		
1,300.0	1,295.1	1,266.4	1,255.0	2.7	3.5	-162.08	-119.7	-123.4	253.4	248.9	4.49	56.444		
1,400.0	1,394.3	1,362.6	1,350.0	3.0	3.8	-162.15	-129.7	-135.3	280.7	275.9	4.85	57.898		
1,500.0	1,493.6	1,458.8	1,444.9	3.3	4.1	-162.21	-139.7	-147.2	308.0	302.8	5.21	59.150		
1,600.0	1,592.8	1,555.0	1,539.8	3.5	4.4	-162.25	-149.8	-159.2	335.3	329.8	5.57	60.237		
1,700.0	1,692.1	1,651.2	1,634.8	3.8	4.8	-162.29	-159.8	-171.1	362.6	356.7	5.93	61.191		
1,800.0	1,791.3	1,747.4	1,729.7	4.1	5.1	-162.33	-169.8	-183.0	389.9	383.6	6.29	62.034		
1,900.0	1,890.5	1,843.6	1,824.6	4.3	5.4	-162.36	-179.8	-194.9	417.2	410.6	6.65	62.785		
2,000.0	1,989.8	1,939.8	1,919.5	4.6	5.7	-162.38	-189.9	-206.9	444.5	437.5	7.01	63.458		
2,100.0	2,089.0	2,036.0	2,014.5	4.9	6.0	-162.41	-199.9	-218.8	471.8	464.5	7.36	64.065		
2,200.0	2,188.2	2,132.2	2,109.4	5.2	6.4	-162.43	-209.9	-230.7	499.1	491.4	7.72	64.614		
2,300.0	2,287.5	2,228.4	2,204.3	5.4	6.7	-162.45	-219.9	-242.6	526.4	518.4	8.08	65.114		
2,400.0	2,386.7	2,324.6	2,299.3	5.7	7.0	-162.46	-229.9	-254.5	553.7	545.3	8.44	65.571		
2,500.0	2,486.0	2,420.8	2,394.2	6.0	7.3	-162.48	-240.0	-266.5	581.0	572.2	8.80	65.990		
2,600.0	2,585.2	2,517.0	2,489.1	6.3	7.7	-162.49	-250.0	-278.4	608.3	599.2	9.16	66.376		
2,700.0	2,684.4	2,613.2	2,584.1	6.5	8.0	-162.50	-260.0	-290.3	635.6	626.1	9.53	66.733		
2,800.0	2,783.7	2,709.4	2,679.0	6.8	8.3	-162.52	-270.0	-302.2	662.9	653.1	9.89	67.063		
2,900.0	2,882.9	2,805.6	2,773.9	7.1	8.6	-162.53	-280.0	-314.2	690.2	680.0	10.25	67.370		
3,000.0	2,982.2	2,901.8	2,868.9	7.4	8.9	-162.54	-290.1	-326.1	717.5	706.9	10.61	67.655		
3,100.0	3,081.4	2,998.0	2,963.8	7.6	9.3	-162.54	-300.1	-338.0	744.8	733.9	10.97	67.922		
3,200.0	3,180.6	3,094.2	3,058.7	7.9	9.6	-162.55	-310.1	-349.9	772.1	760.8	11.33	68.172		
3,300.0	3,279.9	3,190.4	3,153.7	8.2	9.9	-162.56	-320.1	-361.9	799.4	787.8	11.69	68.406		
3,400.0	3,379.1	3,286.6	3,248.6	8.5	10.2	-162.57	-330.1	-373.8	826.7	814.7	12.05	68.626		
3,500.0	3,478.3	3,382.8	3,343.5	8.7	10.5	-162.57	-340.2	-385.7	854.0	841.6	12.41	68.834		
3,600.0	3,577.6	3,479.0	3,438.5	9.0	10.9	-162.58	-350.2	-397.6	881.3	868.6	12.77	69.029		
3,700.0	3,676.8	3,575.2	3,533.4	9.3	11.2	-162.59	-360.2	-409.5	908.6	895.5	13.13	69.214		
3,800.0	3,776.1	3,671.4	3,628.3	9.6	11.5	-162.59	-370.2	-421.5	935.9	922.5	13.49	69.388		
3,900.0	3,875.3	3,767.6	3,723.3	9.9	11.8	-162.60	-380.3	-433.4	963.2	949.4	13.85	69.554		
4,000.0	3,974.5	3,863.8	3,818.2	10.1	12.1	-162.60	-390.3	-445.3	990.5	976.3	14.21	69.711		
4,100.0	4,073.8	3,960.0	3,913.1	10.4	12.5	-162.61	-400.3	-457.2	1,017.8	1,003.3	14.57	69.860		
4,200.0	4,173.0	4,056.2	4,008.1	10.7	12.8	-162.61	-410.3	-469.2	1,045.1	1,030.2	14.93	70.003		
4,300.0	4,272.3	4,152.4	4,103.0	11.0	13.1	-162.62	-420.3	-481.1	1,072.4	1,057.2	15.29	70.138		
4,400.0	4,371.5	4,248.6	4,197.9	11.2	13.4	-162.62	-430.4	-493.0	1,099.7	1,084.1	15.65	70.267		
4,500.0	4,470.7	4,344.8	4,292.9	11.5	13.8	-162.62	-440.4	-504.9	1,127.0	1,111.0	16.01	70.390		
4,600.0	4,570.0	4,441.0	4,387.8	11.8	14.1	-162.63	-450.4	-516.8	1,154.3	1,138.0	16.37	70.508		
4,700.0	4,669.2	4,537.2	4,482.7	12.1	14.4	-162.63	-460.4	-528.8	1,181.7	1,164.9	16.73	70.620		
4,800.0	4,768.4	4,633.4	4,577.6	12.3	14.7	-162.64	-470.4	-540.7	1,209.0	1,191.9	17.09	70.728		
4,900.0	4,867.7	4,729.6	4,672.6	12.6	15.0	-162.64	-480.5	-552.6	1,236.3	1,218.8	17.45	70.832		
5,000.0	4,966.9	4,825.8	4,767.5	12.9	15.4	-162.64	-490.5	-564.5	1,263.6	1,245.7	17.81	70.931		
5,100.0	5,066.2	4,922.0	4,862.4	13.2	15.7	-162.64	-500.5	-576.5	1,290.9	1,272.7	18.17	71.026		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		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	-163.70	-41.5	-12.1	43.3					
100.0	100.0	100.0	100.0	0.1	0.1	-163.70	-41.5	-12.1	43.3	43.0	0.27	158.893		
200.0	200.0	200.0	200.0	0.3	0.3	-163.70	-41.5	-12.1	43.3	42.6	0.62	69.627		
300.0	300.0	300.0	300.0	0.5	0.5	-163.70	-41.5	-12.1	43.3	42.3	0.97	44.582		
400.0	400.0	400.0	400.0	0.7	0.7	-163.70	-41.5	-12.1	43.3	41.9	1.32	32.788		
500.0	500.0	500.0	500.0	0.8	0.8	-163.70	-41.5	-12.1	43.3	41.6	1.67	25.928 CC, ES		
600.0	600.0	600.0	600.0	1.0	1.0	176.50	-41.5	-12.1	45.9	43.9	2.02	22.758 SF		
700.0	699.6	699.6	699.6	1.2	1.2	177.00	-41.5	-12.1	53.7	51.3	2.36	22.772		
800.0	798.9	798.9	798.9	1.4	1.4	177.54	-41.5	-12.1	65.7	63.0	2.70	24.299		
900.0	898.2	894.5	894.5	1.7	1.5	178.55	-43.3	-13.6	80.2	77.2	3.04	26.359		
1,000.0	997.4	988.5	988.2	1.9	1.7	-179.78	-48.6	-18.1	99.4	96.0	3.38	29.380		
1,100.0	1,096.6	1,080.5	1,079.5	2.2	1.9	-177.96	-57.3	-25.4	123.2	119.4	3.72	33.088		
1,200.0	1,195.9	1,170.2	1,167.8	2.5	2.2	-176.25	-68.9	-35.1	151.4	147.4	4.06	37.296		
1,300.0	1,295.1	1,262.7	1,258.4	2.7	2.4	-174.74	-83.4	-47.3	183.0	178.6	4.40	41.584		
1,400.0	1,394.3	1,357.4	1,351.1	3.0	2.8	-173.63	-98.5	-59.9	215.0	210.2	4.75	45.280		
1,500.0	1,493.6	1,452.1	1,443.7	3.3	3.1	-172.80	-113.5	-72.5	247.0	241.9	5.09	48.481		
1,600.0	1,592.8	1,546.8	1,536.4	3.5	3.4	-172.17	-128.5	-85.1	279.0	273.6	5.44	51.281		
1,700.0	1,692.1	1,641.5	1,629.0	3.8	3.8	-171.66	-143.5	-97.7	311.1	305.3	5.79	53.748		
1,800.0	1,791.3	1,736.2	1,721.6	4.1	4.1	-171.25	-158.5	-110.3	343.1	337.0	6.13	55.939		
1,900.0	1,890.5	1,830.9	1,814.3	4.3	4.5	-170.91	-173.5	-122.9	375.2	368.7	6.48	57.897		
2,000.0	1,989.8	1,925.6	1,906.9	4.6	4.9	-170.63	-188.6	-135.5	407.3	400.5	6.83	59.657		
2,100.0	2,089.0	2,020.3	1,999.6	4.9	5.2	-170.38	-203.6	-148.1	439.4	432.2	7.17	61.248		
2,200.0	2,188.2	2,114.9	2,092.2	5.2	5.6	-170.17	-218.6	-160.7	471.5	464.0	7.52	62.693		
2,300.0	2,287.5	2,209.6	2,184.8	5.4	6.0	-169.99	-233.6	-173.3	503.6	495.7	7.87	64.011		
2,400.0	2,386.7	2,304.3	2,277.5	5.7	6.3	-169.83	-248.6	-185.9	535.7	527.5	8.21	65.218		
2,500.0	2,486.0	2,399.0	2,370.1	6.0	6.7	-169.68	-263.6	-198.5	567.9	559.3	8.56	66.327		
2,600.0	2,585.2	2,493.7	2,462.8	6.3	7.1	-169.55	-278.7	-211.1	600.0	591.1	8.91	67.350		
2,700.0	2,684.4	2,588.4	2,555.4	6.5	7.5	-169.44	-293.7	-223.7	632.1	622.8	9.26	68.297		
2,800.0	2,783.7	2,683.1	2,648.1	6.8	7.8	-169.33	-308.7	-236.3	664.2	654.6	9.60	69.175		
2,900.0	2,882.9	2,777.8	2,740.7	7.1	8.2	-169.24	-323.7	-248.9	696.4	686.4	9.95	69.992		
3,000.0	2,982.2	2,872.5	2,833.3	7.4	8.6	-169.15	-338.7	-261.5	728.5	718.2	10.30	70.754		
3,100.0	3,081.4	2,967.2	2,926.0	7.6	9.0	-169.07	-353.7	-274.1	760.6	750.0	10.64	71.467		
3,200.0	3,180.6	3,061.9	3,018.6	7.9	9.3	-169.00	-368.8	-286.7	792.7	781.8	10.99	72.135		
3,300.0	3,279.9	3,156.6	3,111.3	8.2	9.7	-168.93	-383.8	-299.3	824.9	813.5	11.34	72.762		
3,400.0	3,379.1	3,251.3	3,203.9	8.5	10.1	-168.87	-398.8	-311.9	857.0	845.3	11.68	73.352		
3,500.0	3,478.3	3,345.9	3,296.5	8.7	10.5	-168.81	-413.8	-324.5	889.1	877.1	12.03	73.908		
3,600.0	3,577.6	3,440.6	3,389.2	9.0	10.9	-168.76	-428.8	-337.1	921.3	908.9	12.38	74.432		
3,700.0	3,676.8	3,535.3	3,481.8	9.3	11.2	-168.71	-443.8	-349.7	953.4	940.7	12.72	74.928		
3,800.0	3,776.1	3,630.0	3,574.5	9.6	11.6	-168.66	-458.8	-362.3	985.6	972.5	13.07	75.398		
3,900.0	3,875.3	3,724.7	3,667.1	9.9	12.0	-168.62	-473.9	-374.9	1,017.7	1,004.3	13.42	75.844		
4,000.0	3,974.5	3,819.4	3,759.8	10.1	12.4	-168.58	-488.9	-387.5	1,049.8	1,036.1	13.77	76.267		
4,100.0	4,073.8	3,914.1	3,852.4	10.4	12.8	-168.54	-503.9	-400.1	1,082.0	1,067.9	14.11	76.669		
4,200.0	4,173.0	4,008.8	3,945.0	10.7	13.1	-168.50	-518.9	-412.7	1,114.1	1,099.6	14.46	77.052		
4,300.0	4,272.3	4,103.5	4,037.7	11.0	13.5	-168.47	-533.9	-425.3	1,146.2	1,131.4	14.81	77.417		
4,400.0	4,371.5	4,198.2	4,130.3	11.2	13.9	-168.44	-548.9	-437.9	1,178.4	1,163.2	15.15	77.766		
4,500.0	4,470.7	4,292.9	4,223.0	11.5	14.3	-168.41	-564.0	-450.5	1,210.5	1,195.0	15.50	78.098		
4,600.0	4,570.0	4,387.6	4,315.6	11.8	14.7	-168.38	-579.0	-463.1	1,242.7	1,226.8	15.85	78.417		
4,700.0	4,669.2	4,482.3	4,408.2	12.1	15.0	-168.35	-594.0	-475.7	1,274.8	1,258.6	16.19	78.721		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-166.98	-58.6	-13.6	60.2					
100.0	100.0	100.0	100.0	0.1	0.1	-166.98	-58.6	-13.6	60.2	59.9	0.27	221.059		
200.0	200.0	200.0	200.0	0.3	0.3	-166.98	-58.6	-13.6	60.2	59.6	0.62	96.869		
300.0	300.0	300.0	300.0	0.5	0.5	-166.98	-58.6	-13.6	60.2	59.2	0.97	62.024		
400.0	400.0	400.0	400.0	0.7	0.7	-166.98	-58.6	-13.6	60.2	58.9	1.32	45.615		
500.0	500.0	500.0	500.0	0.8	0.8	-166.98	-58.6	-13.6	60.2	58.5	1.67	36.073	CC, ES	
600.0	600.0	600.0	600.0	1.0	1.0	173.29	-58.6	-13.6	62.8	60.8	2.02	31.147		
700.0	699.6	699.6	699.6	1.2	1.2	174.01	-58.6	-13.6	70.6	68.2	2.36	29.924	SF	
800.0	798.9	798.9	798.9	1.4	1.4	174.87	-58.6	-13.6	82.5	79.8	2.70	30.520		
900.0	898.2	898.2	898.2	1.7	1.5	175.53	-58.6	-13.6	94.8	91.7	3.05	31.065		
1,000.0	997.4	997.4	997.4	1.9	1.7	176.05	-58.6	-13.6	107.1	103.7	3.40	31.502		
1,100.0	1,096.6	1,091.1	1,091.0	2.2	1.9	176.72	-60.5	-14.7	121.6	117.8	3.74	32.538		
1,200.0	1,195.9	1,183.1	1,182.8	2.5	2.0	177.73	-66.0	-18.3	140.7	136.7	4.07	34.567		
1,300.0	1,295.1	1,273.2	1,272.3	2.7	2.2	178.86	-75.1	-24.0	164.5	160.1	4.40	37.347		
1,400.0	1,394.3	1,361.1	1,359.0	3.0	2.5	179.99	-87.4	-31.8	192.6	187.9	4.73	40.701		
1,500.0	1,493.6	1,446.5	1,442.4	3.3	2.7	-178.97	-102.5	-41.4	225.1	220.0	5.06	44.503		
1,600.0	1,592.8	1,533.9	1,527.1	3.5	3.0	-178.00	-120.9	-53.0	261.3	255.9	5.39	48.515		
1,700.0	1,692.1	1,626.8	1,616.9	3.8	3.4	-177.20	-141.0	-65.7	298.2	292.5	5.72	52.105		
1,800.0	1,791.3	1,719.6	1,706.7	4.1	3.8	-176.57	-161.0	-78.4	335.2	329.1	6.06	55.302		
1,900.0	1,890.5	1,812.5	1,796.4	4.3	4.2	-176.07	-181.0	-91.1	372.1	365.7	6.40	58.167		
2,000.0	1,989.8	1,905.4	1,886.2	4.6	4.6	-175.66	-201.1	-103.8	409.1	402.4	6.73	60.748		
2,100.0	2,089.0	1,998.2	1,976.0	4.9	5.0	-175.31	-221.1	-116.6	446.1	439.1	7.07	63.086		
2,200.0	2,188.2	2,091.1	2,065.8	5.2	5.4	-175.02	-241.2	-129.3	483.1	475.7	7.41	65.212		
2,300.0	2,287.5	2,184.0	2,155.6	5.4	5.8	-174.77	-261.2	-142.0	520.2	512.4	7.75	67.156		
2,400.0	2,386.7	2,276.9	2,245.4	5.7	6.3	-174.56	-281.3	-154.7	557.2	549.1	8.08	68.939		
2,500.0	2,486.0	2,369.7	2,335.2	6.0	6.7	-174.37	-301.3	-167.4	594.3	585.8	8.42	70.582		
2,600.0	2,585.2	2,462.6	2,424.9	6.3	7.1	-174.20	-321.3	-180.1	631.3	622.6	8.76	72.100		
2,700.0	2,684.4	2,555.5	2,514.7	6.5	7.5	-174.05	-341.4	-192.8	668.4	659.3	9.09	73.506		
2,800.0	2,783.7	2,648.3	2,604.5	6.8	8.0	-173.92	-361.4	-205.5	705.4	696.0	9.43	74.813		
2,900.0	2,882.9	2,741.2	2,694.3	7.1	8.4	-173.80	-381.5	-218.2	742.5	732.7	9.77	76.031		
3,000.0	2,982.2	2,834.1	2,784.1	7.4	8.9	-173.69	-401.5	-230.9	779.5	769.4	10.10	77.168		
3,100.0	3,081.4	2,926.9	2,873.9	7.6	9.3	-173.59	-421.6	-243.6	816.6	806.2	10.44	78.233		
3,200.0	3,180.6	3,019.8	2,963.7	7.9	9.7	-173.50	-441.6	-256.3	853.7	842.9	10.77	79.231		
3,300.0	3,279.9	3,112.7	3,053.4	8.2	10.2	-173.42	-461.7	-269.0	890.7	879.6	11.11	80.170		
3,400.0	3,379.1	3,205.5	3,143.2	8.5	10.6	-173.34	-481.7	-281.7	927.8	916.4	11.45	81.053		
3,500.0	3,478.3	3,298.4	3,233.0	8.7	11.1	-173.27	-501.7	-294.4	964.9	953.1	11.78	81.887		
3,600.0	3,577.6	3,391.3	3,322.8	9.0	11.5	-173.21	-521.8	-307.1	1,001.9	989.8	12.12	82.674		
3,700.0	3,676.8	3,484.1	3,412.6	9.3	11.9	-173.15	-541.8	-319.8	1,039.0	1,026.6	12.46	83.419		
3,800.0	3,776.1	3,577.0	3,502.4	9.6	12.4	-173.09	-561.9	-332.5	1,076.1	1,063.3	12.79	84.125		
3,900.0	3,875.3	3,669.9	3,592.2	9.9	12.8	-173.04	-581.9	-345.2	1,113.2	1,100.0	13.13	84.795		
4,000.0	3,974.5	3,762.8	3,681.9	10.1	13.3	-172.99	-602.0	-357.9	1,150.2	1,136.8	13.46	85.432		
4,100.0	4,073.8	3,855.6	3,771.7	10.4	13.7	-172.94	-622.0	-370.7	1,187.3	1,173.5	13.80	86.039		
4,200.0	4,173.0	3,948.5	3,861.5	10.7	14.2	-172.90	-642.0	-383.4	1,224.4	1,210.3	14.14	86.616		
4,300.0	4,272.3	4,041.4	3,951.3	11.0	14.6	-172.86	-662.1	-396.1	1,261.5	1,247.0	14.47	87.167		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design (J16W) - HMU Federal 16-14D3 - 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	-168.41	-75.8	-15.5	77.3					
100.0	100.0	100.0	100.0	0.1	0.1	-168.41	-75.8	-15.5	77.3	77.1	0.27	284.043		
200.0	200.0	200.0	200.0	0.3	0.3	-168.41	-75.8	-15.5	77.3	76.7	0.62	124.468		
300.0	300.0	300.0	300.0	0.5	0.5	-168.41	-75.8	-15.5	77.3	76.4	0.97	79.695		
400.0	400.0	400.0	400.0	0.7	0.7	-168.41	-75.8	-15.5	77.3	76.0	1.32	58.612		
500.0	500.0	500.0	500.0	0.8	0.8	-168.41	-75.8	-15.5	77.3	75.7	1.67	46.350 CC, ES		
600.0	600.0	596.0	596.0	1.0	1.0	172.26	-77.9	-16.6	82.4	80.3	2.01	40.990 SF		
700.0	699.6	690.5	690.2	1.2	1.2	173.88	-84.2	-19.8	97.4	95.0	2.34	41.551		
800.0	798.9	782.4	781.4	1.4	1.4	175.68	-94.3	-25.0	121.2	118.6	2.68	45.298		
900.0	898.2	871.9	869.5	1.7	1.7	177.20	-107.9	-31.9	150.0	147.0	3.01	49.872		
1,000.0	997.4	958.7	954.3	1.9	2.0	178.43	-124.6	-40.4	183.2	179.9	3.33	54.946		
1,100.0	1,096.6	1,042.6	1,035.3	2.2	2.4	179.41	-144.0	-50.2	220.6	217.0	3.65	60.398		
1,200.0	1,195.9	1,133.4	1,122.4	2.5	2.8	-179.75	-167.0	-61.9	260.4	256.4	3.98	65.364		
1,300.0	1,295.1	1,225.1	1,210.3	2.7	3.3	-179.13	-190.2	-73.7	300.2	295.9	4.31	69.586		
1,400.0	1,394.3	1,316.7	1,298.2	3.0	3.7	-178.66	-213.4	-85.5	340.1	335.4	4.65	73.216		
1,500.0	1,493.6	1,408.4	1,386.1	3.3	4.2	-178.28	-236.6	-97.3	380.0	375.0	4.98	76.370		
1,600.0	1,592.8	1,500.1	1,474.0	3.5	4.6	-177.98	-259.8	-109.1	419.9	414.6	5.31	79.136		
1,700.0	1,692.1	1,591.8	1,561.9	3.8	5.1	-177.72	-283.0	-120.9	459.8	454.1	5.64	81.577		
1,800.0	1,791.3	1,683.5	1,649.8	4.1	5.6	-177.51	-306.3	-132.7	499.7	493.7	5.97	83.752		
1,900.0	1,890.5	1,775.1	1,737.7	4.3	6.1	-177.33	-329.5	-144.5	539.6	533.3	6.30	85.702		
2,000.0	1,989.8	1,866.8	1,825.6	4.6	6.5	-177.18	-352.7	-156.3	579.5	572.9	6.63	87.459		
2,100.0	2,089.0	1,958.5	1,913.5	4.9	7.0	-177.04	-375.9	-168.1	619.4	612.4	6.96	89.051		
2,200.0	2,188.2	2,050.2	2,001.4	5.2	7.5	-176.92	-399.1	-179.9	659.3	652.0	7.29	90.501		
2,300.0	2,287.5	2,141.9	2,089.3	5.4	8.0	-176.82	-422.3	-191.6	699.2	691.6	7.61	91.825		
2,400.0	2,386.7	2,233.5	2,177.2	5.7	8.5	-176.72	-445.5	-203.4	739.2	731.2	7.94	93.041		
2,500.0	2,486.0	2,325.2	2,265.1	6.0	8.9	-176.64	-468.7	-215.2	779.1	770.8	8.27	94.160		
2,600.0	2,585.2	2,416.9	2,353.0	6.3	9.4	-176.56	-492.0	-227.0	819.0	810.4	8.60	95.194		
2,700.0	2,684.4	2,508.6	2,440.9	6.5	9.9	-176.49	-515.2	-238.8	858.9	850.0	8.93	96.152		
2,800.0	2,783.7	2,600.2	2,528.8	6.8	10.4	-176.43	-538.4	-250.6	898.9	889.6	9.26	97.042		
2,900.0	2,882.9	2,691.9	2,616.7	7.1	10.9	-176.37	-561.6	-262.4	938.8	929.2	9.59	97.871		
3,000.0	2,982.2	2,783.6	2,704.6	7.4	11.4	-176.32	-584.8	-274.2	978.7	968.8	9.92	98.645		
3,100.0	3,081.4	2,875.3	2,792.6	7.6	11.8	-176.27	-608.0	-286.0	1,018.6	1,008.4	10.25	99.370		
3,200.0	3,180.6	2,967.0	2,880.5	7.9	12.3	-176.23	-631.2	-297.8	1,058.6	1,048.0	10.58	100.050		
3,300.0	3,279.9	3,058.6	2,968.4	8.2	12.8	-176.18	-654.4	-309.6	1,098.5	1,087.6	10.91	100.689		
3,400.0	3,379.1	3,150.3	3,056.3	8.5	13.3	-176.15	-677.6	-321.4	1,138.4	1,127.2	11.24	101.290		
3,500.0	3,478.3	3,242.0	3,144.2	8.7	13.8	-176.11	-700.9	-333.2	1,178.4	1,166.8	11.57	101.858		
3,600.0	3,577.6	3,333.7	3,232.1	9.0	14.3	-176.08	-724.1	-345.0	1,218.3	1,206.4	11.90	102.394		
3,700.0	3,676.8	3,425.4	3,320.0	9.3	14.7	-176.04	-747.3	-356.8	1,258.2	1,246.0	12.23	102.902		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design (J16W) - HMU Federal 16-16B - 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	-174.62	-51.0	-4.8	51.2						
100.0	100.0	100.0	100.0	0.1	0.1	-174.62	-51.0	-4.8	51.2	51.0	0.27	188.131			
200.0	200.0	200.0	200.0	0.3	0.3	-174.62	-51.0	-4.8	51.2	50.6	0.62	82.440 CC, ES			
300.0	300.0	298.6	298.5	0.5	0.5	-177.01	-52.5	-2.7	52.6	51.6	0.97	54.153			
400.0	400.0	396.6	396.3	0.7	0.7	176.60	-56.9	3.4	57.2	55.8	1.33	43.040			
500.0	500.0	493.6	492.5	0.8	1.0	168.18	-64.2	13.4	66.0	64.4	1.68	39.235			
600.0	600.0	591.9	589.4	1.0	1.3	141.33	-73.4	26.1	80.6	78.5	2.11	38.244 SF			
700.0	699.6	689.9	686.2	1.2	1.6	138.45	-82.6	38.8	99.8	97.3	2.49	40.055			
800.0	798.9	787.4	782.5	1.4	1.9	137.96	-91.7	51.4	122.1	119.2	2.90	42.102			
900.0	898.2	884.8	878.6	1.7	2.2	137.82	-100.9	64.0	144.7	141.3	3.32	43.541			
1,000.0	997.4	982.2	974.8	1.9	2.5	137.72	-110.0	76.6	167.2	163.5	3.75	44.588			
1,100.0	1,096.6	1,079.7	1,071.0	2.2	2.9	137.65	-119.2	89.2	189.8	185.6	4.18	45.377			
1,200.0	1,195.9	1,177.1	1,167.2	2.5	3.2	137.59	-128.3	101.8	212.3	207.7	4.62	45.991			
1,300.0	1,295.1	1,274.5	1,263.3	2.7	3.5	137.54	-137.4	114.4	234.9	229.8	5.05	46.479			
1,400.0	1,394.3	1,371.9	1,359.5	3.0	3.8	137.50	-146.6	127.0	257.4	251.9	5.49	46.877			
1,500.0	1,493.6	1,469.4	1,455.7	3.3	4.1	137.46	-155.7	139.5	280.0	274.0	5.93	47.205			
1,600.0	1,592.8	1,566.8	1,551.9	3.5	4.5	137.44	-164.8	152.1	302.5	296.1	6.37	47.481			
1,700.0	1,692.1	1,664.2	1,648.0	3.8	4.8	137.41	-174.0	164.7	325.1	318.3	6.81	47.716			
1,800.0	1,791.3	1,761.6	1,744.2	4.1	5.1	137.39	-183.1	177.3	347.6	340.4	7.25	47.918			
1,900.0	1,890.5	1,859.1	1,840.4	4.3	5.4	137.37	-192.2	189.9	370.2	362.5	7.70	48.094			
2,000.0	1,989.8	1,956.5	1,936.6	4.6	5.7	137.35	-201.4	202.5	392.7	384.6	8.14	48.248			
2,100.0	2,089.0	2,053.9	2,032.7	4.9	6.1	137.34	-210.5	215.1	415.3	406.7	8.58	48.384			
2,200.0	2,188.2	2,151.3	2,128.9	5.2	6.4	137.33	-219.6	227.7	437.8	428.8	9.03	48.504			
2,300.0	2,287.5	2,248.8	2,225.1	5.4	6.7	137.31	-228.8	240.3	460.4	450.9	9.47	48.613			
2,400.0	2,386.7	2,346.2	2,321.2	5.7	7.0	137.30	-237.9	252.9	482.9	473.0	9.91	48.710			
2,500.0	2,486.0	2,443.6	2,417.4	6.0	7.4	137.29	-247.0	265.5	505.5	495.1	10.36	48.798			
2,600.0	2,585.2	2,541.0	2,513.6	6.3	7.7	137.28	-256.2	278.1	528.0	517.2	10.80	48.878			
2,700.0	2,684.4	2,638.4	2,609.8	6.5	8.0	137.28	-265.3	290.7	550.6	539.3	11.25	48.951			
2,800.0	2,783.7	2,735.9	2,705.9	6.8	8.3	137.27	-274.5	303.3	573.1	561.4	11.69	49.018			
2,900.0	2,882.9	2,833.3	2,802.1	7.1	8.6	137.26	-283.6	315.9	595.7	583.5	12.14	49.079			
3,000.0	2,982.2	2,930.7	2,898.3	7.4	9.0	137.26	-292.7	328.5	618.2	605.6	12.58	49.136			
3,100.0	3,081.4	3,028.1	2,994.5	7.6	9.3	137.25	-301.9	341.1	640.8	627.8	13.03	49.188			
3,200.0	3,180.6	3,125.6	3,090.6	7.9	9.6	137.24	-311.0	353.7	663.3	649.9	13.47	49.237			
3,300.0	3,279.9	3,223.0	3,186.8	8.2	9.9	137.24	-320.1	366.3	685.9	672.0	13.92	49.282			
3,400.0	3,379.1	3,320.4	3,283.0	8.5	10.3	137.23	-329.3	378.9	708.4	694.1	14.36	49.324			
3,500.0	3,478.3	3,417.8	3,379.2	8.7	10.6	137.23	-338.4	391.5	731.0	716.2	14.81	49.363			
3,600.0	3,577.6	3,515.3	3,475.3	9.0	10.9	137.22	-347.5	404.0	753.5	738.3	15.25	49.400			
3,700.0	3,676.8	3,612.7	3,571.5	9.3	11.2	137.22	-356.7	416.6	776.1	760.4	15.70	49.435			
3,800.0	3,776.1	3,710.1	3,667.7	9.6	11.5	137.22	-365.8	429.2	798.6	782.5	16.14	49.468			
3,900.0	3,875.3	3,807.5	3,763.9	9.9	11.9	137.21	-374.9	441.8	821.2	804.6	16.59	49.498			
4,000.0	3,974.5	3,905.0	3,860.0	10.1	12.2	137.21	-384.1	454.4	843.7	826.7	17.04	49.527			
4,100.0	4,073.8	4,002.4	3,956.2	10.4	12.5	137.21	-393.2	467.0	866.3	848.8	17.48	49.555			
4,200.0	4,173.0	4,099.8	4,052.4	10.7	12.8	137.20	-402.3	479.6	888.8	870.9	17.93	49.581			
4,300.0	4,272.3	4,197.2	4,148.5	11.0	13.2	137.20	-411.5	492.2	911.4	893.0	18.37	49.605			
4,400.0	4,371.5	4,294.7	4,244.7	11.2	13.5	137.20	-420.6	504.8	933.9	915.1	18.82	49.628			
4,500.0	4,470.7	4,392.1	4,340.9	11.5	13.8	137.19	-429.8	517.4	956.5	937.2	19.26	49.651			
4,600.0	4,570.0	4,489.5	4,437.1	11.8	14.1	137.19	-438.9	530.0	979.0	959.3	19.71	49.672			
4,700.0	4,669.2	4,586.9	4,533.2	12.1	14.4	137.19	-448.0	542.6	1,001.6	981.4	20.16	49.692			
4,800.0	4,768.4	4,684.4	4,629.4	12.3	14.8	137.19	-457.2	555.2	1,024.1	1,003.5	20.60	49.711			
4,900.0	4,867.7	4,781.8	4,725.6	12.6	15.1	137.18	-466.3	567.8	1,046.7	1,025.6	21.05	49.729			
5,000.0	4,966.9	4,879.2	4,821.8	12.9	15.4	137.18	-475.4	580.4	1,069.2	1,047.8	21.49	49.747			
5,100.0	5,066.2	4,976.6	4,917.9	13.2	15.7	137.18	-484.6	593.0	1,091.8	1,069.9	21.94	49.763			

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design (J16W) - HMU Federal 16-16B - 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	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
5,200.0	5,165.4	5,074.1	5,014.1	13.4	16.1	137.18	-493.7	605.6	1,114.3	1,092.0	22.39	49.779		
5,300.0	5,264.6	5,171.5	5,110.3	13.7	16.4	137.18	-502.8	618.2	1,136.9	1,114.1	22.83	49.795		
5,400.0	5,363.9	5,268.9	5,206.5	14.0	16.7	137.17	-512.0	630.8	1,159.4	1,136.2	23.28	49.810		
5,500.0	5,463.1	5,366.3	5,302.6	14.3	17.0	137.17	-521.1	643.4	1,182.0	1,158.3	23.72	49.824		
5,600.0	5,562.4	5,463.7	5,398.8	14.6	17.3	137.17	-530.2	656.0	1,204.6	1,180.4	24.17	49.837		
5,700.0	5,661.6	5,561.2	5,495.0	14.8	17.7	137.17	-539.4	668.5	1,227.1	1,202.5	24.62	49.850		
5,800.0	5,760.8	5,658.6	5,591.2	15.1	18.0	137.17	-548.5	681.1	1,249.7	1,224.6	25.06	49.863		
5,900.0	5,860.1	5,756.0	5,687.3	15.4	18.3	137.17	-557.6	693.7	1,272.2	1,246.7	25.51	49.875		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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			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	-174.52	-67.7	-6.5	68.1					
100.0	100.0	100.0	100.0	0.1	0.1	-174.52	-67.7	-6.5	68.1	67.8	0.27	249.965		
200.0	200.0	200.0	200.0	0.3	0.3	-174.52	-67.7	-6.5	68.1	67.4	0.62	109.535		
300.0	300.0	300.0	300.0	0.5	0.5	-174.52	-67.7	-6.5	68.1	67.1	0.97	70.134 CC, ES		
400.0	400.0	397.3	397.3	0.7	0.7	-175.88	-69.7	-5.0	70.0	68.7	1.32	53.189		
500.0	500.0	494.2	493.8	0.8	0.9	-179.52	-75.7	-0.6	75.9	74.3	1.66	45.684		
600.0	600.0	589.7	588.6	1.0	1.1	156.14	-85.4	6.5	88.8	86.7	2.04	43.568 SF		
700.0	699.6	682.9	680.4	1.2	1.4	152.72	-98.5	16.2	110.8	108.4	2.41	46.030		
800.0	798.9	774.7	769.9	1.4	1.8	150.47	-114.8	28.2	140.5	137.7	2.79	50.392		
900.0	898.2	869.7	862.3	1.7	2.2	148.92	-132.6	41.3	171.6	168.4	3.19	53.841		
1,000.0	997.4	964.6	954.6	1.9	2.6	147.85	-150.3	54.4	202.8	199.2	3.59	56.482		
1,100.0	1,096.6	1,059.6	1,047.0	2.2	3.0	147.06	-168.0	67.5	234.1	230.1	4.00	58.552		
1,200.0	1,195.9	1,154.5	1,139.4	2.5	3.4	146.46	-185.7	80.6	265.3	260.9	4.41	60.213		
1,300.0	1,295.1	1,249.5	1,231.7	2.7	3.8	145.98	-203.5	93.6	296.6	291.8	4.82	61.570		
1,400.0	1,394.3	1,344.4	1,324.1	3.0	4.2	145.60	-221.2	106.7	327.9	322.7	5.23	62.700		
1,500.0	1,493.6	1,439.4	1,416.4	3.3	4.6	145.28	-238.9	119.8	359.3	353.6	5.64	63.653		
1,600.0	1,592.8	1,534.3	1,508.8	3.5	5.1	145.02	-256.6	132.9	390.6	384.5	6.06	64.468		
1,700.0	1,692.1	1,629.3	1,601.2	3.8	5.5	144.79	-274.4	146.0	421.9	415.5	6.47	65.171		
1,800.0	1,791.3	1,724.2	1,693.5	4.1	5.9	144.59	-292.1	159.0	453.3	446.4	6.89	65.785		
1,900.0	1,890.5	1,819.2	1,785.9	4.3	6.3	144.42	-309.8	172.1	484.6	477.3	7.31	66.324		
2,000.0	1,989.8	1,914.1	1,878.2	4.6	6.7	144.27	-327.5	185.2	516.0	508.3	7.72	66.802		
2,100.0	2,089.0	2,009.1	1,970.6	4.9	7.2	144.14	-345.3	198.3	547.3	539.2	8.14	67.229		
2,200.0	2,188.2	2,104.0	2,063.0	5.2	7.6	144.02	-363.0	211.4	578.7	570.1	8.56	67.611		
2,300.0	2,287.5	2,199.0	2,155.3	5.4	8.0	143.92	-380.7	224.4	610.0	601.1	8.98	67.956		
2,400.0	2,386.7	2,293.9	2,247.7	5.7	8.4	143.82	-398.4	237.5	641.4	632.0	9.40	68.269		
2,500.0	2,486.0	2,388.9	2,340.0	6.0	8.8	143.74	-416.2	250.6	672.8	663.0	9.81	68.554		
2,600.0	2,585.2	2,483.8	2,432.4	6.3	9.3	143.66	-433.9	263.7	704.1	693.9	10.23	68.815		
2,700.0	2,684.4	2,578.8	2,524.7	6.5	9.7	143.59	-451.6	276.8	735.5	724.8	10.65	69.054		
2,800.0	2,783.7	2,673.8	2,617.1	6.8	10.1	143.52	-469.3	289.8	766.9	755.8	11.07	69.275		
2,900.0	2,882.9	2,768.7	2,709.5	7.1	10.5	143.46	-487.1	302.9	798.2	786.7	11.49	69.478		
3,000.0	2,982.2	2,863.7	2,801.8	7.4	10.9	143.40	-504.8	316.0	829.6	817.7	11.91	69.667		
3,100.0	3,081.4	2,958.6	2,894.2	7.6	11.4	143.35	-522.5	329.1	861.0	848.6	12.33	69.843		
3,200.0	3,180.6	3,053.6	2,986.5	7.9	11.8	143.30	-540.2	342.2	892.3	879.6	12.75	70.006		
3,300.0	3,279.9	3,148.5	3,078.9	8.2	12.2	143.26	-558.0	355.2	923.7	910.5	13.17	70.159		
3,400.0	3,379.1	3,243.5	3,171.3	8.5	12.6	143.21	-575.7	368.3	955.1	941.5	13.59	70.302		
3,500.0	3,478.3	3,338.4	3,263.6	8.7	13.1	143.17	-593.4	381.4	986.4	972.4	14.00	70.436		
3,600.0	3,577.6	3,433.4	3,356.0	9.0	13.5	143.14	-611.1	394.5	1,017.8	1,003.4	14.42	70.562		
3,700.0	3,676.8	3,528.3	3,448.3	9.3	13.9	143.10	-628.9	407.6	1,049.2	1,034.3	14.84	70.680		
3,800.0	3,776.1	3,623.3	3,540.7	9.6	14.3	143.07	-646.6	420.7	1,080.5	1,065.3	15.26	70.792		
3,900.0	3,875.3	3,718.2	3,633.1	9.9	14.7	143.04	-664.3	433.7	1,111.9	1,096.2	15.68	70.898		
4,000.0	3,974.5	3,813.2	3,725.4	10.1	15.2	143.01	-682.0	446.8	1,143.3	1,127.2	16.10	70.998		
4,100.0	4,073.8	3,908.1	3,817.8	10.4	15.6	142.98	-699.8	459.9	1,174.7	1,158.1	16.52	71.093		
4,200.0	4,173.0	4,003.1	3,910.1	10.7	16.0	142.95	-717.5	473.0	1,206.0	1,189.1	16.94	71.183		
4,300.0	4,272.3	4,098.0	4,002.5	11.0	16.4	142.93	-735.2	486.1	1,237.4	1,220.0	17.36	71.268		
4,400.0	4,371.5	4,193.0	4,094.9	11.2	16.8	142.90	-752.9	499.1	1,268.8	1,251.0	17.78	71.349		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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 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	-174.49	-84.9	-8.2	85.3					
100.0	100.0	100.0	100.0	0.1	0.1	-174.49	-84.9	-8.2	85.3	85.0	0.27	313.147		
200.0	200.0	200.0	200.0	0.3	0.3	-174.49	-84.9	-8.2	85.3	84.6	0.62	137.222 CC, ES		
300.0	300.0	296.4	296.4	0.5	0.5	-175.42	-87.0	-7.0	87.3	86.4	0.96	90.518		
400.0	400.0	392.3	392.0	0.7	0.7	-177.95	-93.2	-3.3	93.6	92.3	1.31	71.553		
500.0	500.0	487.3	486.2	0.8	1.0	178.55	-103.5	2.6	104.5	102.8	1.65	63.297		
600.0	600.0	580.5	578.0	1.0	1.3	155.05	-117.6	10.7	122.4	120.4	2.05	59.857 SF		
700.0	699.6	670.7	666.0	1.2	1.7	152.47	-134.8	20.7	149.5	147.1	2.41	62.131		
800.0	798.9	762.1	754.3	1.4	2.1	150.92	-155.2	32.5	183.6	180.8	2.78	66.028		
900.0	898.2	855.8	844.7	1.7	2.5	149.97	-176.4	44.8	218.3	215.1	3.17	68.874		
1,000.0	997.4	949.6	935.2	1.9	3.0	149.28	-197.6	57.0	253.0	249.5	3.56	71.040		
1,100.0	1,096.6	1,043.3	1,025.7	2.2	3.4	148.75	-218.8	69.3	287.8	283.9	3.96	72.734		
1,200.0	1,195.9	1,137.0	1,116.2	2.5	3.9	148.34	-240.0	81.6	322.6	318.3	4.35	74.091		
1,300.0	1,295.1	1,230.8	1,206.6	2.7	4.4	148.01	-261.2	93.8	357.4	352.7	4.75	75.199		
1,400.0	1,394.3	1,324.5	1,297.1	3.0	4.8	147.74	-282.3	106.1	392.2	387.1	5.15	76.121		
1,500.0	1,493.6	1,418.2	1,387.6	3.3	5.3	147.51	-303.5	118.3	427.0	421.5	5.55	76.899		
1,600.0	1,592.8	1,511.9	1,478.1	3.5	5.7	147.31	-324.7	130.6	461.9	455.9	5.95	77.563		
1,700.0	1,692.1	1,605.7	1,568.6	3.8	6.2	147.15	-345.9	142.9	496.7	490.3	6.36	78.136		
1,800.0	1,791.3	1,699.4	1,659.0	4.1	6.6	147.00	-367.1	155.1	531.5	524.8	6.76	78.636		
1,900.0	1,890.5	1,793.1	1,749.5	4.3	7.1	146.87	-388.3	167.4	566.4	559.2	7.16	79.075		
2,000.0	1,989.8	1,886.9	1,840.0	4.6	7.6	146.76	-409.5	179.6	601.2	593.6	7.57	79.464		
2,100.0	2,089.0	1,980.6	1,930.5	4.9	8.0	146.66	-430.6	191.9	636.0	628.1	7.97	79.811		
2,200.0	2,188.2	2,074.3	2,020.9	5.2	8.5	146.57	-451.8	204.2	670.9	662.5	8.37	80.122		
2,300.0	2,287.5	2,168.0	2,111.4	5.4	8.9	146.49	-473.0	216.4	705.7	696.9	8.78	80.403		
2,400.0	2,386.7	2,261.8	2,201.9	5.7	9.4	146.42	-494.2	228.7	740.6	731.4	9.18	80.658		
2,500.0	2,486.0	2,355.5	2,292.4	6.0	9.9	146.35	-515.4	240.9	775.4	765.8	9.59	80.890		
2,600.0	2,585.2	2,449.2	2,382.8	6.3	10.3	146.29	-536.6	253.2	810.3	800.3	9.99	81.102		
2,700.0	2,684.4	2,543.0	2,473.3	6.5	10.8	146.23	-557.8	265.5	845.1	834.7	10.40	81.296		
2,800.0	2,783.7	2,636.7	2,563.8	6.8	11.2	146.18	-578.9	277.7	879.9	869.1	10.80	81.476		
2,900.0	2,882.9	2,730.4	2,654.3	7.1	11.7	146.13	-600.1	290.0	914.8	903.6	11.21	81.641		
3,000.0	2,982.2	2,824.2	2,744.8	7.4	12.2	146.09	-621.3	302.2	949.6	938.0	11.61	81.795		
3,100.0	3,081.4	2,917.9	2,835.2	7.6	12.6	146.05	-642.5	314.5	984.5	972.5	12.02	81.937		
3,200.0	3,180.6	3,011.6	2,925.7	7.9	13.1	146.01	-663.7	326.8	1,019.3	1,006.9	12.42	82.070		
3,300.0	3,279.9	3,105.3	3,016.2	8.2	13.5	145.98	-684.9	339.0	1,054.2	1,041.4	12.83	82.194		
3,400.0	3,379.1	3,199.1	3,106.7	8.5	14.0	145.94	-706.1	351.3	1,089.0	1,075.8	13.23	82.310		
3,500.0	3,478.3	3,292.8	3,197.1	8.7	14.5	145.91	-727.2	363.5	1,123.9	1,110.2	13.64	82.419		
3,600.0	3,577.6	3,386.5	3,287.6	9.0	14.9	145.88	-748.4	375.8	1,158.7	1,144.7	14.04	82.521		
3,700.0	3,676.8	3,480.3	3,378.1	9.3	15.4	145.85	-769.6	388.1	1,193.6	1,179.1	14.45	82.617		
3,800.0	3,776.1	3,574.0	3,468.6	9.6	15.8	145.83	-790.8	400.3	1,228.4	1,213.6	14.85	82.708		
3,900.0	3,875.3	3,667.7	3,559.0	9.9	16.3	145.80	-812.0	412.6	1,263.3	1,248.0	15.26	82.794		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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							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	-174.87	-34.6	-3.1	34.7							
100.0	100.0	100.0	100.0	0.1	0.1	-174.87	-34.6	-3.1	34.7	34.5	0.27	127.599				
200.0	200.0	200.0	200.0	0.3	0.3	-174.87	-34.6	-3.1	34.7	34.1	0.62	55.914				
300.0	300.0	300.0	300.0	0.5	0.5	-174.87	-34.6	-3.1	34.7	33.8	0.97	35.801	CC			
304.1	304.1	304.1	304.1	0.5	0.5	-174.88	-34.6	-3.1	34.7	33.8	0.99	35.270				
400.0	400.0	399.9	399.8	0.7	0.7	-179.16	-34.9	-0.5	34.9	33.6	1.32	26.359	ES			
500.0	500.0	499.2	498.8	0.8	0.9	168.63	-35.8	7.2	36.5	34.8	1.69	21.561				
600.0	600.0	598.3	597.2	1.0	1.1	135.37	-37.2	18.9	43.6	41.5	2.10	20.792	SF			
700.0	699.6	697.4	695.6	1.2	1.4	130.02	-38.6	30.9	55.7	53.2	2.50	22.278				
800.0	798.9	796.3	793.7	1.4	1.6	129.37	-40.0	42.9	70.7	67.7	2.93	24.085				
900.0	898.2	895.1	891.8	1.7	1.9	129.20	-41.3	54.9	85.8	82.5	3.38	25.377				
1,000.0	997.4	994.0	989.9	1.9	2.2	129.08	-42.7	66.9	101.0	97.2	3.84	26.311				
1,100.0	1,096.6	1,092.8	1,088.0	2.2	2.4	129.00	-44.1	78.9	116.2	111.9	4.30	27.013				
1,200.0	1,195.9	1,191.7	1,186.2	2.5	2.7	128.93	-45.5	90.9	131.3	126.6	4.77	27.556				
1,300.0	1,295.1	1,290.5	1,284.3	2.7	3.0	128.88	-46.9	102.9	146.5	141.3	5.23	27.987				
1,400.0	1,394.3	1,389.3	1,382.4	3.0	3.2	128.83	-48.3	114.9	161.7	156.0	5.71	28.336				
1,500.0	1,493.6	1,488.2	1,480.5	3.3	3.5	128.80	-49.7	126.9	176.8	170.6	6.18	28.625				
1,600.0	1,592.8	1,587.0	1,578.6	3.5	3.8	128.77	-51.1	138.9	192.0	185.3	6.65	28.867				
1,700.0	1,692.1	1,685.9	1,676.7	3.8	4.0	128.74	-52.5	150.8	207.2	200.0	7.13	29.072				
1,800.0	1,791.3	1,784.7	1,774.8	4.1	4.3	128.72	-53.9	162.8	222.3	214.7	7.60	29.249				
1,900.0	1,890.5	1,883.6	1,872.9	4.3	4.6	128.70	-55.3	174.8	237.5	229.4	8.08	29.403				
2,000.0	1,989.8	1,982.4	1,971.0	4.6	4.9	128.68	-56.7	186.8	252.6	244.1	8.55	29.537				
2,100.0	2,089.0	2,081.3	2,069.1	4.9	5.1	128.67	-58.1	198.8	267.8	258.8	9.03	29.656				
2,200.0	2,188.2	2,180.1	2,167.2	5.2	5.4	128.65	-59.5	210.8	283.0	273.5	9.51	29.761				
2,300.0	2,287.5	2,278.9	2,265.3	5.4	5.7	128.64	-60.9	222.8	298.1	288.2	9.99	29.855				
2,400.0	2,386.7	2,377.8	2,363.4	5.7	6.0	128.63	-62.3	234.8	313.3	302.8	10.46	29.940				
2,500.0	2,486.0	2,476.6	2,461.5	6.0	6.2	128.62	-63.7	246.8	328.5	317.5	10.94	30.017				
2,600.0	2,585.2	2,575.5	2,559.6	6.3	6.5	128.61	-65.0	258.8	343.6	332.2	11.42	30.086				
2,700.0	2,684.4	2,674.3	2,657.7	6.5	6.8	128.60	-66.4	270.8	358.8	346.9	11.90	30.150				
2,800.0	2,783.7	2,773.2	2,755.8	6.8	7.0	128.60	-67.8	282.7	374.0	361.6	12.38	30.208				
2,900.0	2,882.9	2,872.0	2,853.9	7.1	7.3	128.59	-69.2	294.7	389.1	376.3	12.86	30.262				
3,000.0	2,982.2	2,970.8	2,952.0	7.4	7.6	128.58	-70.6	306.7	404.3	390.9	13.34	30.311				
3,100.0	3,081.4	3,069.7	3,050.1	7.6	7.9	128.58	-72.0	318.7	419.4	405.6	13.82	30.357				
3,200.0	3,180.6	3,168.5	3,148.2	7.9	8.1	128.57	-73.4	330.7	434.6	420.3	14.30	30.399				
3,300.0	3,279.9	3,267.4	3,246.3	8.2	8.4	128.57	-74.8	342.7	449.8	435.0	14.78	30.438				
3,400.0	3,379.1	3,366.2	3,344.4	8.5	8.7	128.56	-76.2	354.7	464.9	449.7	15.26	30.475				
3,500.0	3,478.3	3,465.1	3,442.5	8.7	9.0	128.56	-77.6	366.7	480.1	464.4	15.74	30.509				
3,600.0	3,577.6	3,563.9	3,540.6	9.0	9.2	128.55	-79.0	378.7	495.3	479.1	16.22	30.541				
3,700.0	3,676.8	3,662.7	3,638.7	9.3	9.5	128.55	-80.4	390.7	510.4	493.7	16.70	30.572				
3,800.0	3,776.1	3,761.6	3,736.8	9.6	9.8	128.54	-81.8	402.7	525.6	508.4	17.18	30.600				
3,900.0	3,875.3	3,860.4	3,835.0	9.9	10.0	128.54	-83.2	414.6	540.8	523.1	17.66	30.627				
4,000.0	3,974.5	3,959.3	3,933.1	10.1	10.3	128.54	-84.6	426.6	555.9	537.8	18.14	30.652				
4,100.0	4,073.8	4,058.1	4,031.2	10.4	10.6	128.53	-86.0	438.6	571.1	552.5	18.62	30.676				
4,200.0	4,173.0	4,157.0	4,129.3	10.7	10.9	128.53	-87.3	450.6	586.3	567.2	19.10	30.698				
4,300.0	4,272.3	4,255.8	4,227.4	11.0	11.1	128.53	-88.7	462.6	601.4	581.8	19.58	30.720				
4,400.0	4,371.5	4,354.7	4,325.5	11.2	11.4	128.53	-90.1	474.6	616.6	596.5	20.06	30.740				
4,500.0	4,470.7	4,453.5	4,423.6	11.5	11.7	128.52	-91.5	486.6	631.7	611.2	20.54	30.759				
4,600.0	4,570.0	4,552.3	4,521.7	11.8	12.0	128.52	-92.9	498.6	646.9	625.9	21.02	30.778				
4,700.0	4,669.2	4,651.2	4,619.8	12.1	12.2	128.52	-94.3	510.6	662.1	640.6	21.50	30.795				
4,800.0	4,768.4	4,750.0	4,717.9	12.3	12.5	128.52	-95.7	522.6	677.2	655.3	21.98	30.812				
4,900.0	4,867.7	4,848.9	4,816.0	12.6	12.8	128.51	-97.1	534.5	692.4	669.9	22.46	30.828				
5,000.0	4,966.9	4,947.7	4,914.1	12.9	13.1	128.51	-98.5	546.5	707.6	684.6	22.94	30.843				

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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								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	5,066.2	5,046.6	5,012.2	13.2	13.3	128.51	-99.9	558.5	722.7	699.3	23.42	30.858			
5,200.0	5,165.4	5,145.4	5,110.3	13.4	13.6	128.51	-101.3	570.5	737.9	714.0	23.90	30.872			
5,300.0	5,264.6	5,244.2	5,208.4	13.7	13.9	128.51	-102.7	582.5	753.1	728.7	24.38	30.885			
5,400.0	5,363.9	5,343.1	5,306.5	14.0	14.1	128.50	-104.1	594.5	768.2	743.4	24.86	30.898			
5,500.0	5,463.1	5,441.9	5,404.6	14.3	14.4	128.50	-105.5	606.5	783.4	758.0	25.34	30.910			
5,600.0	5,562.4	5,540.8	5,502.7	14.6	14.7	128.50	-106.9	618.5	798.6	772.7	25.82	30.922			
5,700.0	5,661.6	5,639.6	5,600.8	14.8	15.0	128.50	-108.3	630.5	813.7	787.4	26.31	30.933			
5,800.0	5,760.8	5,738.5	5,698.9	15.1	15.2	128.50	-109.6	642.5	828.9	802.1	26.79	30.944			
5,900.0	5,860.1	5,837.3	5,797.0	15.4	15.5	128.50	-111.0	654.5	844.0	816.8	27.27	30.955			
6,000.0	5,959.3	5,936.2	5,895.1	15.7	15.8	128.49	-112.4	666.4	859.2	831.5	27.75	30.965			
6,100.0	6,058.5	6,035.0	5,993.2	15.9	16.1	128.49	-113.8	678.4	874.4	846.1	28.23	30.975			
6,200.0	6,157.8	6,133.8	6,091.3	16.2	16.3	128.49	-115.2	690.4	889.5	860.8	28.71	30.984			
6,300.0	6,257.0	6,232.7	6,189.4	16.5	16.6	128.49	-116.6	702.4	904.7	875.5	29.19	30.994			
6,400.0	6,356.3	6,331.5	6,287.5	16.8	16.9	128.49	-118.0	714.4	919.9	890.2	29.67	31.002			
6,500.0	6,455.5	6,430.4	6,385.6	17.0	17.2	128.49	-119.4	726.4	935.0	904.9	30.15	31.011			
6,600.0	6,554.7	6,529.2	6,483.7	17.3	17.4	128.49	-120.8	738.4	950.2	919.6	30.63	31.019			
6,700.0	6,654.0	6,628.1	6,581.9	17.6	17.7	128.49	-122.2	750.4	965.4	934.2	31.11	31.027			
6,800.0	6,753.2	6,734.9	6,687.9	17.9	18.0	128.50	-123.7	763.1	980.4	948.8	31.60	31.024			
6,900.0	6,852.5	6,860.4	6,812.9	18.2	18.2	128.70	-124.9	774.0	993.4	961.4	32.09	30.962			
7,000.0	6,951.7	6,986.3	6,938.7	18.4	18.4	129.14	-125.6	779.4	1,003.8	971.3	32.52	30.868			
7,100.0	7,050.9	7,098.5	7,050.9	18.7	18.6	129.72	-125.6	780.0	1,012.0	979.1	32.91	30.755			
7,200.0	7,150.2	7,197.8	7,150.2	19.0	18.7	130.25	-125.6	780.0	1,020.0	986.7	33.27	30.658			
7,300.0	7,249.4	7,297.0	7,249.4	19.3	18.8	130.78	-125.6	780.0	1,028.0	994.4	33.63	30.567			
7,400.0	7,348.7	7,396.3	7,348.7	19.5	18.9	131.33	-125.6	780.0	1,035.6	1,001.5	34.01	30.452			
7,500.0	7,448.4	7,496.0	7,448.4	19.7	19.0	131.75	-125.6	780.0	1,040.9	1,006.6	34.35	30.307			
7,600.0	7,548.3	7,595.9	7,548.3	19.9	19.2	131.98	-125.6	780.0	1,044.0	1,009.4	34.65	30.133			
7,700.0	7,648.3	7,695.9	7,648.3	20.0	19.3	152.05	-125.6	780.0	1,044.8	1,009.9	34.92	29.924			
7,800.0	7,748.3	7,795.9	7,748.3	20.1	19.4	152.05	-125.6	780.0	1,044.8	1,009.6	35.18	29.695			
7,900.0	7,848.3	7,895.9	7,848.3	20.2	19.5	152.05	-125.6	780.0	1,044.8	1,009.4	35.45	29.469			
8,000.0	7,948.3	7,995.9	7,948.3	20.3	19.6	152.05	-125.6	780.0	1,044.8	1,009.1	35.73	29.246			
8,100.0	8,048.3	8,095.9	8,048.3	20.5	19.8	152.05	-125.6	780.0	1,044.8	1,008.8	36.00	29.024			
8,200.0	8,148.3	8,195.9	8,148.3	20.6	19.9	152.05	-125.6	780.0	1,044.8	1,008.6	36.27	28.805			
8,300.0	8,248.3	8,295.9	8,248.3	20.7	20.0	152.05	-125.6	780.0	1,044.8	1,008.3	36.55	28.588			
8,400.0	8,348.3	8,395.9	8,348.3	20.8	20.1	152.05	-125.6	780.0	1,044.8	1,008.0	36.82	28.373			
8,500.0	8,448.3	8,495.9	8,448.3	20.9	20.3	152.05	-125.6	780.0	1,044.8	1,007.7	37.10	28.161			
8,600.0	8,548.3	8,595.9	8,548.3	21.1	20.4	152.05	-125.6	780.0	1,044.8	1,007.5	37.38	27.951			
8,700.0	8,648.3	8,695.9	8,648.3	21.2	20.5	152.05	-125.6	780.0	1,044.8	1,007.2	37.66	27.743			
8,800.0	8,748.3	8,795.9	8,748.3	21.3	20.7	152.05	-125.6	780.0	1,044.8	1,006.9	37.94	27.537			
8,900.0	8,848.3	8,895.9	8,848.3	21.4	20.8	152.05	-125.6	780.0	1,044.8	1,006.6	38.23	27.334			
9,000.0	8,948.3	8,995.9	8,948.3	21.6	20.9	152.05	-125.6	780.0	1,044.8	1,006.3	38.51	27.132			
9,100.0	9,048.3	9,095.9	9,048.3	21.7	21.0	152.05	-125.6	780.0	1,044.8	1,006.0	38.79	26.933			
9,200.0	9,148.3	9,195.9	9,148.3	21.8	21.2	152.05	-125.6	780.0	1,044.8	1,005.8	39.08	26.736			
9,300.0	9,248.3	9,295.9	9,248.3	22.0	21.3	152.05	-125.6	780.0	1,044.8	1,005.5	39.37	26.542			
9,400.0	9,348.3	9,395.9	9,348.3	22.1	21.4	152.05	-125.6	780.0	1,044.8	1,005.2	39.65	26.349			
9,500.0	9,448.3	9,495.9	9,448.3	22.2	21.6	152.05	-125.6	780.0	1,044.8	1,004.9	39.94	26.159			
9,600.0	9,548.3	9,595.9	9,548.3	22.3	21.7	152.05	-125.6	780.0	1,044.8	1,004.6	40.23	25.971			
9,700.0	9,648.3	9,695.9	9,648.3	22.5	21.8	152.05	-125.6	780.0	1,044.8	1,004.3	40.52	25.784			
9,800.0	9,748.3	9,795.9	9,748.3	22.6	22.0	152.05	-125.6	780.0	1,044.8	1,004.0	40.81	25.600			
9,900.0	9,848.3	9,895.9	9,848.3	22.7	22.1	152.05	-125.6	780.0	1,044.8	1,003.7	41.11	25.418			
10,000.0	9,948.3	9,995.9	9,948.3	22.9	22.2	152.05	-125.6	780.0	1,044.8	1,003.4	41.40	25.238			
10,062.1	10,010.4	10,058.0	10,010.4	23.0	22.3	152.05	-125.6	780.0	1,044.8	1,003.3	41.58	25.127			
10,098.7	10,047.0	10,084.6	10,037.0	23.0	22.4	152.05	-125.6	780.0	1,044.9	1,003.2	41.67	25.073			

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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		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	-174.44	-101.6	-9.9	102.1					
100.0	100.0	100.0	100.0	0.1	0.1	-174.44	-101.6	-9.9	102.1	101.8	0.27	374.997		
200.0	200.0	200.0	200.0	0.3	0.3	-174.44	-101.6	-9.9	102.1	101.5	0.62	164.325		
300.0	300.0	300.0	300.0	0.5	0.5	-174.44	-101.6	-9.9	102.1	101.1	0.97	105.215 CC, ES		
400.0	400.0	395.6	395.6	0.7	0.7	-175.15	-103.8	-8.8	104.2	102.9	1.31	79.432		
500.0	500.0	490.7	490.4	0.8	0.9	-177.10	-110.1	-5.6	110.7	109.0	1.65	66.917		
600.0	600.0	584.6	583.6	1.0	1.1	160.40	-120.5	-0.3	124.1	122.0	2.02	61.532 SF		
700.0	699.6	676.1	673.6	1.2	1.4	158.21	-134.5	6.8	146.7	144.4	2.37	61.862		
800.0	798.9	764.4	759.8	1.4	1.8	156.61	-151.7	15.5	177.4	174.6	2.74	64.791		
900.0	898.2	849.9	842.3	1.7	2.2	155.17	-171.8	25.6	212.4	209.2	3.11	68.244		
1,000.0	997.4	936.4	924.8	1.9	2.6	153.78	-195.1	37.4	251.0	247.5	3.49	71.894		
1,100.0	1,096.6	1,028.2	1,012.1	2.2	3.1	152.64	-220.4	50.3	290.4	286.5	3.88	74.803		
1,200.0	1,195.9	1,119.9	1,099.3	2.5	3.7	151.77	-245.7	63.1	329.9	325.6	4.27	77.175		
1,300.0	1,295.1	1,211.7	1,186.6	2.7	4.2	151.08	-271.0	75.9	369.5	364.8	4.67	79.145		
1,400.0	1,394.3	1,303.4	1,273.8	3.0	4.7	150.53	-296.4	88.7	409.1	404.0	5.06	80.804		
1,500.0	1,493.6	1,395.2	1,361.1	3.3	5.2	150.07	-321.7	101.6	448.7	443.2	5.46	82.218		
1,600.0	1,592.8	1,487.0	1,448.3	3.5	5.7	149.69	-347.0	114.4	488.3	482.5	5.85	83.439		
1,700.0	1,692.1	1,578.7	1,535.6	3.8	6.2	149.37	-372.4	127.2	528.0	521.7	6.25	84.503		
1,800.0	1,791.3	1,670.5	1,622.9	4.1	6.8	149.09	-397.7	140.1	567.7	561.0	6.64	85.438		
1,900.0	1,890.5	1,762.3	1,710.1	4.3	7.3	148.85	-423.0	152.9	607.3	600.3	7.04	86.267		
2,000.0	1,989.8	1,854.0	1,797.4	4.6	7.8	148.63	-448.4	165.7	647.0	639.6	7.44	87.006		
2,100.0	2,089.0	1,945.8	1,884.6	4.9	8.3	148.45	-473.7	178.5	686.7	678.9	7.83	87.669		
2,200.0	2,188.2	2,037.6	1,971.9	5.2	8.8	148.28	-499.0	191.4	726.4	718.2	8.23	88.267		
2,300.0	2,287.5	2,129.3	2,059.2	5.4	9.4	148.13	-524.3	204.2	766.1	757.5	8.63	88.810		
2,400.0	2,386.7	2,221.1	2,146.4	5.7	9.9	147.99	-549.7	217.0	805.8	796.8	9.02	89.304		
2,500.0	2,486.0	2,312.8	2,233.7	6.0	10.4	147.87	-575.0	229.9	845.5	836.1	9.42	89.755		
2,600.0	2,585.2	2,404.6	2,320.9	6.3	10.9	147.76	-600.3	242.7	885.3	875.4	9.82	90.170		
2,700.0	2,684.4	2,496.4	2,408.2	6.5	11.5	147.66	-625.7	255.5	925.0	914.8	10.21	90.551		
2,800.0	2,783.7	2,588.1	2,495.5	6.8	12.0	147.56	-651.0	268.3	964.7	954.1	10.61	90.904		
2,900.0	2,882.9	2,679.9	2,582.7	7.1	12.5	147.48	-676.3	281.2	1,004.4	993.4	11.01	91.231		
3,000.0	2,982.2	2,771.7	2,670.0	7.4	13.0	147.40	-701.6	294.0	1,044.1	1,032.7	11.41	91.535		
3,100.0	3,081.4	2,863.4	2,757.2	7.6	13.6	147.32	-727.0	306.8	1,083.9	1,072.1	11.80	91.818		
3,200.0	3,180.6	2,955.2	2,844.5	7.9	14.1	147.25	-752.3	319.6	1,123.6	1,111.4	12.20	92.082		
3,300.0	3,279.9	3,046.9	2,931.8	8.2	14.6	147.19	-777.6	332.5	1,163.3	1,150.7	12.60	92.329		
3,400.0	3,379.1	3,138.7	3,019.0	8.5	15.1	147.13	-803.0	345.3	1,203.0	1,190.0	13.00	92.562		
3,500.0	3,478.3	3,230.5	3,106.3	8.7	15.7	147.07	-828.3	358.1	1,242.8	1,229.4	13.39	92.780		
3,600.0	3,577.6	3,322.2	3,193.5	9.0	16.2	147.02	-853.6	371.0	1,282.5	1,268.7	13.79	92.985		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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	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	-169.62	-92.5	-16.9	94.1					
100.0	100.0	100.0	100.0	0.1	0.1	-169.62	-92.5	-16.9	94.1	93.8	0.27	345.444		
200.0	200.0	200.0	200.0	0.3	0.3	-169.62	-92.5	-16.9	94.1	93.4	0.62	151.374 CC, ES		
300.0	300.0	295.3	295.3	0.5	0.5	-169.31	-94.7	-17.9	96.5	95.5	0.96	100.033		
400.0	400.0	390.2	389.9	0.7	0.7	-168.47	-101.2	-20.7	103.8	102.5	1.32	78.852		
500.0	500.0	484.1	483.1	0.8	1.0	-167.31	-111.9	-25.2	116.0	114.3	1.68	69.006		
600.0	600.0	576.2	573.8	1.0	1.3	173.99	-126.5	-31.4	135.5	133.5	1.98	68.372 SF		
700.0	699.6	664.9	660.3	1.2	1.6	175.29	-144.3	-39.0	164.7	162.4	2.30	71.469		
800.0	798.9	749.5	741.9	1.4	2.1	176.43	-164.7	-47.7	202.1	199.5	2.62	77.119		
900.0	898.2	835.2	823.6	1.7	2.5	177.36	-188.5	-57.8	243.5	240.6	2.94	82.816		
1,000.0	997.4	925.8	909.9	1.9	3.0	178.08	-214.1	-68.7	285.6	282.4	3.27	87.416		
1,100.0	1,096.6	1,016.5	996.2	2.2	3.5	178.61	-239.7	-79.6	327.8	324.2	3.59	91.200		
1,200.0	1,195.9	1,107.1	1,082.4	2.5	4.0	179.03	-265.4	-90.5	369.9	366.0	3.92	94.366		
1,300.0	1,295.1	1,197.8	1,168.7	2.7	4.5	179.35	-291.0	-101.5	412.1	407.8	4.25	97.052		
1,400.0	1,394.3	1,288.4	1,255.0	3.0	5.1	179.62	-316.6	-112.4	454.2	449.7	4.57	99.358		
1,500.0	1,493.6	1,379.1	1,341.2	3.3	5.6	179.84	-342.3	-123.3	496.4	491.5	4.90	101.363		
1,600.0	1,592.8	1,469.7	1,427.5	3.5	6.1	-179.97	-367.9	-134.2	538.6	533.4	5.22	103.120		
1,700.0	1,692.1	1,560.4	1,513.8	3.8	6.6	-179.81	-393.5	-145.1	580.8	575.2	5.55	104.674		
1,800.0	1,791.3	1,651.0	1,600.0	4.1	7.1	-179.67	-419.2	-156.0	623.0	617.1	5.87	106.056		
1,900.0	1,890.5	1,741.7	1,686.3	4.3	7.6	-179.55	-444.8	-167.0	665.2	659.0	6.20	107.295		
2,000.0	1,989.8	1,832.4	1,772.6	4.6	8.1	-179.45	-470.4	-177.9	707.4	700.8	6.52	108.411		
2,100.0	2,089.0	1,923.0	1,858.8	4.9	8.6	-179.35	-496.1	-188.8	749.5	742.7	6.85	109.421		
2,200.0	2,188.2	2,013.7	1,945.1	5.2	9.1	-179.27	-521.7	-199.7	791.7	784.6	7.18	110.341		
2,300.0	2,287.5	2,104.3	2,031.4	5.4	9.7	-179.19	-547.3	-210.6	833.9	826.4	7.50	111.181		
2,400.0	2,386.7	2,195.0	2,117.6	5.7	10.2	-179.12	-573.0	-221.5	876.1	868.3	7.83	111.951		
2,500.0	2,486.0	2,285.6	2,203.9	6.0	10.7	-179.06	-598.6	-232.5	918.3	910.2	8.15	112.659		
2,600.0	2,585.2	2,376.3	2,290.2	6.3	11.2	-179.01	-624.2	-243.4	960.5	952.1	8.48	113.314		
2,700.0	2,684.4	2,466.9	2,376.5	6.5	11.7	-178.95	-649.9	-254.3	1,002.7	993.9	8.80	113.921		
2,800.0	2,783.7	2,557.6	2,462.7	6.8	12.2	-178.91	-675.5	-265.2	1,044.9	1,035.8	9.13	114.484		
2,900.0	2,882.9	2,648.3	2,549.0	7.1	12.7	-178.86	-701.1	-276.1	1,087.2	1,077.7	9.45	115.009		
3,000.0	2,982.2	2,738.9	2,635.3	7.4	13.3	-178.82	-726.8	-287.0	1,129.4	1,119.6	9.78	115.498		
3,100.0	3,081.4	2,829.6	2,721.5	7.6	13.8	-178.78	-752.4	-297.9	1,171.6	1,161.5	10.10	115.957		
3,200.0	3,180.6	2,920.2	2,807.8	7.9	14.3	-178.75	-778.0	-308.9	1,213.8	1,203.3	10.43	116.387		
3,300.0	3,279.9	3,010.9	2,894.1	8.2	14.8	-178.72	-803.7	-319.8	1,256.0	1,245.2	10.75	116.791		

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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						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	-174.35	-17.1	-1.7	17.2					
100.0	100.0	100.0	100.0	0.1	0.1	-174.35	-17.1	-1.7	17.2	16.9	0.27	63.198		
200.0	200.0	200.0	200.0	0.3	0.3	-174.35	-17.1	-1.7	17.2	16.6	0.62	27.694		
300.0	300.0	300.6	300.5	0.5	0.5	178.72	-15.4	0.3	15.4	14.5	0.98	15.775		
400.0	400.0	400.5	400.2	0.7	0.7	148.40	-10.4	6.4	12.2	10.9	1.37	8.904		
415.8	415.8	416.2	415.8	0.7	0.8	140.37	-9.3	7.7	12.1	10.7	1.44	8.415 CC, ES, SF		
500.0	500.0	499.5	498.2	0.8	1.0	97.60	-2.2	16.4	16.6	14.9	1.70	9.733		
600.0	600.0	597.2	594.3	1.0	1.4	56.66	9.1	30.0	30.4	28.3	2.09	14.514		
700.0	699.6	695.5	690.3	1.2	1.7	52.35	22.8	46.5	45.8	43.3	2.47	18.513		
800.0	798.9	794.7	787.0	1.4	2.1	53.36	36.7	63.3	59.0	56.1	2.91	20.239		
900.0	898.2	893.8	883.7	1.7	2.6	54.29	50.6	80.1	72.0	68.6	3.37	21.327		
1,000.0	997.4	993.0	980.5	1.9	3.0	54.94	64.5	96.9	85.0	81.1	3.85	22.093		
1,100.0	1,096.6	1,092.1	1,077.2	2.2	3.4	55.42	78.4	113.7	98.0	93.6	4.32	22.655		
1,200.0	1,195.9	1,191.3	1,173.9	2.5	3.8	55.78	92.3	130.4	111.0	106.2	4.81	23.080		
1,300.0	1,295.1	1,290.4	1,270.6	2.7	4.2	56.07	106.2	147.2	124.0	118.7	5.30	23.411		
1,400.0	1,394.3	1,389.6	1,367.4	3.0	4.6	56.30	120.1	164.0	137.0	131.2	5.79	23.675		
1,500.0	1,493.6	1,488.7	1,464.1	3.3	5.1	56.50	134.0	180.8	150.0	143.8	6.28	23.889		
1,600.0	1,592.8	1,587.8	1,560.8	3.5	5.5	56.66	147.9	197.6	163.1	156.3	6.78	24.066		
1,700.0	1,692.1	1,687.0	1,657.5	3.8	5.9	56.80	161.8	214.4	176.1	168.8	7.27	24.215		
1,800.0	1,791.3	1,786.1	1,754.2	4.1	6.3	56.92	175.7	231.2	189.1	181.3	7.77	24.341		
1,900.0	1,890.5	1,885.3	1,851.0	4.3	6.8	57.02	189.6	247.9	202.1	193.9	8.27	24.449		
2,000.0	1,989.8	1,984.4	1,947.7	4.6	7.2	57.11	203.5	264.7	215.2	206.4	8.77	24.543		
2,100.0	2,089.0	2,083.6	2,044.4	4.9	7.6	57.19	217.4	281.5	228.2	218.9	9.27	24.626		
2,200.0	2,188.2	2,182.7	2,141.1	5.2	8.0	57.26	231.3	298.3	241.2	231.4	9.77	24.698		
2,300.0	2,287.5	2,281.9	2,237.9	5.4	8.4	57.33	245.2	315.1	254.2	244.0	10.27	24.762		
2,400.0	2,386.7	2,381.0	2,334.6	5.7	8.9	57.39	259.1	331.9	267.3	256.5	10.77	24.820		
2,500.0	2,486.0	2,480.2	2,431.3	6.0	9.3	57.44	273.0	348.7	280.3	269.0	11.27	24.871		
2,600.0	2,585.2	2,579.3	2,528.0	6.3	9.7	57.49	286.9	365.4	293.3	281.5	11.77	24.918		
2,700.0	2,684.4	2,678.5	2,624.8	6.5	10.1	57.53	300.8	382.2	306.3	294.1	12.27	24.960		
2,800.0	2,783.7	2,777.6	2,721.5	6.8	10.5	57.57	314.7	399.0	319.4	306.6	12.78	24.999		
2,900.0	2,882.9	2,876.8	2,818.2	7.1	11.0	57.61	328.6	415.8	332.4	319.1	13.28	25.034		
3,000.0	2,982.2	2,975.9	2,914.9	7.4	11.4	57.64	342.5	432.6	345.4	331.6	13.78	25.066		
3,100.0	3,081.4	3,075.1	3,011.6	7.6	11.8	57.68	356.4	449.4	358.4	344.2	14.28	25.096		
3,200.0	3,180.6	3,174.2	3,108.4	7.9	12.2	57.70	370.3	466.1	371.5	356.7	14.79	25.124		
3,300.0	3,279.9	3,273.4	3,205.1	8.2	12.7	57.73	384.2	482.9	384.5	369.2	15.29	25.149		
3,400.0	3,379.1	3,372.5	3,301.8	8.5	13.1	57.76	398.1	499.7	397.5	381.7	15.79	25.173		
3,500.0	3,478.3	3,471.7	3,398.5	8.7	13.5	57.78	412.0	516.5	410.6	394.3	16.30	25.195		
3,600.0	3,577.6	3,570.8	3,495.3	9.0	13.9	57.81	425.9	533.3	423.6	406.8	16.80	25.215		
3,700.0	3,676.8	3,669.9	3,592.0	9.3	14.3	57.83	439.8	550.1	436.6	419.3	17.30	25.235		
3,800.0	3,776.1	3,769.1	3,688.7	9.6	14.8	57.85	453.7	566.9	449.6	431.8	17.81	25.253		
3,900.0	3,875.3	3,868.2	3,785.4	9.9	15.2	57.87	467.6	583.6	462.7	444.4	18.31	25.270		
4,000.0	3,974.5	3,967.4	3,882.2	10.1	15.6	57.88	481.5	600.4	475.7	456.9	18.81	25.286		
4,100.0	4,073.8	4,066.5	3,978.9	10.4	16.0	57.90	495.4	617.2	488.7	469.4	19.32	25.301		
4,200.0	4,173.0	4,165.7	4,075.6	10.7	16.5	57.92	509.3	634.0	501.8	481.9	19.82	25.315		
4,300.0	4,272.3	4,264.8	4,172.3	11.0	16.9	57.93	523.2	650.8	514.8	494.5	20.32	25.328		
4,400.0	4,371.5	4,364.0	4,269.0	11.2	17.3	57.95	537.1	667.6	527.8	507.0	20.83	25.341		
4,500.0	4,470.7	4,463.1	4,365.8	11.5	17.7	57.96	551.0	684.4	540.8	519.5	21.33	25.353		
4,600.0	4,570.0	4,562.3	4,462.5	11.8	18.2	57.97	564.9	701.1	553.9	532.0	21.84	25.364		
4,700.0	4,669.2	4,661.4	4,559.2	12.1	18.6	57.99	578.8	717.9	566.9	544.6	22.34	25.375		
4,800.0	4,768.4	4,760.6	4,655.9	12.3	19.0	58.00	592.7	734.7	579.9	557.1	22.84	25.386		
4,900.0	4,867.7	4,859.7	4,752.7	12.6	19.4	58.01	606.6	751.5	592.9	569.6	23.35	25.396		
5,000.0	4,966.9	4,958.9	4,849.4	12.9	19.8	58.02	620.5	768.3	606.0	582.1	23.85	25.405		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	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							Warning		
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Total Uncertainty Axis	Separation Factor				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)						
5,100.0	5,066.2	5,058.0	4,946.1	13.2	20.3	58.03	634.4	785.1	619.0	594.6	24.36	25.414				
5,200.0	5,165.4	5,157.2	5,042.8	13.4	20.7	58.04	648.3	801.9	632.0	607.2	24.86	25.423				
5,300.0	5,264.6	5,256.3	5,139.5	13.7	21.1	58.05	662.1	818.6	645.1	619.7	25.37	25.431				
5,400.0	5,363.9	5,355.5	5,236.3	14.0	21.5	58.06	676.0	835.4	658.1	632.2	25.87	25.439				
5,500.0	5,463.1	5,454.6	5,333.0	14.3	22.0	58.07	689.9	852.2	671.1	644.7	26.37	25.446				
5,600.0	5,562.4	5,553.8	5,429.7	14.6	22.4	58.08	703.8	869.0	684.1	657.3	26.88	25.454				
5,700.0	5,661.6	5,652.9	5,526.4	14.8	22.8	58.09	717.7	885.8	697.2	669.8	27.38	25.461				
5,800.0	5,760.8	5,752.0	5,623.2	15.1	23.2	58.10	731.6	902.6	710.2	682.3	27.89	25.467				
5,900.0	5,860.1	5,851.2	5,719.9	15.4	23.6	58.10	745.5	919.3	723.2	694.8	28.39	25.474				
6,000.0	5,959.3	5,950.3	5,816.6	15.7	24.1	58.11	759.4	936.1	736.3	707.4	28.90	25.480				
6,100.0	6,058.5	6,049.5	5,913.3	15.9	24.5	58.12	773.3	952.9	749.3	719.9	29.40	25.486				
6,200.0	6,157.8	6,148.6	6,010.1	16.2	24.9	58.12	787.2	969.7	762.3	732.4	29.90	25.492				
6,300.0	6,257.0	6,247.8	6,106.8	16.5	25.3	58.13	801.1	986.5	775.3	744.9	30.41	25.497				
6,400.0	6,356.3	6,346.9	6,203.5	16.8	25.8	58.14	815.0	1,003.3	788.4	757.5	30.91	25.503				
6,500.0	6,455.5	6,446.1	6,300.2	17.0	26.2	58.14	828.9	1,020.1	801.4	770.0	31.42	25.508				
6,600.0	6,554.7	6,545.2	6,396.9	17.3	26.6	58.15	842.8	1,036.8	814.4	782.5	31.92	25.513				
6,700.0	6,654.0	6,644.4	6,493.7	17.6	27.0	58.16	856.7	1,053.6	827.5	795.0	32.43	25.518				
6,800.0	6,753.2	6,743.5	6,590.4	17.9	27.5	58.16	870.6	1,070.4	840.5	807.6	32.93	25.522				
6,900.0	6,852.5	6,842.7	6,687.1	18.2	27.9	58.17	884.5	1,087.2	853.5	820.1	33.44	25.527				
7,000.0	6,951.7	6,941.8	6,783.8	18.4	28.3	58.17	898.4	1,104.0	866.5	832.6	33.94	25.531				
7,100.0	7,050.9	7,041.0	6,880.6	18.7	28.7	58.18	912.3	1,120.8	879.6	845.1	34.45	25.536				
7,200.0	7,150.2	7,140.1	6,977.3	19.0	29.1	58.18	926.2	1,137.6	892.6	857.7	34.95	25.540				
7,300.0	7,249.4	7,238.0	7,102.4	19.3	29.6	58.25	943.0	1,157.8	904.5	868.9	35.53	25.458				
7,400.0	7,348.7	7,406.2	7,238.8	19.5	30.1	58.53	957.2	1,174.9	912.7	876.5	36.13	25.258				
7,500.0	7,448.4	7,545.1	7,376.8	19.7	30.4	58.76	967.2	1,187.0	918.4	881.8	36.63	25.071				
7,600.0	7,548.3	7,684.3	7,515.7	19.9	30.6	58.89	972.9	1,193.9	921.7	884.7	37.02	24.896				
7,700.0	7,648.3	7,816.9	7,648.3	20.0	30.7	78.94	974.4	1,195.7	922.5	885.2	37.31	24.728				
7,800.0	7,748.3	7,916.9	7,748.3	20.1	30.8	78.94	974.4	1,195.7	922.5	885.0	37.56	24.561				
7,900.0	7,848.3	8,016.9	7,848.3	20.2	30.8	78.94	974.4	1,195.7	922.5	884.7	37.82	24.395				
8,000.0	7,948.3	8,116.9	7,948.3	20.3	30.9	78.94	974.4	1,195.7	922.5	884.5	38.07	24.231				
8,100.0	8,048.3	8,216.9	8,048.3	20.5	31.0	78.94	974.4	1,195.7	922.5	884.2	38.33	24.068				
8,200.0	8,148.3	8,316.9	8,148.3	20.6	31.1	78.94	974.4	1,195.7	922.5	883.9	38.59	23.906				
8,300.0	8,248.3	8,416.9	8,248.3	20.7	31.2	78.94	974.4	1,195.7	922.5	883.7	38.85	23.746				
8,400.0	8,348.3	8,516.9	8,348.3	20.8	31.2	78.94	974.4	1,195.7	922.5	883.4	39.11	23.586				
8,500.0	8,448.3	8,616.9	8,448.3	20.9	31.3	78.94	974.4	1,195.7	922.5	883.2	39.38	23.429				
8,600.0	8,548.3	8,716.9	8,548.3	21.1	31.4	78.94	974.4	1,195.7	922.5	882.9	39.64	23.272				
8,700.0	8,648.3	8,816.9	8,648.3	21.2	31.5	78.94	974.4	1,195.7	922.5	882.6	39.91	23.117				
8,800.0	8,748.3	8,916.9	8,748.3	21.3	31.6	78.94	974.4	1,195.7	922.5	882.4	40.17	22.963				
8,900.0	8,848.3	9,016.9	8,848.3	21.4	31.7	78.94	974.4	1,195.7	922.5	882.1	40.44	22.811				
9,000.0	8,948.3	9,116.9	8,948.3	21.6	31.8	78.94	974.4	1,195.7	922.5	881.8	40.71	22.659				
9,100.0	9,048.3	9,216.9	9,048.3	21.7	31.8	78.94	974.4	1,195.7	922.5	881.5	40.98	22.509				
9,200.0	9,148.3	9,316.9	9,148.3	21.8	31.9	78.94	974.4	1,195.7	922.5	881.3	41.26	22.361				
9,300.0	9,248.3	9,416.9	9,248.3	22.0	32.0	78.94	974.4	1,195.7	922.5	881.0	41.53	22.214				
9,400.0	9,348.3	9,516.9	9,348.3	22.1	32.1	78.94	974.4	1,195.7	922.5	880.7	41.80	22.068				
9,500.0	9,448.3	9,616.9	9,448.3	22.2	32.2	78.94	974.4	1,195.7	922.5	880.4	42.08	21.923				
9,600.0	9,548.3	9,716.9	9,548.3	22.3	32.3	78.94	974.4	1,195.7	922.5	880.2	42.36	21.780				
9,700.0	9,648.3	9,816.9	9,648.3	22.5	32.4	78.94	974.4	1,195.7	922.5	879.9	42.63	21.638				
9,800.0	9,748.3	9,916.9	9,748.3	22.6	32.5	78.94	974.4	1,195.7	922.5	879.6	42.91	21.498				
9,900.0	9,848.3	10,016.9	9,848.3	22.7	32.6	78.94	974.4	1,195.7	922.5	879.3	43.19	21.358				
10,000.0	9,948.3	10,116.9	9,948.3	22.9	32.7	78.94	974.4	1,195.7	922.5	879.1	43.47	21.220				
10,098.7	10,047.0	10,215.6	10,047.0	23.0	32.8	78.94	974.4	1,195.7	922.5	878.8	43.75	21.086				

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 113-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		
6,300.0	6,257.0	6,386.9	6,277.2	16.5	21.8	-51.44	1,731.1	-383.4	1,264.8	1,237.2	27.65	45.740		
6,400.0	6,356.3	6,463.5	6,352.4	16.8	22.1	-52.03	1,716.4	-380.5	1,238.7	1,210.5	28.21	43.903		
6,500.0	6,455.5	6,546.2	6,433.7	17.0	22.4	-52.71	1,701.1	-378.4	1,214.1	1,185.3	28.82	42.125		
6,600.0	6,554.7	6,641.1	6,526.9	17.3	22.8	-53.55	1,684.0	-376.6	1,190.3	1,160.8	29.51	40.332		
6,700.0	6,654.0	6,728.5	6,612.8	17.6	23.1	-54.41	1,667.5	-376.0	1,166.8	1,136.6	30.21	38.624		
6,800.0	6,753.2	6,821.4	6,704.2	17.9	23.4	-55.33	1,651.0	-375.5	1,144.6	1,113.6	30.93	37.005		
6,900.0	6,852.5	6,919.9	6,801.2	18.2	23.7	-56.22	1,634.4	-372.7	1,122.1	1,090.5	31.64	35.462		
7,000.0	6,951.7	7,002.9	6,883.1	18.4	24.0	-56.96	1,621.2	-369.8	1,100.4	1,068.1	32.28	34.092		
7,100.0	7,050.9	7,077.5	6,957.0	18.7	24.2	-57.62	1,610.6	-367.7	1,080.6	1,047.7	32.87	32.871		
7,200.0	7,150.2	7,155.0	7,033.9	19.0	24.4	-58.29	1,601.5	-366.1	1,063.3	1,029.8	33.47	31.767		
7,300.0	7,249.4	7,230.5	7,109.1	19.3	24.6	-58.91	1,594.3	-364.8	1,048.1	1,014.1	34.05	30.787		
7,400.0	7,348.7	7,309.5	7,187.8	19.5	24.7	-59.34	1,588.2	-363.5	1,035.1	1,000.6	34.55	29.963		
7,500.0	7,448.4	7,386.1	7,264.3	19.7	24.8	-59.59	1,583.9	-362.5	1,026.0	991.0	34.94	29.362		
7,600.0	7,548.3	7,468.1	7,346.3	19.9	25.0	-59.75	1,581.4	-362.1	1,020.8	985.5	35.28	28.935		
7,700.0	7,648.3	7,565.3	7,443.4	20.0	25.1	-39.86	1,578.9	-362.1	1,018.2	982.6	35.60	28.606		
7,800.0	7,748.3	7,663.9	7,542.0	20.1	25.2	-39.95	1,576.4	-362.2	1,016.4	980.5	35.90	28.313		
7,900.0	7,848.3	7,762.3	7,640.4	20.2	25.3	-40.02	1,574.3	-362.2	1,014.8	978.6	36.20	28.036		
8,000.0	7,948.3	7,862.1	7,740.1	20.3	25.4	-40.09	1,572.4	-362.1	1,013.2	976.7	36.49	27.766		
8,100.0	8,048.3	7,961.9	7,839.9	20.5	25.6	-40.15	1,570.5	-361.9	1,011.6	974.9	36.79	27.501		
8,200.0	8,148.3	8,061.8	7,939.8	20.6	25.7	-40.22	1,568.5	-361.9	1,010.1	973.0	37.09	27.235		
8,300.0	8,248.3	8,161.8	8,039.7	20.7	25.8	-40.33	1,566.1	-362.4	1,008.6	971.2	37.41	26.961		
8,400.0	8,348.3	8,260.8	8,138.7	20.8	25.9	-40.45	1,563.6	-363.0	1,007.1	969.4	37.73	26.690		
8,500.0	8,448.3	8,362.2	8,240.1	20.9	26.1	-40.58	1,561.0	-363.8	1,005.6	967.6	38.06	26.419		
8,600.0	8,548.3	8,459.8	8,337.7	21.1	26.2	-40.70	1,558.5	-364.5	1,004.1	965.7	38.39	26.155		
8,700.0	8,648.3	8,558.1	8,435.9	21.2	26.3	-40.83	1,556.2	-365.3	1,002.9	964.2	38.71	25.906		
8,800.0	8,748.3	8,661.2	8,539.0	21.3	26.5	-40.93	1,554.0	-365.8	1,001.6	962.6	39.04	25.659		
8,900.0	8,848.3	8,766.4	8,644.2	21.4	26.6	-41.02	1,551.6	-365.9	999.9	960.6	39.36	25.406		
9,000.0	8,948.3	8,869.5	8,747.2	21.6	26.8	-41.10	1,549.0	-365.4	997.8	958.1	39.67	25.151		
9,100.0	9,048.3	8,966.5	8,844.2	21.7	26.9	-41.16	1,546.7	-364.9	995.6	955.6	39.97	24.910		
9,200.0	9,148.3	9,063.6	8,941.2	21.8	27.0	-41.26	1,544.3	-365.0	993.8	953.5	40.29	24.667		
9,300.0	9,248.3	9,165.8	9,043.4	22.0	27.2	-41.39	1,541.5	-365.4	992.0	951.4	40.62	24.419		
9,400.0	9,348.3	9,272.2	9,149.8	22.1	27.3	-41.49	1,538.4	-365.1	989.7	948.7	40.95	24.168		
9,500.0	9,448.3	9,371.2	9,248.7	22.2	27.4	-41.53	1,536.1	-363.9	987.1	945.9	41.24	23.935		
9,600.0	9,548.3	9,468.4	9,346.0	22.3	27.6	-41.55	1,534.1	-362.8	984.8	943.3	41.53	23.714		
9,700.0	9,648.3	9,568.4	9,445.9	22.5	27.7	-41.59	1,532.1	-361.8	982.6	940.8	41.82	23.494		
9,798.1	9,746.4	9,645.0	9,522.5	22.6	27.8	-41.61	1,530.6	-360.9	980.7	938.6	42.08	23.307 CC		
9,800.0	9,748.3	9,645.0	9,522.5	22.6	27.8	-41.61	1,530.6	-360.9	980.7	938.6	42.08	23.306 ES, SF		
9,900.0	9,848.3	9,645.0	9,522.5	22.7	27.8	-41.61	1,530.6	-360.9	986.0	943.8	42.22	23.354		
10,000.0	9,948.3	9,645.0	9,522.5	22.9	27.8	-41.61	1,530.6	-360.9	1,001.2	958.9	42.36	23.638		
10,098.7	10,047.0	9,645.0	9,522.5	23.0	27.8	-41.61	1,530.6	-360.9	1,025.7	983.2	42.50	24.136		

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

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well HMU Federal 16-10A
Project:	Mamm Creek	TVD Reference:	WELL @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	MD Reference:	WELL @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	HMU Federal 16-10A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	DD	Database:	EDM 5000.1 US Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

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

Coordinates are relative to: HMU Federal 16-10A
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°

