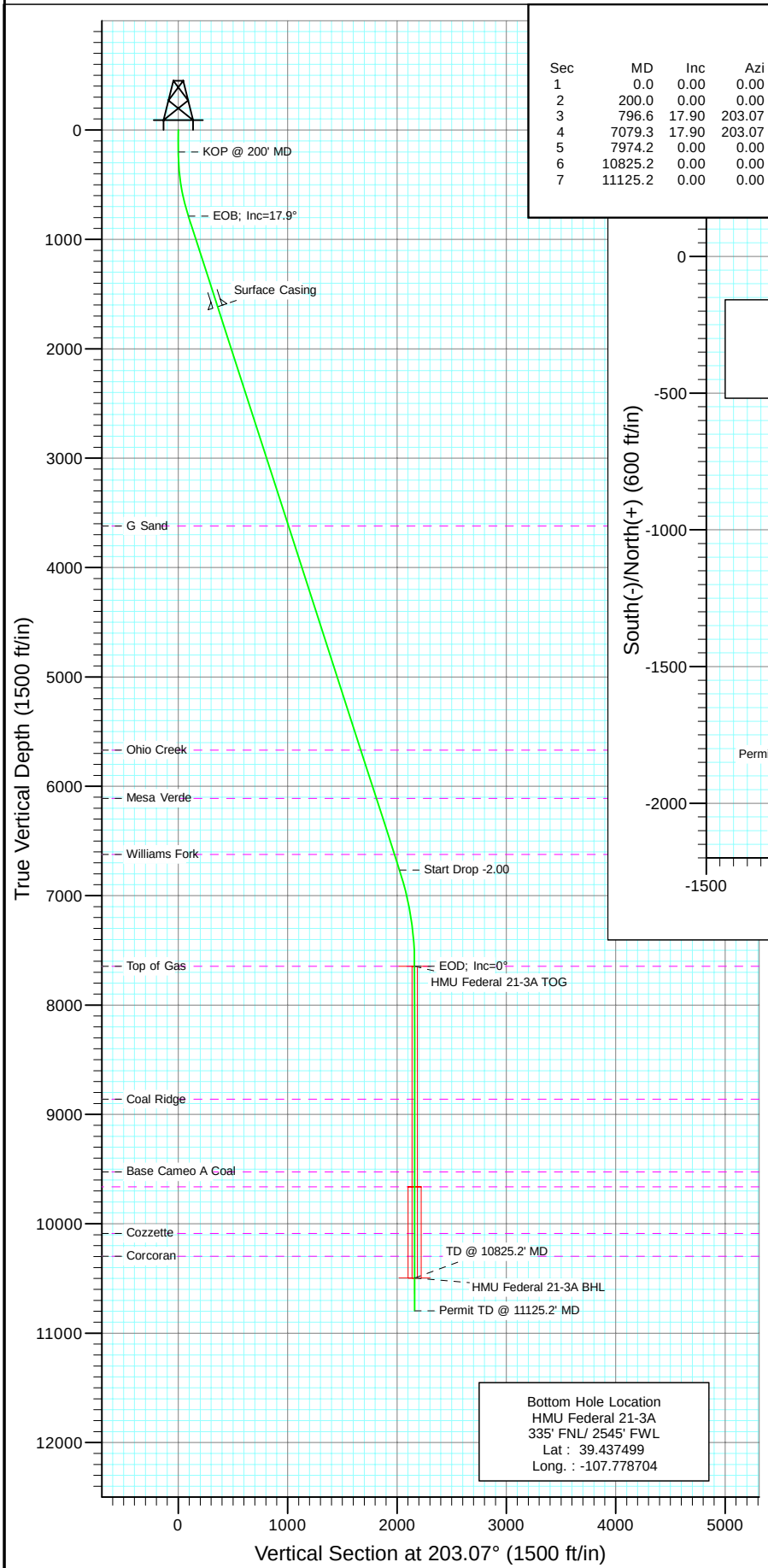
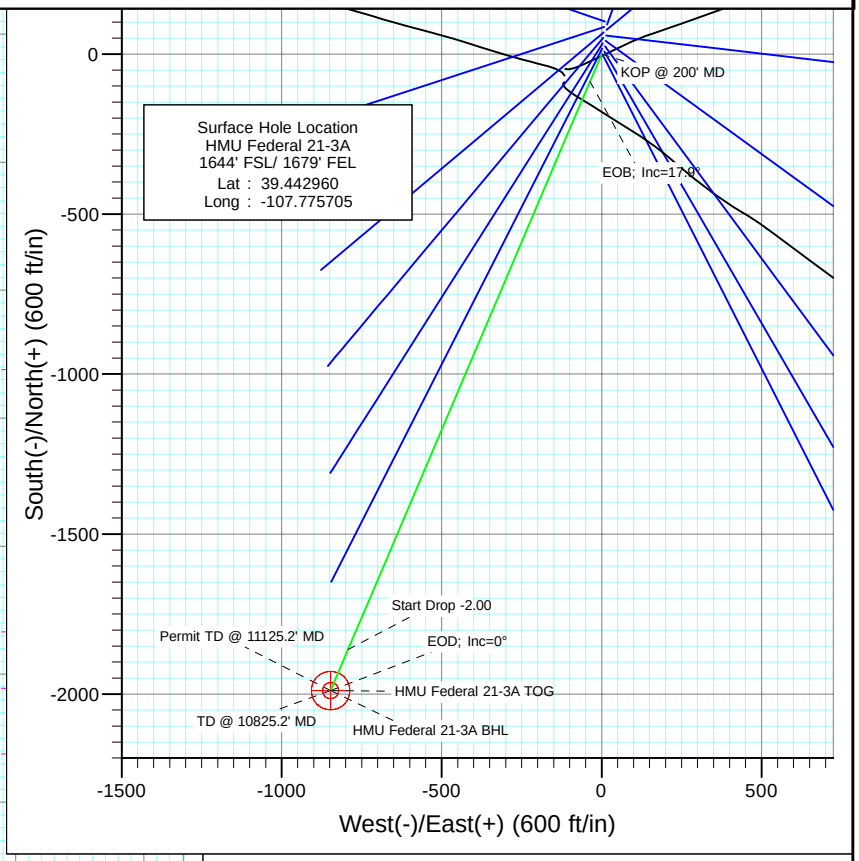
Project: Mamm Creek
Site: (J16W)
Well: HMU Federal 21-3A
Wellbore: DD
Design: Plan #1

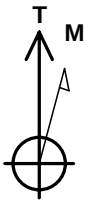
CATHEDRAL

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	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	796.6	17.90	203.07	786.9	-85.0	-36.2	3.00	203.07	92.4	
4	7079.3	17.90	203.07	6765.6	-1861.5	-792.7	0.00	0.00	2023.3	
5	7974.2	0.00	0.00	7646.0	-1989.1	-847.0	2.00	180.00	2161.9	HMU Federal 21-3A TOG
6	10825.2	0.00	0.00	10497.0	-1989.1	-847.0	0.00	0.00	2161.9	HMU Federal 21-3A BHL
7	11125.2	0.00	0.00	10797.0	-1989.1	-847.0	0.00	0.00	2161.9	







Azimuths to True North
Magnetic North: 10.30°

Magnetic Field
Strength: 52330.6snT
Dip Angle: 65.77°
Date: 10/29/2010
Model: IGRF200510

FORMATION TOP DETAILS

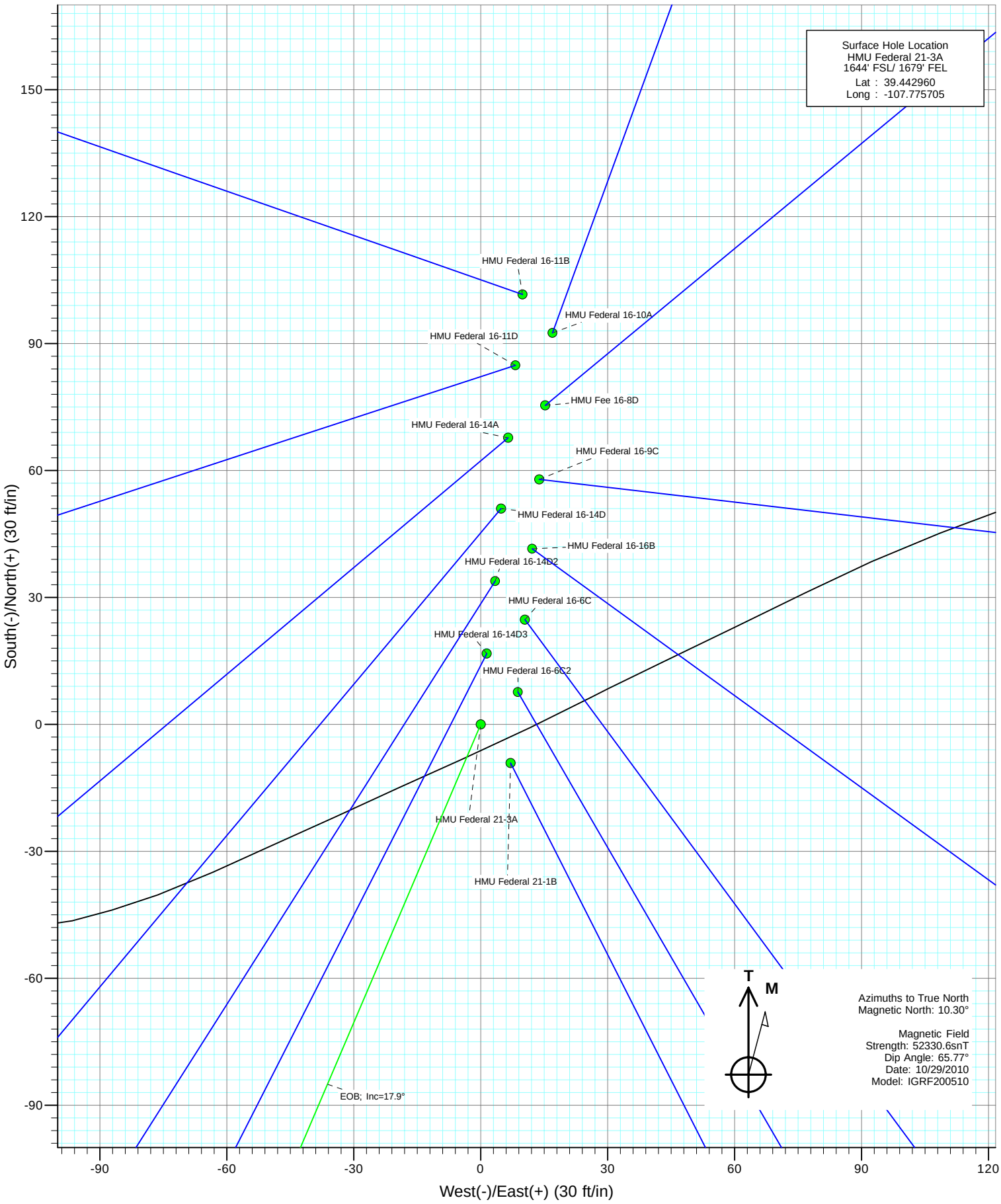
TVDPath	MDPath	Formation
3620.0	3773.7	G Sand
5670.0	5928.0	Ohio Creek
6111.0	6391.4	Mesa Verde
6623.0	6929.5	Williams Fork
7646.0	7974.2	Top of Gas
8862.0	9190.2	Coal Ridge
9526.0	9854.2	Base Cameo A Coal
9662.0	9990.2	Rollins
10088.0	10416.2	Cozzette
10297.0	10625.2	Corcoran

DESIGN DETAILS: Plan #1

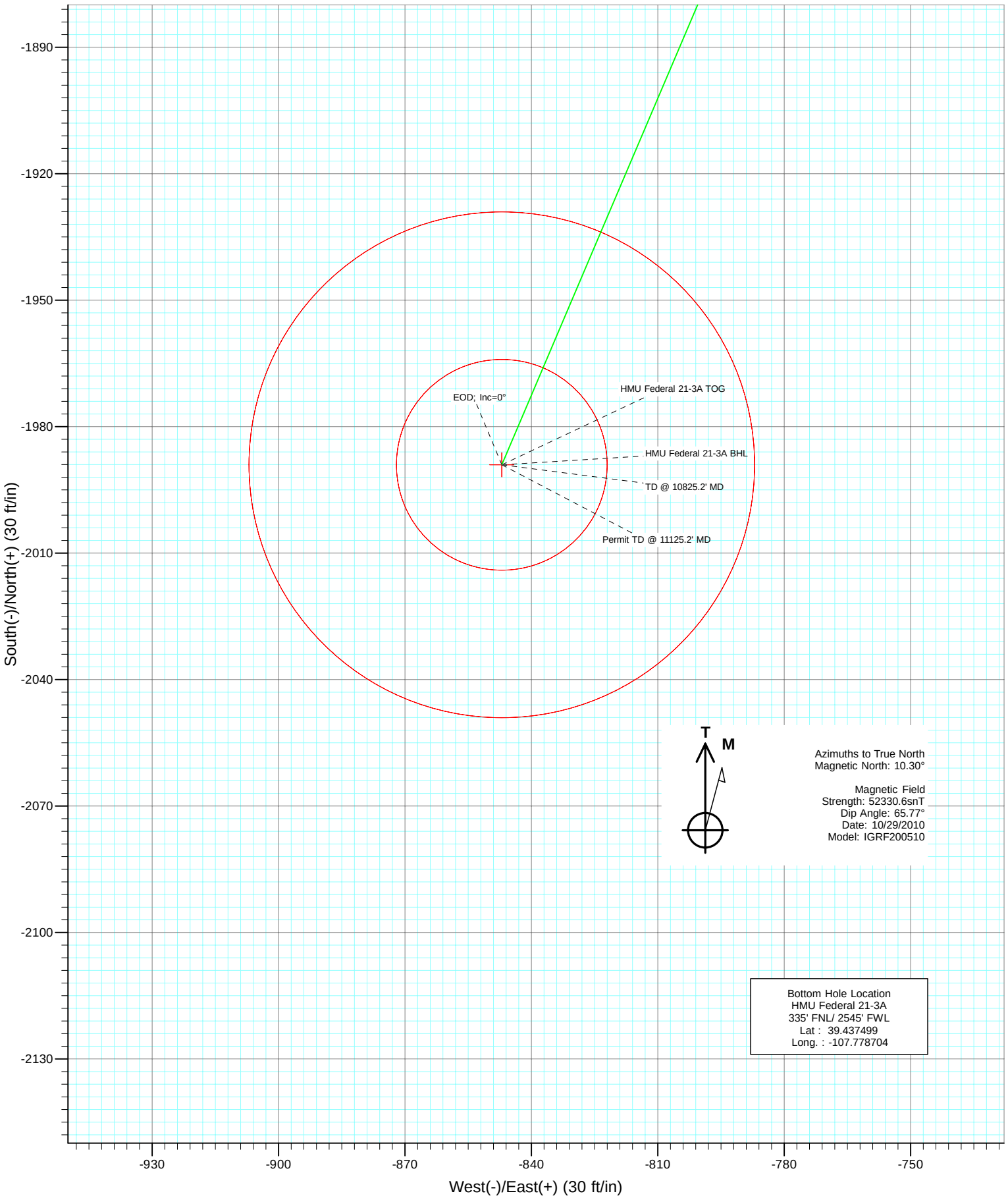
105XXX; KR
KBE @ 7667.0ft (Original Well Elev)

Target	Azimuth	Origin	N/S	E/W	From TVD
HMU Federal 21-3A BHL	203.07	Slot	0.0	0.0	0.0

Project: Mamm Creek
Site: (J16W)
Well: HMU Federal 21-3A
Wellbore: DD
Design: Plan #1



Project: Mamm Creek
Site: (J16W)
Well: HMU Federal 21-3A
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 21-3A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site:	(J16W)	**North Reference:**	True
Well:	HMU Federal 21-3A	**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 21-3A

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,594,280.17 ft	**Latitude:**	39.442960
	+E/-W	0.0 ft	**Easting:**	2,357,382.96 ft	**Longitude:**	-107.775705
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	7,645.0 ft

Wellbore DD

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

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	203.07

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
796.6	17.90	203.07	786.9	-85.0	-36.2	3.00	3.00	0.00	203.07	
7,079.3	17.90	203.07	6,765.6	-1,861.5	-792.7	0.00	0.00	0.00	0.00	
7,974.2	0.00	0.00	7,646.0	-1,989.1	-847.0	2.00	-2.00	0.00	180.00	HMU Federal 21-3A T
10,825.2	0.00	0.00	10,497.0	-1,989.1	-847.0	0.00	0.00	0.00	0.00	HMU Federal 21-3A E
11,125.2	0.00	0.00	10,797.0	-1,989.1	-847.0	0.00	0.00	0.00	0.00	

Database:	EDM 5000.1 US Multi Users DB	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site:	(J16W)	**North Reference:**	True
Well:	HMU Federal 21-3A	**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	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	KOP @ 200' MD
210.0	0.30	203.07	210.0	0.0	0.0	0.0	3.00	3.00	
240.0	1.20	203.07	240.0	-0.4	-0.2	0.4	3.00	3.00	
270.0	2.10	203.07	270.0	-1.2	-0.5	1.3	3.00	3.00	
300.0	3.00	203.07	300.0	-2.4	-1.0	2.6	3.00	3.00	
330.0	3.90	203.07	329.9	-4.1	-1.7	4.4	3.00	3.00	
360.0	4.80	203.07	359.8	-6.2	-2.6	6.7	3.00	3.00	
390.0	5.70	203.07	389.7	-8.7	-3.7	9.4	3.00	3.00	
420.0	6.60	203.07	419.5	-11.6	-5.0	12.7	3.00	3.00	
450.0	7.50	203.07	449.3	-15.0	-6.4	16.3	3.00	3.00	
480.0	8.40	203.07	479.0	-18.9	-8.0	20.5	3.00	3.00	
510.0	9.30	203.07	508.6	-23.1	-9.8	25.1	3.00	3.00	
540.0	10.20	203.07	538.2	-27.8	-11.8	30.2	3.00	3.00	
570.0	11.10	203.07	567.7	-32.9	-14.0	35.7	3.00	3.00	
600.0	12.00	203.07	597.1	-38.4	-16.4	41.7	3.00	3.00	
630.0	12.90	203.07	626.4	-44.3	-18.9	48.2	3.00	3.00	
660.0	13.80	203.07	655.6	-50.7	-21.6	55.1	3.00	3.00	
690.0	14.70	203.07	684.6	-57.5	-24.5	62.5	3.00	3.00	
720.0	15.60	203.07	713.6	-64.7	-27.6	70.4	3.00	3.00	
750.0	16.50	203.07	742.4	-72.4	-30.8	78.6	3.00	3.00	
780.0	17.40	203.07	771.1	-80.4	-34.2	87.4	3.00	3.00	
796.6	17.90	203.07	786.9	-85.0	-36.2	92.4	3.00	3.00	EOB; Inc=17.9°
810.0	17.90	203.07	799.7	-88.8	-37.8	96.5	0.00	0.00	
840.0	17.90	203.07	828.2	-97.3	-41.4	105.8	0.00	0.00	
870.0	17.90	203.07	856.8	-105.8	-45.1	115.0	0.00	0.00	
900.0	17.90	203.07	885.3	-114.3	-48.7	124.2	0.00	0.00	
930.0	17.90	203.07	913.9	-122.8	-52.3	133.4	0.00	0.00	
960.0	17.90	203.07	942.4	-131.2	-55.9	142.6	0.00	0.00	
990.0	17.90	203.07	971.0	-139.7	-59.5	151.9	0.00	0.00	
1,020.0	17.90	203.07	999.5	-148.2	-63.1	161.1	0.00	0.00	
1,050.0	17.90	203.07	1,028.1	-156.7	-66.7	170.3	0.00	0.00	
1,080.0	17.90	203.07	1,056.6	-165.2	-70.3	179.5	0.00	0.00	
1,110.0	17.90	203.07	1,085.2	-173.7	-73.9	188.7	0.00	0.00	
1,140.0	17.90	203.07	1,113.7	-182.1	-77.6	198.0	0.00	0.00	
1,170.0	17.90	203.07	1,142.3	-190.6	-81.2	207.2	0.00	0.00	
1,200.0	17.90	203.07	1,170.8	-199.1	-84.8	216.4	0.00	0.00	
1,230.0	17.90	203.07	1,199.4	-207.6	-88.4	225.6	0.00	0.00	
1,260.0	17.90	203.07	1,227.9	-216.1	-92.0	234.8	0.00	0.00	
1,290.0	17.90	203.07	1,256.5	-224.5	-95.6	244.1	0.00	0.00	
1,320.0	17.90	203.07	1,285.0	-233.0	-99.2	253.3	0.00	0.00	
1,350.0	17.90	203.07	1,313.6	-241.5	-102.8	262.5	0.00	0.00	
1,380.0	17.90	203.07	1,342.1	-250.0	-106.5	271.7	0.00	0.00	
1,410.0	17.90	203.07	1,370.7	-258.5	-110.1	280.9	0.00	0.00	
1,440.0	17.90	203.07	1,399.2	-267.0	-113.7	290.2	0.00	0.00	
1,470.0	17.90	203.07	1,427.8	-275.4	-117.3	299.4	0.00	0.00	

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Project:	Mamm Creek	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site:	(J16W)	**North Reference:**	True
Well:	HMU Federal 21-3A	**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	17.90	203.07	1,456.3	-283.9	-120.9	308.6	0.00	0.00	
1,530.0	17.90	203.07	1,484.9	-292.4	-124.5	317.8	0.00	0.00	
1,560.0	17.90	203.07	1,513.4	-300.9	-128.1	327.0	0.00	0.00	
1,590.0	17.90	203.07	1,541.9	-309.4	-131.7	336.3	0.00	0.00	
1,620.0	17.90	203.07	1,570.5	-317.9	-135.4	345.5	0.00	0.00	
1,650.0	17.90	203.07	1,599.0	-326.3	-139.0	354.7	0.00	0.00	
1,668.8	17.90	203.07	1,616.9	-331.7	-141.2	360.5	0.00	0.00	Surface Casing
1,680.0	17.90	203.07	1,627.6	-334.8	-142.6	363.9	0.00	0.00	
1,710.0	17.90	203.07	1,656.1	-343.3	-146.2	373.1	0.00	0.00	
1,740.0	17.90	203.07	1,684.7	-351.8	-149.8	382.4	0.00	0.00	
1,770.0	17.90	203.07	1,713.2	-360.3	-153.4	391.6	0.00	0.00	
1,800.0	17.90	203.07	1,741.8	-368.8	-157.0	400.8	0.00	0.00	
1,830.0	17.90	203.07	1,770.3	-377.2	-160.6	410.0	0.00	0.00	
1,860.0	17.90	203.07	1,798.9	-385.7	-164.3	419.2	0.00	0.00	
1,890.0	17.90	203.07	1,827.4	-394.2	-167.9	428.5	0.00	0.00	
1,920.0	17.90	203.07	1,856.0	-402.7	-171.5	437.7	0.00	0.00	
1,950.0	17.90	203.07	1,884.5	-411.2	-175.1	446.9	0.00	0.00	
1,980.0	17.90	203.07	1,913.1	-419.7	-178.7	456.1	0.00	0.00	
2,010.0	17.90	203.07	1,941.6	-428.1	-182.3	465.3	0.00	0.00	
2,040.0	17.90	203.07	1,970.2	-436.6	-185.9	474.6	0.00	0.00	
2,070.0	17.90	203.07	1,998.7	-445.1	-189.5	483.8	0.00	0.00	
2,100.0	17.90	203.07	2,027.3	-453.6	-193.2	493.0	0.00	0.00	
2,130.0	17.90	203.07	2,055.8	-462.1	-196.8	502.2	0.00	0.00	
2,160.0	17.90	203.07	2,084.4	-470.5	-200.4	511.4	0.00	0.00	
2,190.0	17.90	203.07	2,112.9	-479.0	-204.0	520.7	0.00	0.00	
2,220.0	17.90	203.07	2,141.5	-487.5	-207.6	529.9	0.00	0.00	
2,250.0	17.90	203.07	2,170.0	-496.0	-211.2	539.1	0.00	0.00	
2,280.0	17.90	203.07	2,198.6	-504.5	-214.8	548.3	0.00	0.00	
2,310.0	17.90	203.07	2,227.1	-513.0	-218.4	557.5	0.00	0.00	
2,340.0	17.90	203.07	2,255.7	-521.4	-222.1	566.8	0.00	0.00	
2,370.0	17.90	203.07	2,284.2	-529.9	-225.7	576.0	0.00	0.00	
2,400.0	17.90	203.07	2,312.7	-538.4	-229.3	585.2	0.00	0.00	
2,430.0	17.90	203.07	2,341.3	-546.9	-232.9	594.4	0.00	0.00	
2,460.0	17.90	203.07	2,369.8	-555.4	-236.5	603.6	0.00	0.00	
2,490.0	17.90	203.07	2,398.4	-563.9	-240.1	612.9	0.00	0.00	

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
HMU Federal 21-3A TO(	0.00	0.00	7,646.0	-1,989.1	-847.0	1,592,312.95	2,356,486.38	39.437499	-107.778704
- plan misses target center by 5471.5ft at 2490.0ft MD (2398.4 TVD, -563.9 N, -240.1 E)									
- Circle (radius 25.0)									
HMU Federal 21-3A BHI	0.00	0.00	10,497.0	-1,989.1	-847.0	1,592,312.95	2,356,486.38	39.437499	-107.778704
- plan misses target center by 8245.4ft at 2490.0ft MD (2398.4 TVD, -563.9 N, -240.1 E)									
- Circle (radius 60.0)									

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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	17.90	203.07	2,407.9	-566.7	-241.3	615.9	0.00	0.00	
2,600.0	17.90	203.07	2,503.1	-595.0	-253.4	646.7	0.00	0.00	
2,700.0	17.90	203.07	2,598.2	-623.2	-265.4	677.4	0.00	0.00	
2,800.0	17.90	203.07	2,693.4	-651.5	-277.4	708.1	0.00	0.00	
2,900.0	17.90	203.07	2,788.5	-679.8	-289.5	738.9	0.00	0.00	
3,000.0	17.90	203.07	2,883.7	-708.1	-301.5	769.6	0.00	0.00	
3,100.0	17.90	203.07	2,978.9	-736.3	-313.6	800.3	0.00	0.00	
3,200.0	17.90	203.07	3,074.0	-764.6	-325.6	831.1	0.00	0.00	
3,300.0	17.90	203.07	3,169.2	-792.9	-337.6	861.8	0.00	0.00	
3,400.0	17.90	203.07	3,264.4	-821.2	-349.7	892.5	0.00	0.00	
3,500.0	17.90	203.07	3,359.5	-849.4	-361.7	923.3	0.00	0.00	
3,600.0	17.90	203.07	3,454.7	-877.7	-373.8	954.0	0.00	0.00	
3,700.0	17.90	203.07	3,549.8	-906.0	-385.8	984.7	0.00	0.00	
3,773.7	17.90	203.07	3,620.0	-926.8	-394.7	1,007.4	0.00	0.00	G Sand
3,800.0	17.90	203.07	3,645.0	-934.3	-397.8	1,015.4	0.00	0.00	
3,900.0	17.90	203.07	3,740.2	-962.5	-409.9	1,046.2	0.00	0.00	
4,000.0	17.90	203.07	3,835.3	-990.8	-421.9	1,076.9	0.00	0.00	
4,100.0	17.90	203.07	3,930.5	-1,019.1	-434.0	1,107.6	0.00	0.00	
4,200.0	17.90	203.07	4,025.6	-1,047.4	-446.0	1,138.4	0.00	0.00	
4,300.0	17.90	203.07	4,120.8	-1,075.6	-458.1	1,169.1	0.00	0.00	
4,400.0	17.90	203.07	4,216.0	-1,103.9	-470.1	1,199.8	0.00	0.00	
4,500.0	17.90	203.07	4,311.1	-1,132.2	-482.1	1,230.6	0.00	0.00	
4,600.0	17.90	203.07	4,406.3	-1,160.5	-494.2	1,261.3	0.00	0.00	
4,700.0	17.90	203.07	4,501.4	-1,188.7	-506.2	1,292.0	0.00	0.00	
4,800.0	17.90	203.07	4,596.6	-1,217.0	-518.3	1,322.8	0.00	0.00	
4,900.0	17.90	203.07	4,691.8	-1,245.3	-530.3	1,353.5	0.00	0.00	
5,000.0	17.90	203.07	4,786.9	-1,273.6	-542.3	1,384.2	0.00	0.00	
5,100.0	17.90	203.07	4,882.1	-1,301.8	-554.4	1,415.0	0.00	0.00	
5,200.0	17.90	203.07	4,977.2	-1,330.1	-566.4	1,445.7	0.00	0.00	
5,300.0	17.90	203.07	5,072.4	-1,358.4	-578.5	1,476.4	0.00	0.00	
5,400.0	17.90	203.07	5,167.6	-1,386.7	-590.5	1,507.2	0.00	0.00	
5,500.0	17.90	203.07	5,262.7	-1,415.0	-602.5	1,537.9	0.00	0.00	
5,600.0	17.90	203.07	5,357.9	-1,443.2	-614.6	1,568.6	0.00	0.00	
5,700.0	17.90	203.07	5,453.0	-1,471.5	-626.6	1,599.4	0.00	0.00	
5,800.0	17.90	203.07	5,548.2	-1,499.8	-638.7	1,630.1	0.00	0.00	
5,900.0	17.90	203.07	5,643.4	-1,528.1	-650.7	1,660.8	0.00	0.00	
5,928.0	17.90	203.07	5,670.0	-1,536.0	-654.1	1,669.4	0.00	0.00	Ohio Creek
6,000.0	17.90	203.07	5,738.5	-1,556.3	-662.7	1,691.6	0.00	0.00	
6,100.0	17.90	203.07	5,833.7	-1,584.6	-674.8	1,722.3	0.00	0.00	
6,200.0	17.90	203.07	5,928.8	-1,612.9	-686.8	1,753.0	0.00	0.00	
6,300.0	17.90	203.07	6,024.0	-1,641.2	-698.9	1,783.8	0.00	0.00	
6,391.4	17.90	203.07	6,111.0	-1,667.0	-709.9	1,811.9	0.00	0.00	Mesa Verde
6,400.0	17.90	203.07	6,119.2	-1,669.4	-710.9	1,814.5	0.00	0.00	
6,500.0	17.90	203.07	6,214.3	-1,697.7	-723.0	1,845.2	0.00	0.00	
6,600.0	17.90	203.07	6,309.5	-1,726.0	-735.0	1,876.0	0.00	0.00	
6,700.0	17.90	203.07	6,404.6	-1,754.3	-747.0	1,906.7	0.00	0.00	
6,800.0	17.90	203.07	6,499.8	-1,782.5	-759.1	1,937.4	0.00	0.00	
6,900.0	17.90	203.07	6,595.0	-1,810.8	-771.1	1,968.2	0.00	0.00	
6,929.5	17.90	203.07	6,623.0	-1,819.1	-774.7	1,977.2	0.00	0.00	Williams Fork
7,000.0	17.90	203.07	6,690.1	-1,839.1	-783.2	1,998.9	0.00	0.00	
7,079.3	17.90	203.07	6,765.6	-1,861.5	-792.7	2,023.3	0.00	0.00	Start Drop -2.00
7,100.0	17.48	203.07	6,785.3	-1,867.3	-795.2	2,029.6	2.00	-2.00	

Database:	EDM 5000.1 US Multi Users DB	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site:	(J16W)	**North Reference:**	True
Well:	HMU Federal 21-3A	**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
7,200.0	15.48	203.07	6,881.2	-1,893.4	-806.3	2,057.9	2.00	-2.00	
7,300.0	13.48	203.07	6,978.0	-1,916.4	-816.1	2,082.9	2.00	-2.00	
7,400.0	11.48	203.07	7,075.6	-1,936.3	-824.6	2,104.6	2.00	-2.00	
7,500.0	9.48	203.07	7,174.0	-1,953.0	-831.7	2,122.7	2.00	-2.00	
7,600.0	7.48	203.07	7,272.9	-1,966.6	-837.5	2,137.5	2.00	-2.00	
7,700.0	5.48	203.07	7,372.2	-1,977.0	-841.9	2,148.8	2.00	-2.00	
7,800.0	3.48	203.07	7,471.9	-1,984.2	-845.0	2,156.6	2.00	-2.00	
7,900.0	1.48	203.07	7,571.8	-1,988.2	-846.6	2,160.9	2.00	-2.00	
7,974.2	0.00	0.00	7,646.0	-1,989.1	-847.0	2,161.9	2.00	-2.00	EOD; Inc=0° - Top of Gas - HMU Federal 21-3A
8,000.0	0.00	0.00	7,671.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,100.0	0.00	0.00	7,771.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,200.0	0.00	0.00	7,871.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,300.0	0.00	0.00	7,971.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,400.0	0.00	0.00	8,071.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,500.0	0.00	0.00	8,171.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,600.0	0.00	0.00	8,271.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,700.0	0.00	0.00	8,371.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,800.0	0.00	0.00	8,471.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
8,900.0	0.00	0.00	8,571.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,000.0	0.00	0.00	8,671.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,100.0	0.00	0.00	8,771.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,190.2	0.00	0.00	8,862.0	-1,989.1	-847.0	2,161.9	0.00	0.00	Coal Ridge
9,200.0	0.00	0.00	8,871.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,300.0	0.00	0.00	8,971.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,400.0	0.00	0.00	9,071.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,500.0	0.00	0.00	9,171.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,600.0	0.00	0.00	9,271.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,700.0	0.00	0.00	9,371.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,800.0	0.00	0.00	9,471.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,854.2	0.00	0.00	9,526.0	-1,989.1	-847.0	2,161.9	0.00	0.00	Base Cameo A Coal
9,900.0	0.00	0.00	9,571.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
9,990.2	0.00	0.00	9,662.0	-1,989.1	-847.0	2,161.9	0.00	0.00	Rollins
10,000.0	0.00	0.00	9,671.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,100.0	0.00	0.00	9,771.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,200.0	0.00	0.00	9,871.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,300.0	0.00	0.00	9,971.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,400.0	0.00	0.00	10,071.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,416.2	0.00	0.00	10,088.0	-1,989.1	-847.0	2,161.9	0.00	0.00	Cozzette
10,500.0	0.00	0.00	10,171.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,600.0	0.00	0.00	10,271.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,625.2	0.00	0.00	10,297.0	-1,989.1	-847.0	2,161.9	0.00	0.00	Corcoran
10,700.0	0.00	0.00	10,371.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,800.0	0.00	0.00	10,471.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
10,825.2	0.00	0.00	10,497.0	-1,989.1	-847.0	2,161.9	0.00	0.00	TD @ 10825.2' MD - HMU Federal 21-3A BHL
10,900.0	0.00	0.00	10,571.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
11,000.0	0.00	0.00	10,671.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
11,100.0	0.00	0.00	10,771.8	-1,989.1	-847.0	2,161.9	0.00	0.00	
11,125.2	0.00	0.00	10,797.0	-1,989.1	-847.0	2,161.9	0.00	0.00	Permit TD @ 11125.2' MD

Database:	EDM 5000.1 US Multi Users DB	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Project:	Mamm Creek	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site:	(J16W)	**North Reference:**	True
Well:	HMU Federal 21-3A	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
HMU Federal 21-3A TO(- plan hits target center - Circle (radius 25.0)	0.00	0.00	7,646.0	-1,989.1	-847.0	1,592,312.95	2,356,486.38	39.437499	-107.778704
HMU Federal 21-3A BHI - plan hits target center - Circle (radius 60.0)	0.00	0.00	10,497.0	-1,989.1	-847.0	1,592,312.95	2,356,486.38	39.437499	-107.778704

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,668.8	1,616.9	Surface Casing	5.500	6.000

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,773.7	3,620.0	G Sand		0.00	
5,928.0	5,670.0	Ohio Creek		0.00	
6,391.4	6,111.0	Mesa Verde		0.00	
6,929.5	6,623.0	Williams Fork		0.00	
7,974.2	7,646.0	Top of Gas		0.00	
9,190.2	8,862.0	Coal Ridge		0.00	
9,854.2	9,526.0	Base Cameo A Coal		0.00	
9,990.2	9,662.0	Rollins		0.00	
10,416.2	10,088.0	Cozzette		0.00	
10,625.2	10,297.0	Corcoran		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
200.0	200.0	0.0	0.0	KOP @ 200' MD
796.6	786.9	-85.0	-36.2	EOB; Inc=17.9°
7,079.3	6,765.6	-1,861.5	-792.7	Start Drop -2.00
7,974.2	7,646.0	-1,989.1	-847.0	EOD; Inc=0°
10,825.2	10,497.0	-1,989.1	-847.0	TD @ 10825.2' MD
11,125.2	10,797.0	-1,989.1	-847.0	Permit TD @ 11125.2' MD

EnCana Oil & Gas (USA) Inc

Mamm Creek
(J16W)
HMU Federal 21-3A
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 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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:	GLOBAL FILTER APPLIED: All wellpaths within 200'+ 100/1000 of reference		
Interpolation Method:	MD Interval 100.0ft	**Error Model:**	Systematic Ellipse
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,312.5ft	**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	11,125.2	Plan #1 (DD)	MWD	Geolink MWD

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
(J16W)						
Existing 16-11 - DD - DD	728.3	714.6	105.2	102.0	33.398	CC, ES
Existing 16-11 - DD - DD	900.0	873.4	119.7	115.3	27.591	SF
Existing 16-16 - DD - DD	1,042.0	1,028.5	36.8	31.8	7.302	CC, ES, SF
Existing 16-9 - DD - DD	779.5	776.4	62.5	59.0	17.485	CC, ES
Existing 16-9 - DD - DD	800.0	795.3	63.1	59.4	17.119	SF
HMU Federal 16-10A - DD - Plan #1	200.0	200.0	94.1	93.4	151.374	CC, ES
HMU Federal 16-10A - DD - Plan #1	600.0	590.6	137.4	135.4	68.995	SF
HMU Federal 16-11B - DD - Plan #1	200.0	200.0	102.1	101.5	164.332	CC, ES
HMU Federal 16-11B - DD - Plan #1	3,700.0	3,472.2	1,280.1	1,255.8	52.759	SF
HMU Federal 16-11D - DD - Plan #1	200.0	200.0	85.3	84.6	137.222	CC, ES
HMU Federal 16-11D - DD - Plan #1	5,700.0	5,564.7	1,300.3	1,264.3	36.150	SF
HMU Federal 16-14A - DD - Plan #1	100.0	100.0	68.1	67.8	249.965	CC
HMU Federal 16-14A - DD - Plan #1	200.0	200.0	68.1	67.4	109.535	ES
HMU Federal 16-14A - DD - Plan #1	800.0	805.1	108.0	104.6	31.474	SF
HMU Federal 16-14D - DD - Plan #1	200.0	200.0	51.2	50.6	82.432	CC, ES
HMU Federal 16-14D - DD - Plan #1	11,125.2	10,916.9	1,015.0	966.1	20.762	SF
HMU Federal 16-14D2 - DD - Plan #1	200.0	200.0	34.0	33.4	54.790	CC, ES
HMU Federal 16-14D2 - DD - Plan #1	10,400.0	10,251.7	680.3	633.7	14.587	SF
HMU Federal 16-14D3 - DD - Plan #1	200.0	200.0	16.8	16.2	27.061	CC, ES
HMU Federal 16-14D3 - DD - Plan #1	7,000.0	7,007.5	286.1	246.6	7.244	SF
HMU Federal 16-16B - DD - Plan #1	200.0	200.0	43.3	42.6	69.621	CC, ES
HMU Federal 16-16B - DD - Plan #1	500.0	499.4	63.8	61.9	34.714	SF
HMU Federal 16-6C - DD - Plan #1	200.0	200.0	26.9	26.3	43.265	CC, ES
HMU Federal 16-6C - DD - Plan #1	500.0	500.7	46.0	44.3	26.928	SF
HMU Federal 16-6C2 - DD - Plan #1	200.0	200.0	11.6	11.0	18.711	CC, ES
HMU Federal 16-6C2 - DD - Plan #1	300.0	300.1	13.6	12.6	13.819	SF
HMU Federal 16-9C - DD - Plan #1	200.0	200.0	59.5	58.9	95.832	CC, ES
HMU Federal 16-9C - DD - Plan #1	500.0	496.7	85.1	83.4	50.331	SF
HMU Federal 21-1B - DD - Plan #1	323.8	323.6	10.3	9.2	9.621	CC, ES
HMU Federal 21-1B - DD - Plan #1	400.0	399.3	12.5	11.1	9.072	SF
HMU Fee 16-8D - DD - Plan #1	200.0	200.0	76.9	76.3	123.796	CC, ES
HMU Fee 16-8D - DD - Plan #1	500.0	484.5	118.8	117.1	71.149	SF

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-120.27	-67.4	-115.5	133.7				
100.0	100.0	99.6	99.6	0.1	0.2	-120.14	-67.2	-115.7	133.8	133.5	0.29	455.968	
200.0	200.0	199.3	199.3	0.3	0.3	-119.76	-66.6	-116.5	134.2	133.6	0.63	214.633	
300.0	300.0	299.4	299.3	0.5	0.5	38.64	-65.4	-117.8	132.7	131.7	0.98	135.619	
400.0	399.6	399.4	399.3	0.7	0.7	42.35	-62.8	-119.5	127.0	125.7	1.36	93.644	
500.0	498.8	496.9	496.8	1.0	0.9	48.56	-59.5	-121.7	118.8	117.0	1.78	66.726	
600.0	597.1	593.0	592.7	1.4	1.0	57.90	-56.1	-125.4	110.5	108.2	2.30	48.125	
700.0	694.3	687.9	687.4	1.8	1.2	70.61	-52.6	-130.5	105.5	102.6	2.94	35.896	
728.3	721.6	714.6	714.1	2.0	1.3	74.71	-51.6	-132.2	105.2	102.0	3.15	33.398	CC, ES
800.0	790.2	781.5	780.7	2.3	1.5	85.63	-49.2	-137.1	107.5	103.8	3.67	29.260	
900.0	885.3	873.4	872.2	2.9	1.7	99.92	-45.2	-145.5	119.7	115.3	4.34	27.591	SF
1,000.0	980.5	965.8	963.8	3.4	1.9	110.59	-41.3	-156.2	140.2	135.3	4.92	28.471	
1,100.0	1,075.7	1,057.2	1,054.2	4.0	2.2	117.66	-37.5	-169.5	166.1	160.6	5.49	30.233	
1,200.0	1,170.8	1,147.9	1,143.4	4.6	2.5	122.15	-33.5	-185.4	195.7	189.6	6.09	32.136	
1,300.0	1,266.0	1,237.6	1,231.1	5.1	2.8	125.08	-28.7	-203.4	228.1	221.4	6.71	33.982	
1,400.0	1,361.1	1,329.6	1,320.8	5.7	3.2	127.11	-23.2	-223.2	262.2	254.8	7.37	35.560	
1,500.0	1,456.3	1,422.4	1,411.1	6.2	3.6	128.52	-17.7	-244.1	296.8	288.8	8.06	36.822	
1,600.0	1,551.5	1,515.2	1,501.1	6.8	4.0	129.54	-12.2	-265.6	331.9	323.1	8.77	37.853	
1,700.0	1,646.6	1,607.9	1,591.1	7.4	4.4	130.38	-6.4	-287.0	367.2	357.7	9.48	38.735	
1,800.0	1,741.8	1,700.0	1,680.6	7.9	4.8	131.15	-0.2	-308.0	403.0	392.8	10.19	39.560	
1,900.0	1,836.9	1,795.3	1,773.3	8.5	5.2	131.86	6.2	-329.4	438.5	427.6	10.90	40.238	
2,000.0	1,932.1	1,889.2	1,864.7	9.1	5.6	132.55	12.4	-349.6	473.9	462.3	11.60	40.845	
2,100.0	2,027.3	1,981.6	1,954.7	9.6	6.0	133.11	18.6	-369.8	509.4	497.1	12.30	41.399	
2,200.0	2,122.4	2,074.0	2,044.8	10.2	6.4	133.66	25.2	-389.4	545.0	532.0	13.00	41.925	
2,300.0	2,217.6	2,164.9	2,133.3	10.8	6.9	134.10	31.7	-409.3	581.0	567.3	13.71	42.382	
2,400.0	2,312.7	2,257.5	2,223.0	11.3	7.3	134.35	38.2	-430.8	617.4	602.9	14.45	42.732	
2,500.0	2,407.9	2,351.2	2,313.9	11.9	7.7	134.57	44.5	-452.6	653.5	638.3	15.19	43.015	
2,600.0	2,503.1	2,438.3	2,398.2	12.5	8.1	134.69	50.7	-473.8	690.2	674.3	15.93	43.324	
2,700.0	2,598.2	2,533.9	2,490.6	13.0	8.6	134.79	57.5	-497.2	727.1	710.4	16.70	43.543	
2,800.0	2,693.4	2,630.7	2,584.5	13.6	9.0	134.92	64.1	-520.3	763.5	746.1	17.46	43.719	
2,900.0	2,788.5	2,721.0	2,671.9	14.2	9.5	135.03	70.3	-541.9	800.0	781.8	18.21	43.928	
3,000.0	2,883.7	2,817.5	2,765.2	14.7	9.9	135.10	76.7	-565.5	836.4	817.4	19.00	44.031	
3,100.0	2,978.9	2,913.3	2,858.0	15.3	10.4	135.17	82.8	-588.7	872.5	852.7	19.76	44.143	
3,200.0	3,074.0	3,010.4	2,952.2	15.9	10.8	135.28	88.7	-611.4	908.1	887.6	20.53	44.233	
3,300.0	3,169.2	3,098.4	3,037.6	16.4	11.3	135.35	94.2	-632.3	944.0	922.7	21.28	44.367	
3,400.0	3,264.4	3,191.2	3,127.4	17.0	11.7	135.42	100.2	-654.5	980.1	958.0	22.03	44.487	
3,500.0	3,359.5	3,284.9	3,218.3	17.6	12.1	135.53	106.5	-676.2	1,016.2	993.4	22.77	44.622	
3,600.0	3,454.7	3,381.3	3,312.1	18.1	12.6	135.69	113.1	-697.7	1,052.1	1,028.6	23.51	44.750	
3,700.0	3,549.8	3,469.0	3,397.3	18.7	13.0	135.80	119.3	-717.6	1,088.4	1,064.1	24.24	44.902	
3,800.0	3,645.0	3,560.1	3,485.5	19.3	13.4	135.87	125.7	-739.2	1,125.0	1,100.0	24.99	45.023	
3,900.0	3,740.2	3,658.5	3,581.0	19.8	13.9	135.93	132.3	-762.5	1,161.2	1,135.5	25.76	45.072	
4,000.0	3,835.3	3,750.7	3,670.3	20.4	14.3	135.98	138.3	-784.4	1,197.3	1,170.8	26.52	45.146	
4,100.0	3,930.5	3,849.0	3,765.6	21.0	14.8	136.04	144.6	-807.4	1,233.2	1,205.9	27.29	45.190	
4,200.0	4,025.6	3,939.9	3,854.0	21.5	15.2	136.12	150.6	-828.0	1,269.1	1,241.0	28.02	45.295	
4,300.0	4,120.8	4,028.8	3,940.4	22.1	15.6	136.20	156.7	-848.3	1,305.1	1,276.4	28.75	45.396	

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-126.82	-87.6	-117.0	146.2				
100.0	100.0	98.6	98.6	0.1	0.2	-126.86	-88.0	-117.4	146.7	146.4	0.29	504.912	
200.0	200.0	197.2	197.2	0.3	0.3	-126.98	-89.1	-118.3	148.1	147.5	0.62	239.121	
300.0	300.0	297.5	297.5	0.5	0.5	30.26	-90.6	-119.5	147.7	146.8	0.97	152.549	
400.0	399.6	397.5	397.5	0.7	0.7	31.47	-92.5	-120.1	142.6	141.2	1.33	107.108	
500.0	498.8	497.0	496.9	1.0	0.9	33.36	-95.6	-119.6	133.0	131.2	1.72	77.315	
600.0	597.1	597.2	597.0	1.4	1.0	36.37	-99.9	-118.0	118.8	116.6	2.16	54.987	
700.0	694.3	696.0	695.6	1.8	1.2	41.65	-104.3	-114.9	99.8	97.1	2.69	37.058	
800.0	790.2	793.8	793.2	2.3	1.4	51.39	-109.2	-110.3	77.3	73.8	3.41	22.629	
900.0	885.3	891.2	890.1	2.9	1.6	68.68	-115.0	-103.2	54.7	50.4	4.34	12.602	
1,000.0	980.5	987.9	986.1	3.4	1.9	101.08	-122.2	-93.2	38.8	33.7	5.10	7.604	
1,042.0	1,020.4	1,028.5	1,026.2	3.7	2.0	120.39	-125.7	-88.0	36.8	31.8	5.04	7.302	CC, ES, SF
1,100.0	1,075.7	1,084.1	1,080.9	4.0	2.2	146.95	-131.0	-79.7	40.8	36.2	4.60	8.863	
1,200.0	1,170.8	1,178.6	1,173.3	4.6	2.5	177.53	-141.2	-62.9	61.9	57.5	4.43	13.983	
1,300.0	1,266.0	1,272.5	1,264.8	5.1	2.9	-167.73	-152.2	-44.8	91.4	86.2	5.21	17.543	
1,400.0	1,361.1	1,366.3	1,356.0	5.7	3.3	-159.74	-164.1	-25.9	123.7	117.5	6.15	20.117	
1,500.0	1,456.3	1,459.8	1,446.6	6.2	3.7	-154.82	-176.3	-6.7	157.2	150.1	7.06	22.277	
1,600.0	1,551.5	1,552.1	1,536.1	6.8	4.1	-151.56	-188.6	12.6	191.6	183.6	7.93	24.163	
1,700.0	1,646.6	1,645.4	1,626.2	7.4	4.5	-149.07	-201.1	32.9	226.9	218.1	8.79	25.821	
1,800.0	1,741.8	1,739.4	1,717.2	7.9	4.9	-147.34	-213.6	53.0	262.3	252.6	9.62	27.262	
1,900.0	1,836.9	1,833.4	1,808.3	8.5	5.4	-146.08	-226.0	72.7	297.5	287.1	10.43	28.530	
2,000.0	1,932.1	1,927.2	1,899.3	9.1	5.8	-145.18	-238.1	91.9	332.7	321.5	11.21	29.670	
2,100.0	2,027.3	2,022.1	1,991.4	9.6	6.2	-144.46	-250.2	111.2	367.8	355.8	12.00	30.642	
2,200.0	2,122.4	2,117.8	2,084.3	10.2	6.7	-143.83	-263.0	130.4	402.4	389.6	12.79	31.469	
2,300.0	2,217.6	2,214.6	2,178.3	10.8	7.1	-143.31	-276.1	149.2	436.6	423.0	13.59	32.125	
2,400.0	2,312.7	2,308.9	2,269.8	11.3	7.5	-142.75	-289.9	167.7	470.3	455.9	14.39	32.688	
2,500.0	2,407.9	2,405.7	2,363.7	11.9	8.0	-142.30	-303.9	186.4	504.0	488.8	15.19	33.169	
2,600.0	2,503.1	2,502.0	2,457.0	12.5	8.4	-141.83	-318.6	204.9	537.1	521.1	16.02	33.524	
2,700.0	2,598.2	2,599.2	2,551.2	13.0	8.9	-141.34	-334.3	223.5	569.9	553.0	16.86	33.809	
2,800.0	2,693.4	2,694.4	2,643.5	13.6	9.3	-140.96	-349.4	241.2	602.3	584.6	17.67	34.090	
2,900.0	2,788.5	2,789.4	2,735.6	14.2	9.7	-140.66	-364.2	258.7	634.7	616.2	18.47	34.364	
3,000.0	2,883.7	2,878.2	2,821.8	14.7	10.2	-140.39	-378.1	275.3	667.4	648.2	19.26	34.654	
3,100.0	2,978.9	2,971.4	2,911.9	15.3	10.6	-140.06	-392.9	293.7	700.8	680.8	20.07	34.912	
3,200.0	3,074.0	3,058.1	2,995.9	15.9	11.0	-139.79	-406.6	311.0	734.5	713.7	20.87	35.199	
3,300.0	3,169.2	3,147.6	3,082.1	16.4	11.5	-139.48	-420.7	330.0	769.4	747.7	21.68	35.485	
3,400.0	3,264.4	3,242.4	3,173.6	17.0	12.0	-139.19	-435.5	350.2	804.2	781.7	22.51	35.722	
3,500.0	3,359.5	3,332.6	3,260.6	17.6	12.4	-138.96	-449.4	369.1	839.1	815.7	23.31	35.993	
3,600.0	3,454.7	3,421.0	3,346.1	18.1	12.8	-138.79	-462.2	388.1	874.6	850.5	24.09	36.302	
3,700.0	3,549.8	3,512.5	3,434.4	18.7	13.3	-138.65	-475.0	407.8	910.5	885.6	24.88	36.599	
3,800.0	3,645.0	3,605.6	3,524.5	19.3	13.7	-138.54	-487.6	427.8	946.4	920.8	25.66	36.889	
3,900.0	3,740.2	3,699.0	3,615.0	19.8	14.1	-138.49	-499.7	447.5	982.4	955.9	26.42	37.180	
4,000.0	3,835.3	3,794.5	3,707.6	20.4	14.6	-138.47	-511.6	467.5	1,018.3	991.1	27.19	37.451	
4,100.0	3,930.5	3,896.6	3,806.6	21.0	15.1	-138.40	-525.4	488.6	1,053.7	1,025.7	28.01	37.618	
4,200.0	4,025.6	3,996.4	3,903.2	21.5	15.6	-138.28	-540.1	509.1	1,088.4	1,059.5	28.84	37.741	
4,300.0	4,120.8	4,090.7	3,994.4	22.1	16.0	-138.17	-554.1	528.1	1,122.7	1,093.1	29.64	37.880	
4,400.0	4,216.0	4,185.0	4,085.7	22.7	16.5	-138.07	-568.1	547.3	1,157.2	1,126.8	30.44	38.015	
4,500.0	4,311.1	4,282.0	4,179.6	23.2	16.9	-137.98	-582.4	566.7	1,191.5	1,160.2	31.25	38.128	
4,600.0	4,406.3	4,377.9	4,272.5	23.8	17.4	-137.91	-596.5	585.6	1,225.5	1,193.5	32.05	38.241	
4,700.0	4,501.4	4,472.9	4,364.7	24.4	17.8	-137.86	-610.2	604.2	1,259.5	1,226.7	32.83	38.359	
4,800.0	4,596.6	4,569.9	4,458.9	24.9	18.2	-137.82	-624.0	622.9	1,293.3	1,259.7	33.62	38.466	

CC - Min centre to center distance or covergent 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 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-112.63	-47.2	-113.1	122.6				
100.0	100.0	100.1	100.1	0.1	0.2	-112.54	-47.0	-113.2	122.5	122.2	0.29	420.557	
200.0	200.0	200.1	200.1	0.3	0.3	-112.30	-46.5	-113.3	122.5	121.8	0.62	196.840	
300.0	300.0	300.9	300.9	0.5	0.5	45.64	-46.2	-113.0	120.2	119.3	0.98	123.157	
400.0	399.6	402.8	402.8	0.7	0.7	48.09	-46.6	-110.9	113.0	111.7	1.35	83.511	
500.0	498.8	503.8	503.7	1.0	0.9	52.88	-47.3	-106.8	101.0	99.2	1.78	56.768	
600.0	597.1	603.7	603.3	1.4	1.1	62.34	-47.1	-100.5	84.8	82.5	2.30	36.832	
700.0	694.3	701.1	700.4	1.8	1.3	80.87	-45.3	-92.3	68.7	65.7	2.99	22.978	
779.5	770.6	776.4	775.2	2.2	1.5	104.27	-42.9	-84.1	62.5	59.0	3.58	17.485	CC, ES
800.0	790.2	795.3	794.0	2.3	1.5	111.11	-42.2	-81.8	63.1	59.4	3.69	17.119	SF
900.0	885.3	886.1	883.9	2.9	1.8	139.94	-37.7	-69.7	79.4	75.5	3.91	20.286	
1,000.0	980.5	975.5	972.1	3.4	2.0	157.51	-31.9	-56.7	111.0	107.0	3.99	27.839	
1,100.0	1,075.7	1,064.4	1,059.7	4.0	2.3	167.69	-25.5	-42.6	149.3	145.1	4.16	35.909	
1,200.0	1,170.8	1,153.8	1,147.5	4.6	2.6	173.99	-18.8	-27.7	190.6	186.2	4.42	43.152	
1,300.0	1,266.0	1,243.9	1,236.2	5.1	2.9	177.99	-12.1	-13.2	232.8	228.1	4.74	49.107	
1,400.0	1,361.1	1,331.8	1,322.6	5.7	3.2	-179.19	-5.6	1.4	276.0	270.9	5.10	54.159	
1,500.0	1,456.3	1,418.7	1,408.0	6.2	3.6	-177.15	1.4	16.1	320.2	314.7	5.47	58.569	
1,600.0	1,551.5	1,505.6	1,493.2	6.8	3.9	-175.57	9.0	31.2	365.3	359.5	5.85	62.440	
1,700.0	1,646.6	1,594.2	1,580.1	7.4	4.2	-174.23	16.6	47.0	410.9	404.6	6.25	65.722	
1,800.0	1,741.8	1,684.6	1,668.7	7.9	4.6	-173.17	24.4	63.0	456.4	449.8	6.66	68.570	
1,900.0	1,836.9	1,777.5	1,760.0	8.5	4.9	-172.32	32.1	78.8	501.5	494.4	7.07	70.941	
2,000.0	1,932.1	1,869.2	1,850.1	9.1	5.2	-171.64	39.2	94.0	546.1	538.6	7.48	72.980	
2,100.0	2,027.3	1,962.0	1,941.4	9.6	5.6	-170.98	45.7	109.7	590.2	582.3	7.91	74.592	
2,200.0	2,122.4	2,050.0	2,027.8	10.2	5.9	-170.39	51.4	125.1	634.3	626.0	8.34	76.089	
2,300.0	2,217.6	2,137.3	2,113.5	10.8	6.2	-169.85	57.1	140.6	678.7	669.9	8.76	77.438	
2,400.0	2,312.7	2,227.5	2,202.0	11.3	6.6	-169.35	63.1	156.9	723.3	714.1	9.20	78.629	
2,500.0	2,407.9	2,319.6	2,292.5	11.9	6.9	-168.92	69.1	173.2	767.7	758.0	9.64	79.637	
2,600.0	2,503.1	2,407.0	2,378.3	12.5	7.2	-168.53	74.5	188.9	812.0	801.9	10.08	80.577	
2,700.0	2,598.2	2,494.7	2,464.3	13.0	7.6	-168.14	79.9	205.2	856.6	846.1	10.52	81.459	
2,800.0	2,693.4	2,579.3	2,547.3	13.6	7.9	-167.81	85.4	220.9	901.5	890.6	10.95	82.308	
2,900.0	2,788.5	2,667.0	2,633.1	14.2	8.3	-167.45	91.0	238.1	946.9	935.5	11.40	83.037	
3,000.0	2,883.7	2,752.3	2,716.6	14.7	8.6	-167.14	96.5	254.7	992.3	980.4	11.85	83.741	
3,100.0	2,978.9	2,832.4	2,794.8	15.3	8.9	-166.85	102.1	270.9	1,038.5	1,026.2	12.28	84.539	
3,200.0	3,074.0	2,923.9	2,884.1	15.9	9.3	-166.55	108.6	289.4	1,084.8	1,072.1	12.75	85.118	
3,300.0	3,169.2	3,016.0	2,974.2	16.4	9.7	-166.30	115.3	307.5	1,130.9	1,117.7	13.20	85.656	
3,400.0	3,264.4	3,107.2	3,063.5	17.0	10.1	-166.10	121.8	325.1	1,176.8	1,163.2	13.66	86.182	
3,500.0	3,359.5	3,199.7	3,154.1	17.6	10.4	-165.91	128.4	342.6	1,222.5	1,208.4	14.11	86.654	
3,600.0	3,454.7	3,294.4	3,246.9	18.1	10.8	-165.75	135.0	360.2	1,267.9	1,253.3	14.56	87.062	

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 16-10A - DD - Plan #1

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	10.38	92.5	16.9	94.1				
100.0	100.0	100.0	100.0	0.1	0.1	10.38	92.5	16.9	94.1	93.8	0.27	345.444	
200.0	200.0	200.0	200.0	0.3	0.3	10.38	92.5	16.9	94.1	93.4	0.62	151.374	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	167.64	92.5	16.9	96.6	95.6	0.97	99.601	
400.0	399.6	399.6	399.6	0.7	0.7	168.51	92.5	16.9	104.3	103.0	1.32	79.159	
500.0	498.8	498.8	498.8	1.0	0.8	169.72	92.5	16.9	117.1	115.4	1.66	70.448	
600.0	597.1	590.6	590.6	1.4	1.0	171.01	94.5	17.7	137.4	135.4	1.99	68.995	SF
700.0	694.3	679.0	678.7	1.8	1.2	172.27	100.4	19.8	167.3	165.0	2.31	72.491	
800.0	790.2	765.6	764.8	2.3	1.4	173.36	109.6	23.2	206.1	203.5	2.61	78.885	
900.0	885.3	856.3	854.8	2.9	1.6	174.33	120.1	27.0	248.2	245.3	2.94	84.383	
1,000.0	980.5	947.0	944.8	3.4	1.8	175.03	130.6	30.8	290.3	287.0	3.27	88.821	
1,100.0	1,075.7	1,037.6	1,034.7	4.0	2.0	175.54	141.1	34.6	332.4	328.8	3.60	92.471	
1,200.0	1,170.8	1,128.3	1,124.7	4.6	2.3	175.95	151.6	38.5	374.6	370.7	3.92	95.526	
1,300.0	1,266.0	1,218.9	1,214.6	5.1	2.5	176.27	162.1	42.3	416.7	412.5	4.25	98.119	
1,400.0	1,361.1	1,309.6	1,304.6	5.7	2.8	176.53	172.6	46.1	458.9	454.3	4.57	100.347	
1,500.0	1,456.3	1,400.2	1,394.6	6.2	3.0	176.74	183.1	49.9	501.1	496.2	4.90	102.282	
1,600.0	1,551.5	1,490.9	1,484.5	6.8	3.2	176.93	193.6	53.7	543.3	538.1	5.22	103.977	
1,700.0	1,646.6	1,581.5	1,574.5	7.4	3.5	177.09	204.1	57.6	585.5	579.9	5.55	105.475	
1,800.0	1,741.8	1,672.2	1,664.5	7.9	3.7	177.22	214.6	61.4	627.7	621.8	5.88	106.808	
1,900.0	1,836.9	1,762.9	1,754.4	8.5	4.0	177.34	225.1	65.2	669.8	663.6	6.20	108.002	
2,000.0	1,932.1	1,853.5	1,844.4	9.1	4.2	177.44	235.6	69.0	712.0	705.5	6.53	109.077	
2,100.0	2,027.3	1,944.2	1,934.4	9.6	4.5	177.54	246.0	72.8	754.2	747.4	6.85	110.051	
2,200.0	2,122.4	2,034.8	2,024.3	10.2	4.7	177.62	256.5	76.7	796.4	789.2	7.18	110.937	
2,300.0	2,217.6	2,125.5	2,114.3	10.8	5.0	177.70	267.0	80.5	838.6	831.1	7.50	111.746	
2,400.0	2,312.7	2,216.1	2,204.3	11.3	5.2	177.76	277.5	84.3	880.8	873.0	7.83	112.488	
2,500.0	2,407.9	2,306.8	2,294.2	11.9	5.5	177.82	288.0	88.1	923.0	914.9	8.16	113.171	
2,600.0	2,503.1	2,397.4	2,384.2	12.5	5.7	177.88	298.5	92.0	965.2	956.7	8.48	113.802	
2,700.0	2,598.2	2,488.1	2,474.2	13.0	6.0	177.93	309.0	95.8	1,007.4	998.6	8.81	114.386	
2,800.0	2,693.4	2,578.8	2,564.1	13.6	6.2	177.98	319.5	99.6	1,049.6	1,040.5	9.13	114.929	
2,900.0	2,788.5	2,669.4	2,654.1	14.2	6.5	178.02	330.0	103.4	1,091.8	1,082.4	9.46	115.434	
3,000.0	2,883.7	2,760.1	2,744.0	14.7	6.7	178.06	340.5	107.2	1,134.0	1,124.3	9.78	115.906	
3,100.0	2,978.9	2,850.7	2,834.0	15.3	7.0	178.10	351.0	111.1	1,176.2	1,166.1	10.11	116.347	
3,200.0	3,074.0	2,941.4	2,924.0	15.9	7.2	178.14	361.5	114.9	1,218.4	1,208.0	10.44	116.761	
3,300.0	3,169.2	3,032.0	3,013.9	16.4	7.5	178.17	372.0	118.7	1,260.6	1,249.9	10.76	117.150	
3,400.0	3,264.4	3,122.7	3,103.9	17.0	7.7	178.20	382.5	122.5	1,302.9	1,291.8	11.09	117.516	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	5.56	101.6	9.9	102.1				
100.0	100.0	100.0	100.0	0.1	0.1	5.56	101.6	9.9	102.1	101.8	0.27	375.013	
200.0	200.0	200.0	200.0	0.3	0.3	5.56	101.6	9.9	102.1	101.5	0.62	164.332	CC, ES
300.0	300.0	298.6	298.6	0.5	0.5	161.53	102.5	7.5	105.2	104.3	0.98	107.812	
400.0	399.6	396.5	396.2	0.7	0.7	158.99	105.0	0.3	114.7	113.4	1.37	84.009	
500.0	498.8	493.0	491.8	1.0	1.0	155.56	109.0	-11.3	130.9	129.0	1.81	72.122	
600.0	597.1	587.3	584.6	1.4	1.3	151.95	114.5	-27.1	153.8	151.5	2.34	65.760	
700.0	694.3	680.3	675.3	1.8	1.7	148.61	121.3	-46.6	183.4	180.5	2.93	62.637	
800.0	790.2	774.0	766.5	2.3	2.1	146.48	128.5	-67.1	217.9	214.4	3.57	61.036	
900.0	885.3	867.0	857.0	2.9	2.5	145.67	135.6	-87.4	254.5	250.2	4.25	59.900	
1,000.0	980.5	960.1	947.5	3.4	2.9	145.07	142.7	-107.8	291.0	286.1	4.94	58.939	
1,100.0	1,075.7	1,053.1	1,038.0	4.0	3.3	144.60	149.8	-128.2	327.6	322.0	5.63	58.137	
1,200.0	1,170.8	1,146.2	1,128.5	4.6	3.7	144.22	157.0	-148.5	364.2	357.8	6.34	57.465	
1,300.0	1,266.0	1,239.2	1,219.0	5.1	4.2	143.91	164.1	-168.9	400.8	393.7	7.04	56.899	
1,400.0	1,361.1	1,332.3	1,309.5	5.7	4.6	143.66	171.2	-189.3	437.4	429.6	7.75	56.417	
1,500.0	1,456.3	1,425.3	1,400.0	6.2	5.0	143.44	178.3	-209.6	474.0	465.5	8.46	56.003	
1,600.0	1,551.5	1,518.3	1,490.5	6.8	5.4	143.26	185.4	-230.0	510.6	501.5	9.18	55.644	
1,700.0	1,646.6	1,611.4	1,581.0	7.4	5.8	143.10	192.5	-250.4	547.3	537.4	9.89	55.331	
1,800.0	1,741.8	1,704.4	1,671.5	7.9	6.2	142.96	199.6	-270.7	583.9	573.3	10.61	55.054	
1,900.0	1,836.9	1,797.5	1,762.0	8.5	6.6	142.83	206.7	-291.1	620.5	609.2	11.32	54.809	
2,000.0	1,932.1	1,890.5	1,852.5	9.1	7.1	142.72	213.8	-311.5	657.1	645.1	12.04	54.590	
2,100.0	2,027.3	1,983.5	1,943.1	9.6	7.5	142.62	221.0	-331.8	693.8	681.0	12.75	54.393	
2,200.0	2,122.4	2,076.6	2,033.6	10.2	7.9	142.54	228.1	-352.2	730.4	716.9	13.47	54.216	
2,300.0	2,217.6	2,169.6	2,124.1	10.8	8.3	142.46	235.2	-372.6	767.1	752.9	14.19	54.055	
2,400.0	2,312.7	2,262.7	2,214.6	11.3	8.7	142.38	242.3	-392.9	803.7	788.8	14.91	53.909	
2,500.0	2,407.9	2,355.7	2,305.1	11.9	9.1	142.32	249.4	-413.3	840.3	824.7	15.63	53.775	
2,600.0	2,503.1	2,448.7	2,395.6	12.5	9.6	142.26	256.5	-433.7	877.0	860.6	16.35	53.652	
2,700.0	2,598.2	2,541.8	2,486.1	13.0	10.0	142.20	263.6	-454.0	913.6	896.6	17.06	53.538	
2,800.0	2,693.4	2,634.8	2,576.6	13.6	10.4	142.15	270.7	-474.4	950.3	932.5	17.78	53.434	
2,900.0	2,788.5	2,727.9	2,667.1	14.2	10.8	142.10	277.9	-494.8	986.9	968.4	18.50	53.337	
3,000.0	2,883.7	2,820.9	2,757.6	14.7	11.2	142.06	285.0	-515.1	1,023.5	1,004.3	19.22	53.246	
3,100.0	2,978.9	2,914.0	2,848.1	15.3	11.7	142.01	292.1	-535.5	1,060.2	1,040.2	19.94	53.162	
3,200.0	3,074.0	3,007.0	2,938.6	15.9	12.1	141.98	299.2	-555.9	1,096.8	1,076.2	20.66	53.084	
3,300.0	3,169.2	3,100.0	3,029.1	16.4	12.5	141.94	306.3	-576.2	1,133.5	1,112.1	21.38	53.011	
3,400.0	3,264.4	3,193.1	3,119.6	17.0	12.9	141.91	313.4	-596.6	1,170.1	1,148.0	22.10	52.942	
3,500.0	3,359.5	3,286.1	3,210.1	17.6	13.3	141.87	320.5	-617.0	1,206.8	1,183.9	22.82	52.877	
3,600.0	3,454.7	3,379.2	3,300.6	18.1	13.7	141.84	327.6	-637.3	1,243.4	1,219.9	23.54	52.816	
3,700.0	3,549.8	3,472.2	3,391.1	18.7	14.2	141.82	334.8	-657.7	1,280.1	1,255.8	24.26	52.759	SF

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	5.51	84.9	8.2	85.3				
100.0	100.0	100.0	100.0	0.1	0.1	5.51	84.9	8.2	85.3	85.0	0.27	313.147	
200.0	200.0	200.0	200.0	0.3	0.3	5.51	84.9	8.2	85.3	84.6	0.62	137.222	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	162.94	84.9	8.2	87.8	86.8	0.97	90.442	
400.0	399.6	401.7	401.7	0.7	0.7	162.81	84.0	5.6	94.2	92.8	1.33	70.818	
500.0	498.8	503.3	502.9	1.0	0.9	160.79	81.5	-2.1	103.5	101.7	1.73	59.968	
600.0	597.1	604.4	603.1	1.4	1.2	157.49	77.3	-14.8	115.9	113.7	2.20	52.757	
700.0	694.3	703.3	700.6	1.8	1.5	154.19	72.1	-30.8	132.3	129.5	2.74	48.247	
800.0	790.2	800.9	796.8	2.3	1.8	152.39	66.9	-46.6	153.4	150.1	3.33	46.097	
900.0	885.3	898.2	892.6	2.9	2.1	151.63	61.8	-62.4	176.7	172.8	3.94	44.805	
1,000.0	980.5	995.4	988.4	3.4	2.4	151.05	56.6	-78.3	200.1	195.5	4.58	43.731	
1,100.0	1,075.7	1,092.6	1,084.1	4.0	2.8	150.59	51.4	-94.1	223.4	218.2	5.22	42.840	
1,200.0	1,170.8	1,189.8	1,179.9	4.6	3.1	150.21	46.3	-109.9	246.8	240.9	5.86	42.098	
1,300.0	1,266.0	1,287.0	1,275.7	5.1	3.4	149.90	41.1	-125.7	270.2	263.7	6.51	41.474	
1,400.0	1,361.1	1,384.3	1,371.5	5.7	3.8	149.64	35.9	-141.5	293.6	286.4	7.17	40.944	
1,500.0	1,456.3	1,481.5	1,467.3	6.2	4.1	149.42	30.7	-157.3	317.0	309.1	7.83	40.488	
1,600.0	1,551.5	1,578.7	1,563.1	6.8	4.4	149.23	25.6	-173.1	340.4	331.9	8.49	40.094	
1,700.0	1,646.6	1,675.9	1,658.9	7.4	4.8	149.06	20.4	-188.9	363.8	354.6	9.15	39.749	
1,800.0	1,741.8	1,773.1	1,754.6	7.9	5.1	148.92	15.2	-204.7	387.2	377.3	9.81	39.445	
1,900.0	1,836.9	1,870.4	1,850.4	8.5	5.5	148.79	10.1	-220.5	410.6	400.1	10.48	39.176	
2,000.0	1,932.1	1,967.6	1,946.2	9.1	5.8	148.67	4.9	-236.3	434.0	422.8	11.15	38.936	
2,100.0	2,027.3	2,064.8	2,042.0	9.6	6.1	148.57	-0.3	-252.2	457.4	445.6	11.81	38.720	
2,200.0	2,122.4	2,162.0	2,137.8	10.2	6.5	148.47	-5.4	-268.0	480.8	468.3	12.48	38.526	
2,300.0	2,217.6	2,259.2	2,233.6	10.8	6.8	148.39	-10.6	-283.8	504.2	491.0	13.15	38.349	
2,400.0	2,312.7	2,356.4	2,329.4	11.3	7.1	148.31	-15.8	-299.6	527.6	513.8	13.82	38.188	
2,500.0	2,407.9	2,453.7	2,425.1	11.9	7.5	148.24	-21.0	-315.4	551.0	536.5	14.48	38.042	
2,600.0	2,503.1	2,550.9	2,520.9	12.5	7.8	148.17	-26.1	-331.2	574.4	559.3	15.15	37.907	
2,700.0	2,598.2	2,648.1	2,616.7	13.0	8.2	148.11	-31.3	-347.0	597.8	582.0	15.82	37.782	
2,800.0	2,693.4	2,745.3	2,712.5	13.6	8.5	148.06	-36.5	-362.8	621.2	604.7	16.49	37.668	
2,900.0	2,788.5	2,842.5	2,808.3	14.2	8.8	148.01	-41.6	-378.6	644.7	627.5	17.16	37.561	
3,000.0	2,883.7	2,939.8	2,904.1	14.7	9.2	147.96	-46.8	-394.4	668.1	650.2	17.83	37.463	
3,100.0	2,978.9	3,037.0	2,999.9	15.3	9.5	147.92	-52.0	-410.2	691.5	673.0	18.50	37.371	
3,200.0	3,074.0	3,134.2	3,095.6	15.9	9.8	147.87	-57.1	-426.1	714.9	695.7	19.17	37.285	
3,300.0	3,169.2	3,231.4	3,191.4	16.4	10.2	147.83	-62.3	-441.9	738.3	718.5	19.84	37.204	
3,400.0	3,264.4	3,328.6	3,287.2	17.0	10.5	147.80	-67.5	-457.7	761.7	741.2	20.52	37.129	
3,500.0	3,359.5	3,425.9	3,383.0	17.6	10.9	147.76	-72.7	-473.5	785.1	763.9	21.19	37.058	
3,600.0	3,454.7	3,523.1	3,478.8	18.1	11.2	147.73	-77.8	-489.3	808.6	786.7	21.86	36.991	
3,700.0	3,549.8	3,620.3	3,574.6	18.7	11.5	147.70	-83.0	-505.1	832.0	809.4	22.53	36.928	
3,800.0	3,645.0	3,717.5	3,670.4	19.3	11.9	147.67	-88.2	-520.9	855.4	832.2	23.20	36.869	
3,900.0	3,740.2	3,814.7	3,766.1	19.8	12.2	147.64	-93.3	-536.7	878.8	854.9	23.87	36.813	
4,000.0	3,835.3	3,912.0	3,861.9	20.4	12.6	147.62	-98.5	-552.5	902.2	877.7	24.54	36.759	
4,100.0	3,930.5	4,009.2	3,957.7	21.0	12.9	147.59	-103.7	-568.3	925.6	900.4	25.22	36.709	
4,200.0	4,025.6	4,106.4	4,053.5	21.5	13.2	147.57	-108.8	-584.1	949.0	923.2	25.89	36.661	
4,300.0	4,120.8	4,203.6	4,149.3	22.1	13.6	147.55	-114.0	-600.0	972.5	945.9	26.56	36.615	
4,400.0	4,216.0	4,300.8	4,245.1	22.7	13.9	147.53	-119.2	-615.8	995.9	968.6	27.23	36.572	
4,500.0	4,311.1	4,398.0	4,340.8	23.2	14.3	147.51	-124.4	-631.6	1,019.3	991.4	27.90	36.530	
4,600.0	4,406.3	4,495.3	4,436.6	23.8	14.6	147.49	-129.5	-647.4	1,042.7	1,014.1	28.57	36.490	
4,700.0	4,501.4	4,592.5	4,532.4	24.4	14.9	147.47	-134.7	-663.2	1,066.1	1,036.9	29.25	36.453	
4,800.0	4,596.6	4,689.7	4,628.2	24.9	15.3	147.45	-139.9	-679.0	1,089.5	1,059.6	29.92	36.416	
4,900.0	4,691.8	4,786.9	4,724.0	25.5	15.6	147.43	-145.0	-694.8	1,113.0	1,082.4	30.59	36.382	
5,000.0	4,786.9	4,884.1	4,819.8	26.1	16.0	147.42	-150.2	-710.6	1,136.4	1,105.1	31.26	36.348	
5,100.0	4,882.1	4,981.4	4,915.6	26.7	16.3	147.40	-155.4	-726.4	1,159.8	1,127.9	31.94	36.317	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,078.6	5,011.3	27.2	16.6	147.39	-160.5	-742.2	1,183.2	1,150.6	32.61	36.286	
5,300.0	5,072.4	5,175.8	5,107.1	27.8	17.0	147.37	-165.7	-758.1	1,206.6	1,173.3	33.28	36.257	
5,400.0	5,167.6	5,273.0	5,202.9	28.4	17.3	147.36	-170.9	-773.9	1,230.0	1,196.1	33.95	36.228	
5,500.0	5,262.7	5,370.2	5,298.7	28.9	17.7	147.34	-176.1	-789.7	1,253.5	1,218.8	34.62	36.201	
5,600.0	5,357.9	5,467.5	5,394.5	29.5	18.0	147.33	-181.2	-805.5	1,276.9	1,241.6	35.30	36.175	
5,700.0	5,453.0	5,564.7	5,490.3	30.1	18.3	147.32	-186.4	-821.3	1,300.3	1,264.3	35.97	36.150	SF

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	5.48	67.7	6.5	68.1				
100.0	100.0	100.0	100.0	0.1	0.1	5.48	67.7	6.5	68.1	67.8	0.27	249.965	CC
200.0	200.0	200.0	200.0	0.3	0.3	5.48	67.7	6.5	68.1	67.4	0.62	109.535	ES
300.0	300.0	302.6	302.5	0.5	0.5	161.47	66.0	4.4	68.6	67.7	0.98	70.036	
400.0	399.6	405.1	404.7	0.7	0.7	158.75	60.7	-1.9	70.5	69.1	1.37	51.574	
500.0	498.8	507.4	506.0	1.0	1.0	154.56	51.9	-12.4	73.9	72.1	1.82	40.630	
600.0	597.1	607.1	604.5	1.4	1.3	150.93	41.5	-24.8	80.7	78.3	2.33	34.616	
700.0	694.3	706.4	702.5	1.8	1.6	149.50	31.1	-37.1	92.1	89.2	2.88	32.022	
800.0	790.2	805.1	799.9	2.3	2.0	149.76	20.9	-49.3	108.0	104.6	3.43	31.474	SF
900.0	885.3	903.5	896.9	2.9	2.3	150.68	10.6	-61.5	126.1	122.1	3.99	31.627	
1,000.0	980.5	1,001.8	994.0	3.4	2.6	151.37	0.4	-73.7	144.1	139.6	4.54	31.744	
1,100.0	1,075.7	1,100.1	1,091.0	4.0	2.9	151.91	-9.9	-85.9	162.2	157.1	5.09	31.840	
1,200.0	1,170.8	1,198.5	1,188.0	4.6	3.3	152.34	-20.1	-98.0	180.3	174.6	5.65	31.920	
1,300.0	1,266.0	1,296.8	1,285.1	5.1	3.6	152.69	-30.4	-110.2	198.4	192.2	6.20	31.988	
1,400.0	1,361.1	1,395.2	1,382.1	5.7	3.9	152.98	-40.6	-122.4	216.5	209.7	6.76	32.047	
1,500.0	1,456.3	1,493.5	1,479.2	6.2	4.2	153.23	-50.9	-134.6	234.6	227.3	7.31	32.098	
1,600.0	1,551.5	1,591.9	1,576.2	6.8	4.6	153.44	-61.1	-146.8	252.7	244.8	7.86	32.144	
1,700.0	1,646.6	1,690.2	1,673.3	7.4	4.9	153.62	-71.3	-159.0	270.8	262.4	8.41	32.184	
1,800.0	1,741.8	1,788.5	1,770.3	7.9	5.2	153.78	-81.6	-171.2	288.9	280.0	8.97	32.220	
1,900.0	1,836.9	1,886.9	1,867.4	8.5	5.6	153.93	-91.8	-183.4	307.0	297.5	9.52	32.253	
2,000.0	1,932.1	1,985.2	1,964.4	9.1	5.9	154.05	-102.1	-195.5	325.2	315.1	10.07	32.283	
2,100.0	2,027.3	2,083.6	2,061.5	9.6	6.2	154.16	-112.3	-207.7	343.3	332.7	10.62	32.310	
2,200.0	2,122.4	2,181.9	2,158.5	10.2	6.5	154.27	-122.6	-219.9	361.4	350.2	11.18	32.334	
2,300.0	2,217.6	2,280.3	2,255.5	10.8	6.9	154.36	-132.8	-232.1	379.5	367.8	11.73	32.357	
2,400.0	2,312.7	2,378.6	2,352.6	11.3	7.2	154.44	-143.1	-244.3	397.6	385.4	12.28	32.377	
2,500.0	2,407.9	2,476.9	2,449.6	11.9	7.5	154.52	-153.3	-256.5	415.8	402.9	12.83	32.397	
2,600.0	2,503.1	2,575.3	2,546.7	12.5	7.8	154.59	-163.5	-268.7	433.9	420.5	13.39	32.414	
2,700.0	2,598.2	2,673.6	2,643.7	13.0	8.2	154.65	-173.8	-280.9	452.0	438.1	13.94	32.431	
2,800.0	2,693.4	2,772.0	2,740.8	13.6	8.5	154.71	-184.0	-293.1	470.1	455.6	14.49	32.446	
2,900.0	2,788.5	2,870.3	2,837.8	14.2	8.8	154.76	-194.3	-305.2	488.3	473.2	15.04	32.461	
3,000.0	2,883.7	2,968.7	2,934.9	14.7	9.2	154.81	-204.5	-317.4	506.4	490.8	15.59	32.474	
3,100.0	2,978.9	3,067.0	3,031.9	15.3	9.5	154.86	-214.8	-329.6	524.5	508.4	16.15	32.487	
3,200.0	3,074.0	3,165.3	3,129.0	15.9	9.8	154.91	-225.0	-341.8	542.6	525.9	16.70	32.498	
3,300.0	3,169.2	3,263.7	3,226.0	16.4	10.1	154.95	-235.2	-354.0	560.8	543.5	17.25	32.510	
3,400.0	3,264.4	3,362.0	3,323.0	17.0	10.5	154.99	-245.5	-366.2	578.9	561.1	17.80	32.520	
3,500.0	3,359.5	3,460.4	3,420.1	17.6	10.8	155.02	-255.7	-378.4	597.0	578.7	18.35	32.530	
3,600.0	3,454.7	3,558.7	3,517.1	18.1	11.1	155.06	-266.0	-390.6	615.1	596.2	18.90	32.539	
3,700.0	3,549.8	3,657.1	3,614.2	18.7	11.5	155.09	-276.2	-402.7	633.3	613.8	19.46	32.548	
3,800.0	3,645.0	3,755.4	3,711.2	19.3	11.8	155.12	-286.5	-414.9	651.4	631.4	20.01	32.557	
3,900.0	3,740.2	3,853.7	3,808.3	19.8	12.1	155.15	-296.7	-427.1	669.5	649.0	20.56	32.565	
4,000.0	3,835.3	3,952.1	3,905.3	20.4	12.4	155.18	-307.0	-439.3	687.7	666.5	21.11	32.572	
4,100.0	3,930.5	4,050.4	4,002.4	21.0	12.8	155.20	-317.2	-451.5	705.8	684.1	21.66	32.580	
4,200.0	4,025.6	4,148.8	4,099.4	21.5	13.1	155.23	-327.4	-463.7	723.9	701.7	22.22	32.586	
4,300.0	4,120.8	4,247.1	4,196.5	22.1	13.4	155.25	-337.7	-475.9	742.0	719.3	22.77	32.593	
4,400.0	4,216.0	4,345.5	4,293.5	22.7	13.8	155.27	-347.9	-488.1	760.2	736.8	23.32	32.599	
4,500.0	4,311.1	4,443.8	4,390.5	23.2	14.1	155.29	-358.2	-500.2	778.3	754.4	23.87	32.605	
4,600.0	4,406.3	4,542.1	4,487.6	23.8	14.4	155.31	-368.4	-512.4	796.4	772.0	24.42	32.611	
4,700.0	4,501.4	4,640.5	4,584.6	24.4	14.7	155.33	-378.7	-524.6	814.6	789.6	24.97	32.617	
4,800.0	4,596.6	4,738.8	4,681.7	24.9	15.1	155.35	-388.9	-536.8	832.7	807.2	25.53	32.622	
4,900.0	4,691.8	4,837.2	4,778.7	25.5	15.4	155.37	-399.2	-549.0	850.8	824.7	26.08	32.627	
5,000.0	4,786.9	4,935.5	4,875.8	26.1	15.7	155.39	-409.4	-561.2	868.9	842.3	26.63	32.632	
5,100.0	4,882.1	5,033.9	4,972.8	26.7	16.1	155.40	-419.6	-573.4	887.1	859.9	27.18	32.637	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,132.2	5,069.9	27.2	16.4	155.42	-429.9	-585.6	905.2	877.5	27.73	32.641	
5,300.0	5,072.4	5,230.5	5,166.9	27.8	16.7	155.43	-440.1	-597.7	923.3	895.0	28.28	32.646	
5,400.0	5,167.6	5,328.9	5,264.0	28.4	17.0	155.45	-450.4	-609.9	941.5	912.6	28.83	32.650	
5,500.0	5,262.7	5,427.2	5,361.0	28.9	17.4	155.46	-460.6	-622.1	959.6	930.2	29.39	32.654	
5,600.0	5,357.9	5,525.6	5,458.0	29.5	17.7	155.47	-470.9	-634.3	977.7	947.8	29.94	32.658	
5,700.0	5,453.0	5,623.9	5,555.1	30.1	18.0	155.49	-481.1	-646.5	995.8	965.4	30.49	32.662	
5,800.0	5,548.2	5,722.3	5,652.1	30.6	18.3	155.50	-491.3	-658.7	1,014.0	982.9	31.04	32.665	
5,900.0	5,643.4	5,820.6	5,749.2	31.2	18.7	155.51	-501.6	-670.9	1,032.1	1,000.5	31.59	32.669	
6,000.0	5,738.5	5,918.9	5,846.2	31.8	19.0	155.52	-511.8	-683.1	1,050.2	1,018.1	32.14	32.672	
6,100.0	5,833.7	6,017.3	5,943.3	32.3	19.3	155.53	-522.1	-695.2	1,068.4	1,035.7	32.70	32.676	
6,200.0	5,928.8	6,115.6	6,040.3	32.9	19.7	155.55	-532.3	-707.4	1,086.5	1,053.2	33.25	32.679	
6,300.0	6,024.0	6,214.0	6,137.4	33.5	20.0	155.56	-542.6	-719.6	1,104.6	1,070.8	33.80	32.682	
6,400.0	6,119.2	6,312.3	6,234.4	34.0	20.3	155.57	-552.8	-731.8	1,122.7	1,088.4	34.35	32.685	
6,500.0	6,214.3	6,410.7	6,331.5	34.6	20.6	155.58	-563.1	-744.0	1,140.9	1,106.0	34.90	32.688	
6,600.0	6,309.5	6,509.0	6,428.5	35.2	21.0	155.59	-573.3	-756.2	1,159.0	1,123.5	35.45	32.691	
6,700.0	6,404.6	6,607.3	6,525.5	35.7	21.3	155.59	-583.5	-768.4	1,177.1	1,141.1	36.01	32.693	
6,800.0	6,499.8	6,705.7	6,622.6	36.3	21.6	155.60	-593.8	-780.6	1,195.3	1,158.7	36.56	32.696	
6,900.0	6,595.0	6,804.0	6,719.6	36.9	22.0	155.61	-604.0	-792.8	1,213.4	1,176.3	37.11	32.699	
7,000.0	6,690.1	6,902.4	6,816.7	37.4	22.3	155.62	-614.3	-804.9	1,231.5	1,193.9	37.66	32.701	
7,100.0	6,785.3	7,000.7	6,913.7	38.0	22.6	155.66	-624.5	-817.1	1,249.6	1,211.4	38.21	32.700	
7,200.0	6,881.2	7,099.4	7,011.2	38.5	22.9	155.75	-634.8	-829.4	1,265.5	1,226.7	38.78	32.634	
7,300.0	6,978.0	7,198.6	7,109.0	38.9	23.3	155.76	-645.1	-841.7	1,278.3	1,238.9	39.36	32.472	
7,400.0	7,075.6	7,286.9	7,196.2	39.3	23.6	155.70	-654.2	-852.4	1,288.1	1,248.2	39.91	32.273	
7,500.0	7,174.0	7,364.4	7,273.0	39.7	23.8	155.66	-660.9	-860.4	1,296.3	1,255.9	40.35	32.123	
7,600.0	7,272.9	7,442.1	7,350.2	39.9	23.9	155.64	-666.3	-866.8	1,303.0	1,262.2	40.73	31.991	
7,700.0	7,372.2	7,519.7	7,427.6	40.1	24.1	155.63	-670.3	-871.6	1,308.2	1,267.1	41.04	31.876	
7,800.0	7,471.9	7,600.0	7,507.7	40.3	24.2	155.62	-673.1	-874.9	1,311.9	1,270.6	41.29	31.773	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	5.38	51.0	4.8	51.2				
100.0	100.0	100.0	100.0	0.1	0.1	5.38	51.0	4.8	51.2	50.9	0.27	188.115	
200.0	200.0	200.0	200.0	0.3	0.3	5.38	51.0	4.8	51.2	50.6	0.62	82.432	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	163.14	51.0	4.8	53.7	52.7	0.97	55.360	
400.0	399.6	399.6	399.6	0.7	0.7	165.21	51.0	4.8	61.3	59.9	1.32	46.452	
500.0	498.8	498.8	498.8	1.0	0.8	167.71	51.0	4.8	74.0	72.3	1.66	44.428	
600.0	597.1	597.1	597.1	1.4	1.0	170.03	51.0	4.8	91.9	89.9	2.00	45.821	
700.0	694.3	694.3	694.3	1.8	1.2	171.95	51.0	4.8	114.9	112.6	2.34	49.194	
800.0	790.2	790.2	790.2	2.3	1.3	173.44	51.0	4.8	143.1	140.5	2.66	53.825	
900.0	885.3	885.3	885.3	2.9	1.5	174.60	51.0	4.8	173.7	170.7	3.00	57.951	
1,000.0	980.5	980.5	980.5	3.4	1.7	175.41	51.0	4.8	204.3	201.0	3.34	61.265	
1,100.0	1,075.7	1,085.4	1,085.4	4.0	1.9	175.89	49.5	3.6	233.4	229.7	3.69	63.239	
1,200.0	1,170.8	1,195.8	1,195.4	4.6	2.1	175.79	43.3	-1.6	257.5	253.4	4.06	63.360	
1,300.0	1,266.0	1,308.7	1,307.3	5.1	2.3	175.20	31.9	-11.2	276.2	271.7	4.46	61.987	
1,400.0	1,361.1	1,421.9	1,418.5	5.7	2.6	174.20	15.5	-25.0	289.5	284.6	4.87	59.424	
1,500.0	1,456.3	1,521.1	1,515.4	6.2	3.0	173.22	-0.8	-38.7	300.7	295.4	5.28	56.946	
1,600.0	1,551.5	1,620.4	1,612.4	6.8	3.3	172.32	-17.1	-52.3	311.9	306.2	5.70	54.701	
1,700.0	1,646.6	1,719.6	1,709.3	7.4	3.6	171.47	-33.4	-66.0	323.3	317.1	6.14	52.653	
1,800.0	1,741.8	1,818.9	1,806.3	7.9	4.0	170.68	-49.6	-79.6	334.6	328.1	6.59	50.783	
1,900.0	1,836.9	1,918.1	1,903.2	8.5	4.4	169.95	-65.9	-93.3	346.1	339.0	7.05	49.070	
2,000.0	1,932.1	2,017.4	2,000.1	9.1	4.8	169.26	-82.2	-106.9	357.6	350.1	7.53	47.500	
2,100.0	2,027.3	2,116.6	2,097.1	9.6	5.1	168.62	-98.5	-120.6	369.1	361.1	8.01	46.058	
2,200.0	2,122.4	2,215.9	2,194.0	10.2	5.5	168.01	-114.7	-134.2	380.7	372.2	8.51	44.731	
2,300.0	2,217.6	2,315.1	2,291.0	10.8	5.9	167.44	-131.0	-147.9	392.3	383.3	9.02	43.509	
2,400.0	2,312.7	2,414.4	2,387.9	11.3	6.3	166.90	-147.3	-161.6	404.0	394.5	9.53	42.382	
2,500.0	2,407.9	2,513.6	2,484.9	11.9	6.7	166.39	-163.5	-175.2	415.7	405.7	10.06	41.340	
2,600.0	2,503.1	2,612.9	2,581.8	12.5	7.1	165.91	-179.8	-188.9	427.4	416.9	10.59	40.375	
2,700.0	2,598.2	2,712.1	2,678.8	13.0	7.5	165.46	-196.1	-202.5	439.2	428.1	11.12	39.480	
2,800.0	2,693.4	2,811.4	2,775.7	13.6	7.9	165.03	-212.4	-216.2	451.0	439.3	11.67	38.649	
2,900.0	2,788.5	2,910.6	2,872.7	14.2	8.3	164.62	-228.6	-229.8	462.8	450.6	12.22	37.875	
3,000.0	2,883.7	3,009.8	2,969.6	14.7	8.7	164.23	-244.9	-243.5	474.6	461.8	12.77	37.154	
3,100.0	2,978.9	3,109.1	3,066.6	15.3	9.1	163.86	-261.2	-257.1	486.5	473.1	13.33	36.481	
3,200.0	3,074.0	3,208.3	3,163.5	15.9	9.5	163.51	-277.5	-270.8	498.3	484.4	13.90	35.851	
3,300.0	3,169.2	3,307.6	3,260.5	16.4	9.9	163.18	-293.7	-284.4	510.2	495.7	14.47	35.261	
3,400.0	3,264.4	3,406.8	3,357.4	17.0	10.3	162.86	-310.0	-298.1	522.1	507.1	15.04	34.708	
3,500.0	3,359.5	3,506.1	3,454.4	17.6	10.7	162.55	-326.3	-311.8	534.0	518.4	15.62	34.188	
3,600.0	3,454.7	3,605.3	3,551.3	18.1	11.1	162.26	-342.6	-325.4	546.0	529.8	16.20	33.699	
3,700.0	3,549.8	3,704.6	3,648.3	18.7	11.6	161.98	-358.8	-339.1	557.9	541.1	16.79	33.238	
3,800.0	3,645.0	3,803.8	3,745.2	19.3	12.0	161.71	-375.1	-352.7	569.9	552.5	17.37	32.802	
3,900.0	3,740.2	3,903.1	3,842.2	19.8	12.4	161.45	-391.4	-366.4	581.8	563.9	17.96	32.391	
4,000.0	3,835.3	4,002.3	3,939.1	20.4	12.8	161.21	-407.7	-380.0	593.8	575.3	18.56	32.002	
4,100.0	3,930.5	4,101.6	4,036.1	21.0	13.2	160.97	-423.9	-393.7	605.8	586.6	19.15	31.634	
4,200.0	4,025.6	4,200.8	4,133.0	21.5	13.6	160.74	-440.2	-407.3	617.8	598.1	19.75	31.285	
4,300.0	4,120.8	4,300.1	4,229.9	22.1	14.0	160.52	-456.5	-421.0	629.8	609.5	20.35	30.953	
4,400.0	4,216.0	4,399.3	4,326.9	22.7	14.4	160.31	-472.8	-434.6	641.8	620.9	20.95	30.638	
4,500.0	4,311.1	4,498.6	4,423.8	23.2	14.8	160.11	-489.0	-448.3	653.9	632.3	21.55	30.338	
4,600.0	4,406.3	4,597.8	4,520.8	23.8	15.2	159.91	-505.3	-461.9	665.9	643.7	22.16	30.052	
4,700.0	4,501.4	4,697.1	4,617.7	24.4	15.6	159.72	-521.6	-475.6	677.9	655.2	22.76	29.779	
4,800.0	4,596.6	4,796.3	4,714.7	24.9	16.1	159.54	-537.8	-489.3	690.0	666.6	23.37	29.519	
4,900.0	4,691.8	4,895.6	4,811.6	25.5	16.5	159.36	-554.1	-502.9	702.0	678.0	23.98	29.271	
5,000.0	4,786.9	4,994.8	4,908.6	26.1	16.9	159.19	-570.4	-516.6	714.1	689.5	24.60	29.033	
5,100.0	4,882.1	5,094.1	5,005.5	26.7	17.3	159.03	-586.7	-530.2	726.2	701.0	25.21	28.806	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,193.3	5,102.5	27.2	17.7	158.87	-602.9	-543.9	738.2	712.4	25.82	28.588	
5,300.0	5,072.4	5,292.6	5,199.4	27.8	18.1	158.72	-619.2	-557.5	750.3	723.9	26.44	28.379	
5,400.0	5,167.6	5,391.8	5,296.4	28.4	18.5	158.57	-635.5	-571.2	762.4	735.3	27.06	28.179	
5,500.0	5,262.7	5,491.0	5,393.3	28.9	18.9	158.42	-651.8	-584.8	774.5	746.8	27.67	27.987	
5,600.0	5,357.9	5,590.3	5,490.3	29.5	19.3	158.28	-668.0	-598.5	786.6	758.3	28.29	27.802	
5,700.0	5,453.0	5,689.5	5,587.2	30.1	19.7	158.15	-684.3	-612.1	798.7	769.8	28.91	27.624	
5,800.0	5,548.2	5,788.8	5,684.2	30.6	20.2	158.02	-700.6	-625.8	810.8	781.2	29.53	27.453	
5,900.0	5,643.4	5,888.0	5,781.1	31.2	20.6	157.89	-716.9	-639.5	822.9	792.7	30.15	27.289	
6,000.0	5,738.5	5,987.3	5,878.1	31.8	21.0	157.76	-733.1	-653.1	835.0	804.2	30.78	27.130	
6,100.0	5,833.7	6,086.5	5,975.0	32.3	21.4	157.64	-749.4	-666.8	847.1	815.7	31.40	26.977	
6,200.0	5,928.8	6,185.8	6,072.0	32.9	21.8	157.53	-765.7	-680.4	859.2	827.2	32.02	26.830	
6,300.0	6,024.0	6,285.0	6,168.9	33.5	22.2	157.41	-782.0	-694.1	871.4	838.7	32.65	26.688	
6,400.0	6,119.2	6,384.3	6,265.9	34.0	22.6	157.30	-798.2	-707.7	883.5	850.2	33.28	26.550	
6,500.0	6,214.3	6,483.5	6,362.8	34.6	23.0	157.19	-814.5	-721.4	895.6	861.7	33.90	26.418	
6,600.0	6,309.5	6,582.8	6,459.8	35.2	23.4	157.09	-830.8	-735.0	907.7	873.2	34.53	26.289	
6,700.0	6,404.6	6,682.0	6,556.7	35.7	23.9	156.99	-847.0	-748.7	919.9	884.7	35.16	26.165	
6,800.0	6,499.8	6,781.3	6,653.6	36.3	24.3	156.89	-863.3	-762.3	932.0	896.2	35.78	26.045	
6,900.0	6,595.0	6,880.5	6,750.6	36.9	24.7	156.79	-879.6	-776.0	944.1	907.7	36.41	25.928	
7,000.0	6,690.1	6,979.8	6,847.5	37.4	25.1	156.70	-895.9	-789.7	956.3	919.2	37.04	25.816	
7,100.0	6,785.3	7,079.0	6,944.5	38.0	25.5	156.62	-912.1	-803.3	968.4	930.7	37.68	25.702	
7,200.0	6,881.2	7,172.2	7,035.5	38.5	25.9	156.57	-927.3	-816.1	978.4	940.1	38.30	25.541	
7,300.0	6,978.0	7,251.1	7,112.9	38.9	26.2	156.52	-939.0	-825.8	986.8	947.9	38.83	25.412	
7,400.0	7,075.6	7,329.9	7,190.7	39.3	26.4	156.49	-948.9	-834.2	994.1	954.8	39.30	25.295	
7,500.0	7,174.0	7,400.0	7,260.1	39.7	26.6	156.47	-956.4	-840.5	1,000.4	960.7	39.69	25.207	
7,600.0	7,272.9	7,487.6	7,347.1	39.9	26.8	156.44	-964.0	-846.8	1,005.4	965.4	40.06	25.101	
7,700.0	7,372.2	7,566.4	7,425.7	40.1	26.9	156.44	-969.0	-851.0	1,009.5	969.1	40.34	25.022	
7,800.0	7,471.9	7,645.2	7,504.3	40.3	27.1	156.44	-972.4	-853.8	1,012.4	971.8	40.57	24.954	
7,900.0	7,571.8	7,724.0	7,583.1	40.4	27.1	156.45	-974.1	-855.3	1,014.2	973.5	40.74	24.893	
8,000.0	7,671.8	7,812.7	7,671.8	40.5	27.2	-0.48	-974.3	-855.5	1,014.8	973.9	40.91	24.808	
8,100.0	7,771.8	7,912.7	7,771.8	40.5	27.3	-0.48	-974.3	-855.5	1,014.8	973.7	41.14	24.666	
8,200.0	7,871.8	8,012.7	7,871.8	40.6	27.4	-0.48	-974.3	-855.5	1,014.8	973.4	41.38	24.525	
8,300.0	7,971.8	8,112.7	7,971.8	40.6	27.5	-0.48	-974.3	-855.5	1,014.8	973.2	41.62	24.384	
8,400.0	8,071.8	8,212.7	8,071.8	40.7	27.6	-0.48	-974.3	-855.5	1,014.8	972.9	41.86	24.244	
8,500.0	8,171.8	8,312.7	8,171.8	40.8	27.7	-0.48	-974.3	-855.5	1,014.8	972.7	42.10	24.104	
8,600.0	8,271.8	8,412.7	8,271.8	40.8	27.8	-0.48	-974.3	-855.5	1,014.8	972.4	42.34	23.966	
8,700.0	8,371.8	8,512.7	8,371.8	40.9	27.8	-0.48	-974.3	-855.5	1,014.8	972.2	42.59	23.828	
8,800.0	8,471.8	8,612.7	8,471.8	41.0	27.9	-0.48	-974.3	-855.5	1,014.8	972.0	42.83	23.691	
8,900.0	8,571.8	8,712.7	8,571.8	41.0	28.0	-0.48	-974.3	-855.5	1,014.8	971.7	43.08	23.555	
9,000.0	8,671.8	8,812.7	8,671.8	41.1	28.1	-0.48	-974.3	-855.5	1,014.8	971.5	43.33	23.419	
9,100.0	8,771.8	8,912.7	8,771.8	41.2	28.2	-0.48	-974.3	-855.5	1,014.8	971.2	43.58	23.285	
9,200.0	8,871.8	9,012.7	8,871.8	41.2	28.3	-0.48	-974.3	-855.5	1,014.8	971.0	43.83	23.151	
9,300.0	8,971.8	9,112.7	8,971.8	41.3	28.4	-0.48	-974.3	-855.5	1,014.8	970.7	44.09	23.018	
9,400.0	9,071.8	9,212.7	9,071.8	41.4	28.5	-0.48	-974.3	-855.5	1,014.8	970.5	44.34	22.886	
9,500.0	9,171.8	9,312.7	9,171.8	41.4	28.6	-0.48	-974.3	-855.5	1,014.8	970.2	44.60	22.755	
9,600.0	9,271.8	9,412.7	9,271.8	41.5	28.7	-0.48	-974.3	-855.5	1,014.8	969.9	44.85	22.624	
9,700.0	9,371.8	9,512.7	9,371.8	41.6	28.8	-0.48	-974.3	-855.5	1,014.8	969.7	45.11	22.495	
9,800.0	9,471.8	9,612.7	9,471.8	41.7	28.9	-0.48	-974.3	-855.5	1,014.8	969.4	45.37	22.366	
9,900.0	9,571.8	9,712.7	9,571.8	41.7	29.0	-0.48	-974.3	-855.5	1,014.8	969.2	45.63	22.238	
10,000.0	9,671.8	9,812.7	9,671.8	41.8	29.1	-0.48	-974.3	-855.5	1,014.8	968.9	45.89	22.112	
10,100.0	9,771.8	9,912.7	9,771.8	41.9	29.2	-0.48	-974.3	-855.5	1,014.8	968.6	46.16	21.986	
10,200.0	9,871.8	10,012.7	9,871.8	41.9	29.3	-0.48	-974.3	-855.5	1,014.8	968.4	46.42	21.860	
10,300.0	9,971.8	10,112.7	9,971.8	42.0	29.4	-0.48	-974.3	-855.5	1,014.8	968.1	46.69	21.736	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
10,400.0	10,071.8	10,212.7	10,071.8	42.1	29.5	-0.48	-974.3	-855.5	1,014.8	967.8	46.95	21.613	
10,500.0	10,171.8	10,312.7	10,171.8	42.2	29.6	-0.48	-974.3	-855.5	1,014.8	967.6	47.22	21.491	
10,600.0	10,271.8	10,412.7	10,271.8	42.2	29.7	-0.48	-974.3	-855.5	1,014.8	967.3	47.49	21.369	
10,700.0	10,371.8	10,512.7	10,371.8	42.3	29.9	-0.48	-974.3	-855.5	1,014.8	967.0	47.76	21.248	
10,800.0	10,471.8	10,612.7	10,471.8	42.4	30.0	-0.48	-974.3	-855.5	1,014.8	966.8	48.03	21.129	
10,900.0	10,571.8	10,712.7	10,571.8	42.5	30.1	-0.48	-974.3	-855.5	1,014.8	966.5	48.30	21.010	
11,000.0	10,671.8	10,812.7	10,671.8	42.6	30.2	-0.48	-974.3	-855.5	1,014.8	966.2	48.57	20.892	
11,100.0	10,771.8	10,912.7	10,771.8	42.6	30.3	-0.48	-974.3	-855.5	1,014.8	965.9	48.85	20.775	
11,125.2	10,797.0	10,916.9	10,776.0	42.7	30.3	-0.48	-974.3	-855.5	1,015.0	966.1	48.89	20.762	SF

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	5.71	33.9	3.4	34.0				
100.0	100.0	100.0	100.0	0.1	0.1	5.71	33.9	3.4	34.0	33.8	0.27	125.033	
200.0	200.0	200.0	200.0	0.3	0.3	5.71	33.9	3.4	34.0	33.4	0.62	54.790	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	163.85	33.9	3.4	36.5	35.6	0.97	37.670	
400.0	399.6	399.6	399.6	0.7	0.7	166.63	33.9	3.4	44.1	42.8	1.32	33.483	
500.0	498.8	498.8	498.8	1.0	0.8	169.60	33.9	3.4	56.9	55.3	1.66	34.238	
600.0	597.1	597.1	597.1	1.4	1.0	172.04	33.9	3.4	74.9	72.9	2.00	37.458	
700.0	694.3	694.3	694.3	1.8	1.2	173.85	33.9	3.4	98.1	95.8	2.33	42.109	
800.0	790.2	790.2	790.2	2.3	1.3	175.16	33.9	3.4	126.4	123.7	2.65	47.676	
900.0	885.3	885.3	885.3	2.9	1.5	176.10	33.9	3.4	157.0	154.0	2.99	52.538	
1,000.0	980.5	980.5	980.5	3.4	1.7	176.74	33.9	3.4	187.7	184.4	3.33	56.424	
1,100.0	1,075.7	1,085.1	1,085.1	4.0	1.9	177.13	32.3	2.4	216.7	213.1	3.68	58.879	
1,200.0	1,170.8	1,195.2	1,194.8	4.6	2.1	177.13	25.5	-1.9	240.6	236.5	4.05	59.407	
1,300.0	1,266.0	1,307.9	1,306.6	5.1	2.3	176.83	13.0	-9.9	258.8	254.4	4.43	58.428	
1,400.0	1,361.1	1,422.6	1,419.2	5.7	2.6	176.25	-5.5	-21.5	271.3	266.5	4.82	56.235	
1,500.0	1,456.3	1,532.2	1,525.5	6.2	3.0	175.46	-28.0	-35.9	278.4	273.2	5.22	53.294	
1,600.0	1,551.5	1,632.0	1,621.9	6.8	3.4	174.72	-49.6	-49.5	284.4	278.8	5.61	50.660	
1,700.0	1,646.6	1,731.7	1,718.3	7.4	3.8	174.01	-71.1	-63.1	290.5	284.5	6.02	48.296	
1,800.0	1,741.8	1,831.5	1,814.8	7.9	4.3	173.34	-92.6	-76.8	296.7	290.2	6.43	46.160	
1,900.0	1,836.9	1,931.2	1,911.2	8.5	4.7	172.69	-114.2	-90.4	302.9	296.0	6.85	44.219	
2,000.0	1,932.1	2,031.0	2,007.7	9.1	5.1	172.06	-135.7	-104.1	309.1	301.8	7.28	42.447	
2,100.0	2,027.3	2,130.7	2,104.1	9.6	5.6	171.46	-157.2	-117.7	315.3	307.6	7.72	40.823	
2,200.0	2,122.4	2,230.5	2,200.5	10.2	6.0	170.88	-178.7	-131.4	321.6	313.4	8.18	39.330	
2,300.0	2,217.6	2,330.2	2,297.0	10.8	6.5	170.33	-200.3	-145.0	327.9	319.3	8.64	37.953	
2,400.0	2,312.7	2,430.0	2,393.4	11.3	7.0	169.80	-221.8	-158.7	334.3	325.2	9.11	36.681	
2,500.0	2,407.9	2,529.7	2,489.9	11.9	7.4	169.28	-243.3	-172.3	340.6	331.0	9.60	35.501	
2,600.0	2,503.1	2,629.5	2,586.3	12.5	7.9	168.79	-264.9	-186.0	347.0	337.0	10.09	34.406	
2,700.0	2,598.2	2,729.2	2,682.7	13.0	8.4	168.31	-286.4	-199.6	353.5	342.9	10.59	33.387	
2,800.0	2,693.4	2,829.0	2,779.2	13.6	8.8	167.85	-307.9	-213.3	359.9	348.8	11.10	32.437	
2,900.0	2,788.5	2,928.7	2,875.6	14.2	9.3	167.41	-329.4	-226.9	366.4	354.8	11.61	31.550	
3,000.0	2,883.7	3,028.5	2,972.1	14.7	9.8	166.98	-351.0	-240.6	372.9	360.7	12.14	30.721	
3,100.0	2,978.9	3,128.2	3,068.5	15.3	10.2	166.57	-372.5	-254.2	379.4	366.7	12.67	29.945	
3,200.0	3,074.0	3,228.0	3,164.9	15.9	10.7	166.17	-394.0	-267.8	385.9	372.7	13.21	29.217	
3,300.0	3,169.2	3,327.7	3,261.4	16.4	11.2	165.78	-415.6	-281.5	392.5	378.7	13.76	28.533	
3,400.0	3,264.4	3,427.5	3,357.8	17.0	11.7	165.41	-437.1	-295.1	399.0	384.7	14.31	27.889	
3,500.0	3,359.5	3,527.2	3,454.3	17.6	12.1	165.05	-458.6	-308.8	405.6	390.8	14.87	27.284	
3,600.0	3,454.7	3,627.0	3,550.7	18.1	12.6	164.70	-480.1	-322.4	412.2	396.8	15.43	26.713	
3,700.0	3,549.8	3,726.7	3,647.1	18.7	13.1	164.36	-501.7	-336.1	418.8	402.8	16.00	26.174	
3,800.0	3,645.0	3,826.5	3,743.6	19.3	13.6	164.03	-523.2	-349.7	425.5	408.9	16.58	25.664	
3,900.0	3,740.2	3,926.2	3,840.0	19.8	14.0	163.71	-544.7	-363.4	432.1	414.9	17.16	25.182	
4,000.0	3,835.3	4,026.0	3,936.4	20.4	14.5	163.41	-566.3	-377.0	438.7	421.0	17.74	24.725	
4,100.0	3,930.5	4,125.7	4,032.9	21.0	15.0	163.11	-587.8	-390.7	445.4	427.1	18.34	24.292	
4,200.0	4,025.6	4,225.5	4,129.3	21.5	15.5	162.82	-609.3	-404.3	452.1	433.2	18.93	23.881	
4,300.0	4,120.8	4,325.3	4,225.8	22.1	16.0	162.53	-630.8	-418.0	458.8	439.2	19.53	23.491	
4,400.0	4,216.0	4,425.0	4,322.2	22.7	16.4	162.26	-652.4	-431.6	465.5	445.3	20.13	23.119	
4,500.0	4,311.1	4,524.8	4,418.6	23.2	16.9	162.00	-673.9	-445.2	472.2	451.4	20.74	22.766	
4,600.0	4,406.3	4,624.5	4,515.1	23.8	17.4	161.74	-695.4	-458.9	478.9	457.6	21.35	22.429	
4,700.0	4,501.4	4,724.3	4,611.5	24.4	17.9	161.49	-717.0	-472.5	485.6	463.7	21.97	22.107	
4,800.0	4,596.6	4,824.0	4,708.0	24.9	18.4	161.24	-738.5	-486.2	492.4	469.8	22.59	21.801	
4,900.0	4,691.8	4,923.8	4,804.4	25.5	18.8	161.00	-760.0	-499.8	499.1	475.9	23.21	21.507	
5,000.0	4,786.9	5,023.5	4,900.8	26.1	19.3	160.77	-781.5	-513.5	505.9	482.0	23.83	21.227	
5,100.0	4,882.1	5,123.3	4,997.3	26.7	19.8	160.55	-803.1	-527.1	512.6	488.2	24.46	20.959	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,223.0	5,093.7	27.2	20.3	160.33	-824.6	-540.8	519.4	494.3	25.09	20.702	
5,300.0	5,072.4	5,322.8	5,190.2	27.8	20.7	160.11	-846.1	-554.4	526.2	500.5	25.72	20.456	
5,400.0	5,167.6	5,422.5	5,286.6	28.4	21.2	159.90	-867.7	-568.1	533.0	506.6	26.36	20.220	
5,500.0	5,262.7	5,522.3	5,383.0	28.9	21.7	159.70	-889.2	-581.7	539.8	512.8	27.00	19.993	
5,600.0	5,357.9	5,622.0	5,479.5	29.5	22.2	159.50	-910.7	-595.4	546.6	518.9	27.64	19.776	
5,700.0	5,453.0	5,721.8	5,575.9	30.1	22.7	159.31	-932.2	-609.0	553.4	525.1	28.28	19.567	
5,800.0	5,548.2	5,821.5	5,672.4	30.6	23.1	159.12	-953.8	-622.7	560.2	531.2	28.93	19.365	
5,900.0	5,643.4	5,921.3	5,768.8	31.2	23.6	158.94	-975.3	-636.3	567.0	537.4	29.57	19.172	
6,000.0	5,738.5	6,021.0	5,865.2	31.8	24.1	158.76	-996.8	-649.9	573.8	543.6	30.22	18.986	
6,100.0	5,833.7	6,120.8	5,961.7	32.3	24.6	158.58	-1,018.4	-663.6	580.6	549.8	30.88	18.806	
6,200.0	5,928.8	6,220.5	6,058.1	32.9	25.1	158.41	-1,039.9	-677.2	587.5	555.9	31.53	18.633	
6,300.0	6,024.0	6,320.3	6,154.6	33.5	25.5	158.24	-1,061.4	-690.9	594.3	562.1	32.18	18.466	
6,400.0	6,119.2	6,420.0	6,251.0	34.0	26.0	158.08	-1,082.9	-704.5	601.2	568.3	32.84	18.305	
6,500.0	6,214.3	6,519.8	6,347.4	34.6	26.5	157.92	-1,104.5	-718.2	608.0	574.5	33.50	18.149	
6,600.0	6,309.5	6,619.5	6,443.9	35.2	27.0	157.76	-1,126.0	-731.8	614.9	580.7	34.16	17.999	
6,700.0	6,404.6	6,719.3	6,540.3	35.7	27.5	157.61	-1,147.5	-745.5	621.7	586.9	34.82	17.854	
6,800.0	6,499.8	6,819.0	6,636.7	36.3	27.9	157.46	-1,169.1	-759.1	628.6	593.1	35.49	17.713	
6,900.0	6,595.0	6,918.8	6,733.2	36.9	28.4	157.31	-1,190.6	-772.8	635.4	599.3	36.15	17.577	
7,000.0	6,690.1	7,018.5	6,829.6	37.4	28.9	157.17	-1,212.1	-786.4	642.3	605.5	36.82	17.446	
7,100.0	6,785.3	7,114.6	6,922.5	38.0	29.4	157.05	-1,232.8	-799.5	649.2	611.7	37.47	17.326	
7,200.0	6,881.2	7,200.0	7,005.5	38.5	29.7	156.99	-1,249.7	-810.2	655.6	617.6	38.04	17.236	
7,300.0	6,978.0	7,281.8	7,085.6	38.9	30.0	156.95	-1,264.0	-819.3	661.3	622.7	38.53	17.161	
7,400.0	7,075.6	7,365.3	7,167.7	39.3	30.3	156.91	-1,276.5	-827.2	666.2	627.2	38.98	17.090	
7,500.0	7,174.0	7,448.7	7,250.3	39.7	30.5	156.89	-1,287.0	-833.9	670.4	631.0	39.37	17.026	
7,600.0	7,272.9	7,532.1	7,333.1	39.9	30.7	156.87	-1,295.5	-839.2	673.8	634.1	39.71	16.968	
7,700.0	7,372.2	7,615.5	7,416.1	40.1	30.9	156.86	-1,301.9	-843.3	676.5	636.5	39.99	16.916	
7,800.0	7,471.9	7,700.0	7,500.4	40.3	31.0	156.85	-1,306.3	-846.1	678.5	638.2	40.22	16.868	
7,900.0	7,571.8	7,782.2	7,582.5	40.4	31.1	156.86	-1,308.6	-847.6	679.6	639.3	40.39	16.827	
8,000.0	7,671.8	7,871.5	7,671.8	40.5	31.2	-0.07	-1,309.0	-847.8	680.0	639.5	40.55	16.769	
8,100.0	7,771.8	7,971.5	7,771.8	40.5	31.2	-0.07	-1,309.0	-847.8	680.0	639.2	40.79	16.671	
8,200.0	7,871.8	8,071.5	7,871.8	40.6	31.3	-0.07	-1,309.0	-847.8	680.0	639.0	41.03	16.574	
8,300.0	7,971.8	8,171.5	7,971.8	40.6	31.4	-0.07	-1,309.0	-847.8	680.0	638.8	41.27	16.476	
8,400.0	8,071.8	8,271.5	8,071.8	40.7	31.5	-0.07	-1,309.0	-847.8	680.0	638.5	41.52	16.380	
8,500.0	8,171.8	8,371.5	8,171.8	40.8	31.6	-0.07	-1,309.0	-847.8	680.0	638.3	41.76	16.284	
8,600.0	8,271.8	8,471.5	8,271.8	40.8	31.6	-0.07	-1,309.0	-847.8	680.0	638.0	42.01	16.188	
8,700.0	8,371.8	8,571.5	8,371.8	40.9	31.7	-0.07	-1,309.0	-847.8	680.0	637.8	42.25	16.094	
8,800.0	8,471.8	8,671.5	8,471.8	41.0	31.8	-0.07	-1,309.0	-847.8	680.0	637.5	42.50	15.999	
8,900.0	8,571.8	8,771.5	8,571.8	41.0	31.9	-0.07	-1,309.0	-847.8	680.0	637.3	42.75	15.906	
9,000.0	8,671.8	8,871.5	8,671.8	41.1	32.0	-0.07	-1,309.0	-847.8	680.0	637.0	43.01	15.812	
9,100.0	8,771.8	8,971.5	8,771.8	41.2	32.1	-0.07	-1,309.0	-847.8	680.0	636.8	43.26	15.720	
9,200.0	8,871.8	9,071.5	8,871.8	41.2	32.1	-0.07	-1,309.0	-847.8	680.0	636.5	43.51	15.628	
9,300.0	8,971.8	9,171.5	8,971.8	41.3	32.2	-0.07	-1,309.0	-847.8	680.0	636.3	43.77	15.537	
9,400.0	9,071.8	9,271.5	9,071.8	41.4	32.3	-0.07	-1,309.0	-847.8	680.0	636.0	44.03	15.446	
9,500.0	9,171.8	9,371.5	9,171.8	41.4	32.4	-0.07	-1,309.0	-847.8	680.0	635.7	44.29	15.356	
9,600.0	9,271.8	9,471.5	9,271.8	41.5	32.5	-0.07	-1,309.0	-847.8	680.0	635.5	44.54	15.266	
9,700.0	9,371.8	9,571.5	9,371.8	41.6	32.6	-0.07	-1,309.0	-847.8	680.0	635.2	44.81	15.177	
9,800.0	9,471.8	9,671.5	9,471.8	41.7	32.7	-0.07	-1,309.0	-847.8	680.0	635.0	45.07	15.089	
9,900.0	9,571.8	9,771.5	9,571.8	41.7	32.8	-0.07	-1,309.0	-847.8	680.0	634.7	45.33	15.001	
10,000.0	9,671.8	9,871.5	9,671.8	41.8	32.9	-0.07	-1,309.0	-847.8	680.0	634.4	45.60	14.914	
10,100.0	9,771.8	9,971.5	9,771.8	41.9	32.9	-0.07	-1,309.0	-847.8	680.0	634.2	45.86	14.828	
10,200.0	9,871.8	10,071.5	9,871.8	41.9	33.0	-0.07	-1,309.0	-847.8	680.0	633.9	46.13	14.742	
10,300.0	9,971.8	10,171.5	9,971.8	42.0	33.1	-0.07	-1,309.0	-847.8	680.0	633.6	46.39	14.657	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
10,358.4	10,030.2	10,229.9	10,030.2	42.1	33.2	-0.07	-1,309.0	-847.8	680.0	633.5	46.55	14.608	
10,400.0	10,071.8	10,251.7	10,052.0	42.1	33.2	-0.07	-1,309.0	-847.8	680.3	633.7	46.64	14.587	SF
10,500.0	10,171.8	10,251.7	10,052.0	42.2	33.2	-0.07	-1,309.0	-847.8	690.5	643.7	46.77	14.763	
10,600.0	10,271.8	10,251.7	10,052.0	42.2	33.2	-0.07	-1,309.0	-847.8	714.7	667.8	46.91	15.235	
10,700.0	10,371.8	10,251.7	10,052.0	42.3	33.2	-0.07	-1,309.0	-847.8	751.5	704.4	47.05	15.973	
10,800.0	10,471.8	10,251.7	10,052.0	42.4	33.2	-0.07	-1,309.0	-847.8	799.2	752.0	47.18	16.938	
10,900.0	10,571.8	10,251.7	10,052.0	42.5	33.2	-0.07	-1,309.0	-847.8	855.9	808.6	47.32	18.088	
11,000.0	10,671.8	10,251.7	10,052.0	42.6	33.2	-0.07	-1,309.0	-847.8	920.1	872.6	47.46	19.388	
11,100.0	10,771.8	10,251.7	10,052.0	42.6	33.2	-0.07	-1,309.0	-847.8	990.2	942.6	47.60	20.805	
11,125.2	10,797.0	10,251.7	10,052.0	42.7	33.2	-0.07	-1,309.0	-847.8	1,008.7	961.1	47.63	21.177	

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	4.82	16.8	1.4	16.8				
100.0	100.0	100.0	100.0	0.1	0.1	4.82	16.8	1.4	16.8	16.5	0.27	61.755	
200.0	200.0	200.0	200.0	0.3	0.3	4.82	16.8	1.4	16.8	16.2	0.62	27.061	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	164.16	16.8	1.4	19.3	18.3	0.97	19.910	
400.0	399.6	399.6	399.6	0.7	0.7	168.67	16.8	1.4	27.0	25.6	1.32	20.458	
500.0	498.8	498.8	498.8	1.0	0.8	172.31	16.8	1.4	39.8	38.2	1.66	24.000	
600.0	597.1	600.0	599.9	1.4	1.0	174.30	14.4	0.2	55.4	53.4	2.00	27.696	
700.0	694.3	702.1	701.7	1.8	1.2	175.11	7.2	-3.4	71.0	68.7	2.34	30.319	
800.0	790.2	805.1	803.8	2.3	1.5	175.37	-4.9	-9.6	86.5	83.9	2.69	32.228	
900.0	885.3	909.3	906.2	2.9	1.8	175.22	-22.2	-18.4	99.1	96.1	3.05	32.457	
1,000.0	980.5	1,014.7	1,008.5	3.4	2.3	174.64	-44.7	-29.8	106.4	102.9	3.44	30.954	
1,100.0	1,075.7	1,116.6	1,106.3	4.0	2.7	173.77	-70.2	-42.8	109.3	105.5	3.83	28.583	
1,200.0	1,170.8	1,216.5	1,202.1	4.6	3.2	172.94	-95.5	-55.6	112.1	107.8	4.22	26.540	
1,300.0	1,266.0	1,316.5	1,297.9	5.1	3.7	172.14	-120.8	-68.5	114.8	110.2	4.63	24.790	
1,400.0	1,361.1	1,416.4	1,393.8	5.7	4.2	171.38	-146.1	-81.4	117.5	112.5	5.05	23.272	
1,500.0	1,456.3	1,516.4	1,489.6	6.2	4.7	170.66	-171.4	-94.2	120.3	114.8	5.48	21.941	
1,600.0	1,551.5	1,616.3	1,585.4	6.8	5.2	169.97	-196.7	-107.1	123.1	117.2	5.93	20.765	
1,700.0	1,646.6	1,716.3	1,681.3	7.4	5.8	169.30	-222.0	-119.9	125.9	119.5	6.39	19.718	
1,800.0	1,741.8	1,816.2	1,777.1	7.9	6.3	168.67	-247.4	-132.8	128.7	121.9	6.85	18.781	
1,900.0	1,836.9	1,916.2	1,872.9	8.5	6.8	168.07	-272.7	-145.7	131.6	124.2	7.33	17.937	
2,000.0	1,932.1	2,016.1	1,968.8	9.1	7.3	167.49	-298.0	-158.5	134.4	126.6	7.83	17.175	
2,100.0	2,027.3	2,116.1	2,064.6	9.6	7.8	166.93	-323.3	-171.4	137.3	129.0	8.33	16.483	
2,200.0	2,122.4	2,216.0	2,160.4	10.2	8.4	166.40	-348.6	-184.2	140.2	131.3	8.84	15.852	
2,300.0	2,217.6	2,316.0	2,256.3	10.8	8.9	165.89	-373.9	-197.1	143.1	133.7	9.37	15.275	
2,400.0	2,312.7	2,415.9	2,352.1	11.3	9.4	165.40	-399.2	-210.0	146.0	136.1	9.90	14.747	
2,500.0	2,407.9	2,515.9	2,447.9	11.9	9.9	164.93	-424.5	-222.8	148.9	138.4	10.44	14.261	
2,600.0	2,503.1	2,615.8	2,543.8	12.5	10.5	164.47	-449.8	-235.7	151.8	140.8	10.99	13.813	
2,700.0	2,598.2	2,715.8	2,639.6	13.0	11.0	164.04	-475.1	-248.5	154.7	143.2	11.55	13.400	
2,800.0	2,693.4	2,815.7	2,735.4	13.6	11.5	163.62	-500.4	-261.4	157.7	145.5	12.11	13.017	
2,900.0	2,788.5	2,915.7	2,831.3	14.2	12.0	163.21	-525.7	-274.3	160.6	147.9	12.68	12.661	
3,000.0	2,883.7	3,015.6	2,927.1	14.7	12.6	162.82	-551.0	-287.1	163.6	150.3	13.26	12.330	
3,100.0	2,978.9	3,115.6	3,022.9	15.3	13.1	162.45	-576.3	-300.0	166.5	152.7	13.85	12.022	
3,200.0	3,074.0	3,215.5	3,118.8	15.9	13.6	162.08	-601.6	-312.8	169.5	155.0	14.44	11.734	
3,300.0	3,169.2	3,315.5	3,214.6	16.4	14.2	161.73	-626.9	-325.7	172.5	157.4	15.04	11.465	
3,400.0	3,264.4	3,415.4	3,310.4	17.0	14.7	161.39	-652.3	-338.6	175.4	159.8	15.65	11.212	
3,500.0	3,359.5	3,515.4	3,406.3	17.6	15.2	161.07	-677.6	-351.4	178.4	162.2	16.26	10.976	
3,600.0	3,454.7	3,615.3	3,502.1	18.1	15.7	160.75	-702.9	-364.3	181.4	164.5	16.87	10.753	
3,700.0	3,549.8	3,715.3	3,597.9	18.7	16.3	160.44	-728.2	-377.1	184.4	166.9	17.49	10.544	
3,800.0	3,645.0	3,815.2	3,693.8	19.3	16.8	160.15	-753.5	-390.0	187.4	169.3	18.12	10.346	
3,900.0	3,740.2	3,915.2	3,789.6	19.8	17.3	159.86	-778.8	-402.9	190.4	171.7	18.74	10.160	
4,000.0	3,835.3	4,015.1	3,885.5	20.4	17.9	159.58	-804.1	-415.7	193.4	174.1	19.38	9.983	
4,100.0	3,930.5	4,115.1	3,981.3	21.0	18.4	159.31	-829.4	-428.6	196.5	176.4	20.01	9.816	
4,200.0	4,025.6	4,215.0	4,077.1	21.5	18.9	159.05	-854.7	-441.5	199.5	178.8	20.65	9.658	
4,300.0	4,120.8	4,315.0	4,173.0	22.1	19.4	158.80	-880.0	-454.3	202.5	181.2	21.30	9.508	
4,400.0	4,216.0	4,414.9	4,268.8	22.7	20.0	158.55	-905.3	-467.2	205.5	183.6	21.95	9.366	
4,500.0	4,311.1	4,514.9	4,364.6	23.2	20.5	158.31	-930.6	-480.0	208.6	186.0	22.60	9.230	
4,600.0	4,406.3	4,614.8	4,460.5	23.8	21.0	158.08	-955.9	-492.9	211.6	188.4	23.25	9.101	
4,700.0	4,501.4	4,714.8	4,556.3	24.4	21.5	157.85	-981.2	-505.8	214.6	190.7	23.91	8.978	
4,800.0	4,596.6	4,814.7	4,652.1	24.9	22.1	157.63	-1,006.5	-518.6	217.7	193.1	24.57	8.861	
4,900.0	4,691.8	4,914.7	4,748.0	25.5	22.6	157.42	-1,031.8	-531.5	220.7	195.5	25.23	8.749	
5,000.0	4,786.9	5,014.6	4,843.8	26.1	23.1	157.21	-1,057.2	-544.3	223.8	197.9	25.89	8.642	
5,100.0	4,882.1	5,114.6	4,939.6	26.7	23.7	157.01	-1,082.5	-557.2	226.8	200.3	26.56	8.540	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,214.5	5,035.5	27.2	24.2	156.82	-1,107.8	-570.1	229.9	202.7	27.23	8.442	
5,300.0	5,072.4	5,314.5	5,131.3	27.8	24.7	156.62	-1,133.1	-582.9	232.9	205.0	27.90	8.349	
5,400.0	5,167.6	5,414.4	5,227.1	28.4	25.2	156.44	-1,158.4	-595.8	236.0	207.4	28.58	8.259	
5,500.0	5,262.7	5,514.4	5,323.0	28.9	25.8	156.26	-1,183.7	-608.6	239.1	209.8	29.25	8.172	
5,600.0	5,357.9	5,614.3	5,418.8	29.5	26.3	156.08	-1,209.0	-621.5	242.1	212.2	29.93	8.090	
5,700.0	5,453.0	5,714.3	5,514.6	30.1	26.8	155.91	-1,234.3	-634.4	245.2	214.6	30.61	8.010	
5,800.0	5,548.2	5,814.2	5,610.5	30.6	27.4	155.74	-1,259.6	-647.2	248.3	217.0	31.29	7.934	
5,900.0	5,643.4	5,914.2	5,706.3	31.2	27.9	155.57	-1,284.9	-660.1	251.3	219.4	31.98	7.860	
6,000.0	5,738.5	6,014.1	5,802.1	31.8	28.4	155.41	-1,310.2	-672.9	254.4	221.7	32.66	7.789	
6,100.0	5,833.7	6,114.1	5,898.0	32.3	28.9	155.26	-1,335.5	-685.8	257.5	224.1	33.35	7.721	
6,200.0	5,928.8	6,214.0	5,993.8	32.9	29.5	155.10	-1,360.8	-698.7	260.6	226.5	34.04	7.655	
6,300.0	6,024.0	6,314.0	6,089.6	33.5	30.0	154.96	-1,386.1	-711.5	263.6	228.9	34.73	7.592	
6,400.0	6,119.2	6,413.9	6,185.5	34.0	30.5	154.81	-1,411.4	-724.4	266.7	231.3	35.42	7.530	
6,500.0	6,214.3	6,513.9	6,281.3	34.6	31.1	154.67	-1,436.7	-737.2	269.8	233.7	36.11	7.471	
6,600.0	6,309.5	6,613.8	6,377.2	35.2	31.6	154.53	-1,462.0	-750.1	272.9	236.1	36.81	7.414	
6,700.0	6,404.6	6,713.8	6,473.0	35.7	32.1	154.39	-1,487.4	-763.0	276.0	238.5	37.50	7.359	
6,800.0	6,499.8	6,813.7	6,568.8	36.3	32.6	154.26	-1,512.7	-775.8	279.1	240.9	38.20	7.305	
6,900.0	6,595.0	6,913.7	6,664.7	36.9	33.2	154.13	-1,538.0	-788.7	282.1	243.3	38.90	7.254	
7,000.0	6,690.1	7,007.5	6,754.8	37.4	33.6	154.10	-1,561.0	-800.4	286.1	246.6	39.49	7.244	SF
7,100.0	6,785.3	7,100.0	6,844.5	38.0	34.0	154.36	-1,581.1	-810.6	292.6	252.8	39.82	7.349	
7,200.0	6,881.2	7,190.6	6,933.1	38.5	34.4	154.74	-1,598.4	-819.4	299.9	259.8	40.01	7.495	
7,300.0	6,978.0	7,281.9	7,022.8	38.9	34.7	155.12	-1,613.2	-826.9	306.7	266.6	40.15	7.639	
7,400.0	7,075.6	7,373.0	7,112.9	39.3	34.9	155.49	-1,625.4	-833.1	313.2	273.0	40.24	7.783	
7,500.0	7,174.0	7,464.0	7,203.2	39.7	35.2	155.85	-1,635.1	-838.1	319.3	279.0	40.29	7.926	
7,600.0	7,272.9	7,554.7	7,293.6	39.9	35.3	156.20	-1,642.2	-841.7	325.1	284.8	40.28	8.069	
7,700.0	7,372.2	7,645.4	7,384.1	40.1	35.4	156.55	-1,646.8	-844.0	330.4	290.2	40.24	8.212	
7,800.0	7,471.9	7,735.9	7,474.6	40.3	35.5	156.90	-1,648.8	-845.0	335.4	295.3	40.15	8.355	
7,900.0	7,571.8	7,833.1	7,571.8	40.4	35.6	157.20	-1,648.9	-845.0	339.3	299.2	40.07	8.468	
8,000.0	7,671.8	7,933.1	7,671.8	40.5	35.6	0.33	-1,648.9	-845.0	340.2	300.0	40.19	8.465	
8,100.0	7,771.8	8,033.1	7,771.8	40.5	35.7	0.33	-1,648.9	-845.0	340.2	299.8	40.43	8.415	
8,200.0	7,871.8	8,133.1	7,871.8	40.6	35.8	0.33	-1,648.9	-845.0	340.2	299.5	40.67	8.364	
8,300.0	7,971.8	8,233.1	7,971.8	40.6	35.9	0.33	-1,648.9	-845.0	340.2	299.3	40.92	8.314	
8,400.0	8,071.8	8,333.1	8,071.8	40.7	35.9	0.33	-1,648.9	-845.0	340.2	299.0	41.16	8.265	
8,500.0	8,171.8	8,433.1	8,171.8	40.8	36.0	0.33	-1,648.9	-845.0	340.2	298.8	41.41	8.215	
8,600.0	8,271.8	8,533.1	8,271.8	40.8	36.1	0.33	-1,648.9	-845.0	340.2	298.5	41.66	8.166	
8,700.0	8,371.8	8,633.1	8,371.8	40.9	36.1	0.33	-1,648.9	-845.0	340.2	298.3	41.91	8.117	
8,800.0	8,471.8	8,733.1	8,471.8	41.0	36.2	0.33	-1,648.9	-845.0	340.2	298.0	42.16	8.069	
8,900.0	8,571.8	8,833.1	8,571.8	41.0	36.3	0.33	-1,648.9	-845.0	340.2	297.8	42.42	8.020	
9,000.0	8,671.8	8,933.1	8,671.8	41.1	36.4	0.33	-1,648.9	-845.0	340.2	297.5	42.67	7.973	
9,100.0	8,771.8	9,033.1	8,771.8	41.2	36.4	0.33	-1,648.9	-845.0	340.2	297.3	42.93	7.925	
9,200.0	8,871.8	9,133.1	8,871.8	41.2	36.5	0.33	-1,648.9	-845.0	340.2	297.0	43.19	7.878	
9,300.0	8,971.8	9,233.1	8,971.8	41.3	36.6	0.33	-1,648.9	-845.0	340.2	296.8	43.44	7.831	
9,400.0	9,071.8	9,333.1	9,071.8	41.4	36.7	0.33	-1,648.9	-845.0	340.2	296.5	43.70	7.784	
9,500.0	9,171.8	9,433.1	9,171.8	41.4	36.7	0.33	-1,648.9	-845.0	340.2	296.2	43.96	7.738	
9,600.0	9,271.8	9,533.1	9,271.8	41.5	36.8	0.33	-1,648.9	-845.0	340.2	296.0	44.23	7.692	
9,700.0	9,371.8	9,633.1	9,371.8	41.6	36.9	0.33	-1,648.9	-845.0	340.2	295.7	44.49	7.647	
9,800.0	9,471.8	9,733.1	9,471.8	41.7	37.0	0.33	-1,648.9	-845.0	340.2	295.4	44.76	7.601	
9,900.0	9,571.8	9,833.1	9,571.8	41.7	37.1	0.33	-1,648.9	-845.0	340.2	295.2	45.02	7.556	
10,000.0	9,671.8	9,933.1	9,671.8	41.8	37.1	0.33	-1,648.9	-845.0	340.2	294.9	45.29	7.512	
10,100.0	9,771.8	10,033.1	9,771.8	41.9	37.2	0.33	-1,648.9	-845.0	340.2	294.6	45.56	7.468	
10,200.0	9,871.8	10,133.1	9,871.8	41.9	37.3	0.33	-1,648.9	-845.0	340.2	294.4	45.83	7.424	
10,300.0	9,971.8	10,233.1	9,971.8	42.0	37.4	0.33	-1,648.9	-845.0	340.2	294.1	46.10	7.380	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
10,400.0	10,071.8	10,333.1	10,071.8	42.1	37.5	0.33	-1,648.9	-845.0	340.2	293.8	46.37	7.337	
10,404.8	10,076.6	10,337.9	10,076.6	42.1	37.5	0.33	-1,648.9	-845.0	340.2	293.8	46.38	7.335	
10,500.0	10,171.8	10,368.3	10,107.0	42.2	37.5	0.33	-1,648.9	-845.0	346.3	299.8	46.55	7.439	
10,600.0	10,271.8	10,368.3	10,107.0	42.2	37.5	0.33	-1,648.9	-845.0	378.0	331.3	46.69	8.097	
10,700.0	10,371.8	10,368.3	10,107.0	42.3	37.5	0.33	-1,648.9	-845.0	431.1	384.3	46.83	9.207	
10,800.0	10,471.8	10,368.3	10,107.0	42.4	37.5	0.33	-1,648.9	-845.0	498.8	451.9	46.96	10.621	
10,900.0	10,571.8	10,368.3	10,107.0	42.5	37.5	0.33	-1,648.9	-845.0	576.0	528.9	47.10	12.229	
11,000.0	10,671.8	10,368.3	10,107.0	42.6	37.5	0.33	-1,648.9	-845.0	659.4	612.1	47.24	13.957	
11,100.0	10,771.8	10,368.3	10,107.0	42.6	37.5	0.33	-1,648.9	-845.0	746.8	699.4	47.38	15.762	
11,125.2	10,797.0	10,368.3	10,107.0	42.7	37.5	0.33	-1,648.9	-845.0	769.3	721.9	47.42	16.225	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	16.30	41.5	12.1	43.3				
100.0	100.0	100.0	100.0	0.1	0.1	16.30	41.5	12.1	43.3	43.0	0.27	158.878	
200.0	200.0	200.0	200.0	0.3	0.3	16.30	41.5	12.1	43.3	42.6	0.62	69.621	CC, ES
300.0	300.0	300.7	300.6	0.5	0.5	176.81	40.0	14.3	45.1	44.1	0.98	46.026	
400.0	399.6	400.7	400.3	0.7	0.7	-174.19	35.3	20.7	51.3	50.0	1.37	37.419	
500.0	498.8	499.4	498.2	1.0	1.0	-163.63	27.8	31.1	63.8	61.9	1.84	34.714	SF
600.0	597.1	597.1	594.6	1.4	1.3	-155.96	18.6	43.7	82.9	80.5	2.34	35.396	
700.0	694.3	693.9	690.2	1.8	1.6	-152.33	9.5	56.2	107.3	104.4	2.88	37.270	
800.0	790.2	789.6	784.6	2.3	1.9	-150.97	0.6	68.6	136.4	132.9	3.44	39.601	
900.0	885.3	884.6	878.4	2.9	2.2	-150.78	-8.3	80.9	167.5	163.5	4.03	41.542	
1,000.0	980.5	979.6	972.2	3.4	2.5	-150.66	-17.3	93.2	198.6	194.0	4.63	42.922	
1,100.0	1,075.7	1,074.7	1,066.1	4.0	2.8	-150.57	-26.2	105.5	229.7	224.5	5.23	43.948	
1,200.0	1,170.8	1,169.7	1,159.9	4.6	3.2	-150.50	-35.1	117.8	260.9	255.0	5.83	44.739	
1,300.0	1,266.0	1,264.7	1,253.7	5.1	3.5	-150.44	-44.0	130.0	292.0	285.5	6.44	45.366	
1,400.0	1,361.1	1,359.8	1,347.5	5.7	3.8	-150.40	-52.9	142.3	323.1	316.1	7.04	45.874	
1,500.0	1,456.3	1,454.8	1,441.3	6.2	4.1	-150.36	-61.8	154.6	354.2	346.6	7.65	46.294	
1,600.0	1,551.5	1,549.8	1,535.1	6.8	4.4	-150.33	-70.7	166.9	385.3	377.1	8.26	46.647	
1,700.0	1,646.6	1,644.9	1,628.9	7.4	4.7	-150.31	-79.6	179.2	416.5	407.6	8.87	46.947	
1,800.0	1,741.8	1,739.9	1,722.8	7.9	5.0	-150.28	-88.5	191.5	447.6	438.1	9.48	47.205	
1,900.0	1,836.9	1,834.9	1,816.6	8.5	5.3	-150.26	-97.5	203.8	478.7	468.6	10.09	47.430	
2,000.0	1,932.1	1,930.0	1,910.4	9.1	5.7	-150.25	-106.4	216.0	509.8	499.1	10.70	47.627	
2,100.0	2,027.3	2,025.0	2,004.2	9.6	6.0	-150.23	-115.3	228.3	541.0	529.6	11.32	47.801	
2,200.0	2,122.4	2,120.0	2,098.0	10.2	6.3	-150.22	-124.2	240.6	572.1	560.1	11.93	47.957	
2,300.0	2,217.6	2,215.1	2,191.8	10.8	6.6	-150.21	-133.1	252.9	603.2	590.7	12.54	48.096	
2,400.0	2,312.7	2,310.1	2,285.6	11.3	6.9	-150.20	-142.0	265.2	634.3	621.2	13.15	48.221	
2,500.0	2,407.9	2,405.1	2,379.5	11.9	7.2	-150.19	-150.9	277.5	665.4	651.7	13.77	48.335	
2,600.0	2,503.1	2,500.2	2,473.3	12.5	7.5	-150.18	-159.8	289.8	696.6	682.2	14.38	48.438	
2,700.0	2,598.2	2,595.2	2,567.1	13.0	7.9	-150.17	-168.7	302.0	727.7	712.7	14.99	48.533	
2,800.0	2,693.4	2,690.2	2,660.9	13.6	8.2	-150.16	-177.7	314.3	758.8	743.2	15.61	48.620	
2,900.0	2,788.5	2,785.3	2,754.7	14.2	8.5	-150.15	-186.6	326.6	789.9	773.7	16.22	48.699	
3,000.0	2,883.7	2,880.3	2,848.5	14.7	8.8	-150.15	-195.5	338.9	821.1	804.2	16.83	48.773	
3,100.0	2,978.9	2,975.3	2,942.3	15.3	9.1	-150.14	-204.4	351.2	852.2	834.7	17.45	48.841	
3,200.0	3,074.0	3,070.4	3,036.2	15.9	9.4	-150.14	-213.3	363.5	883.3	865.2	18.06	48.905	
3,300.0	3,169.2	3,165.4	3,130.0	16.4	9.7	-150.13	-222.2	375.8	914.4	895.7	18.68	48.964	
3,400.0	3,264.4	3,260.4	3,223.8	17.0	10.1	-150.13	-231.1	388.0	945.5	926.3	19.29	49.019	
3,500.0	3,359.5	3,355.5	3,317.6	17.6	10.4	-150.12	-240.0	400.3	976.7	956.8	19.90	49.070	
3,600.0	3,454.7	3,450.5	3,411.4	18.1	10.7	-150.12	-248.9	412.6	1,007.8	987.3	20.52	49.119	
3,700.0	3,549.8	3,545.5	3,505.2	18.7	11.0	-150.11	-257.9	424.9	1,038.9	1,017.8	21.13	49.164	
3,800.0	3,645.0	3,640.6	3,599.0	19.3	11.3	-150.11	-266.8	437.2	1,070.0	1,048.3	21.75	49.207	
3,900.0	3,740.2	3,735.6	3,692.9	19.8	11.6	-150.11	-275.7	449.5	1,101.2	1,078.8	22.36	49.247	
4,000.0	3,835.3	3,830.6	3,786.7	20.4	11.9	-150.10	-284.6	461.8	1,132.3	1,109.3	22.97	49.285	
4,100.0	3,930.5	3,925.7	3,880.5	21.0	12.3	-150.10	-293.5	474.1	1,163.4	1,139.8	23.59	49.321	
4,200.0	4,025.6	4,020.7	3,974.3	21.5	12.6	-150.10	-302.4	486.3	1,194.5	1,170.3	24.20	49.355	
4,300.0	4,120.8	4,115.7	4,068.1	22.1	12.9	-150.09	-311.3	498.6	1,225.6	1,200.8	24.82	49.388	
4,400.0	4,216.0	4,210.8	4,161.9	22.7	13.2	-150.09	-320.2	510.9	1,256.8	1,231.3	25.43	49.419	
4,500.0	4,311.1	4,305.8	4,255.7	23.2	13.5	-150.09	-329.1	523.2	1,287.9	1,261.8	26.05	49.448	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	22.87	24.8	10.4	26.9				
100.0	100.0	100.0	100.0	0.1	0.1	22.87	24.8	10.4	26.9	26.6	0.27	98.732	
200.0	200.0	200.0	200.0	0.3	0.3	22.87	24.8	10.4	26.9	26.3	0.62	43.265	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	179.82	24.8	10.4	29.5	28.5	0.97	30.426	
400.0	399.6	400.5	400.5	0.7	0.7	-176.51	22.6	12.0	36.1	34.8	1.32	27.290	
500.0	498.8	500.7	500.4	1.0	0.9	-168.64	16.3	16.7	46.0	44.3	1.71	26.928	SF
600.0	597.1	600.1	598.9	1.4	1.1	-160.12	5.8	24.4	60.2	58.0	2.18	27.620	
700.0	694.3	698.3	695.4	1.8	1.5	-152.67	-8.5	35.0	79.4	76.6	2.79	28.452	
800.0	790.2	795.1	789.7	2.3	1.9	-147.03	-26.1	48.0	103.7	100.1	3.52	29.447	
900.0	885.3	891.3	883.3	2.9	2.3	-144.13	-44.1	61.2	130.4	126.1	4.30	30.358	
1,000.0	980.5	987.4	976.8	3.4	2.7	-142.22	-62.0	74.5	157.4	152.3	5.09	30.915	
1,100.0	1,075.7	1,083.6	1,070.4	4.0	3.1	-140.87	-80.0	87.7	184.5	178.6	5.90	31.284	
1,200.0	1,170.8	1,179.8	1,163.9	4.6	3.5	-139.87	-97.9	101.0	211.7	204.9	6.71	31.542	
1,300.0	1,266.0	1,276.0	1,257.5	5.1	3.9	-139.09	-115.9	114.2	238.9	231.3	7.53	31.732	
1,400.0	1,361.1	1,372.2	1,351.0	5.7	4.4	-138.47	-133.8	127.5	266.1	257.7	8.35	31.876	
1,500.0	1,456.3	1,468.4	1,444.6	6.2	4.8	-137.97	-151.8	140.7	293.4	284.2	9.17	31.989	
1,600.0	1,551.5	1,564.5	1,538.2	6.8	5.2	-137.55	-169.7	154.0	320.6	310.6	10.00	32.079	
1,700.0	1,646.6	1,660.7	1,631.7	7.4	5.6	-137.20	-187.7	167.2	347.9	337.1	10.82	32.153	
1,800.0	1,741.8	1,756.9	1,725.3	7.9	6.0	-136.90	-205.7	180.5	375.2	363.6	11.65	32.215	
1,900.0	1,836.9	1,853.1	1,818.8	8.5	6.5	-136.64	-223.6	193.7	402.5	390.1	12.48	32.267	
2,000.0	1,932.1	1,949.3	1,912.4	9.1	6.9	-136.41	-241.6	207.0	429.9	416.5	13.30	32.311	
2,100.0	2,027.3	2,045.5	2,006.0	9.6	7.3	-136.21	-259.5	220.2	457.2	443.0	14.13	32.350	
2,200.0	2,122.4	2,141.6	2,099.5	10.2	7.7	-136.04	-277.5	233.5	484.5	469.5	14.96	32.383	
2,300.0	2,217.6	2,237.8	2,193.1	10.8	8.2	-135.88	-295.4	246.7	511.8	496.0	15.79	32.413	
2,400.0	2,312.7	2,334.0	2,286.6	11.3	8.6	-135.74	-313.4	260.0	539.2	522.5	16.62	32.439	
2,500.0	2,407.9	2,430.2	2,380.2	11.9	9.0	-135.61	-331.3	273.2	566.5	549.0	17.45	32.462	
2,600.0	2,503.1	2,526.4	2,473.8	12.5	9.4	-135.49	-349.3	286.5	593.8	575.6	18.28	32.483	
2,700.0	2,598.2	2,622.6	2,567.3	13.0	9.9	-135.38	-367.3	299.7	621.2	602.1	19.11	32.501	
2,800.0	2,693.4	2,718.7	2,660.9	13.6	10.3	-135.29	-385.2	313.0	648.5	628.6	19.94	32.518	
2,900.0	2,788.5	2,814.9	2,754.4	14.2	10.7	-135.20	-403.2	326.2	675.9	655.1	20.77	32.534	
3,000.0	2,883.7	2,911.1	2,848.0	14.7	11.2	-135.11	-421.1	339.5	703.2	681.6	21.61	32.548	
3,100.0	2,978.9	3,007.3	2,941.6	15.3	11.6	-135.04	-439.1	352.7	730.6	708.1	22.44	32.561	
3,200.0	3,074.0	3,103.5	3,035.1	15.9	12.0	-134.97	-457.0	366.0	757.9	734.6	23.27	32.573	
3,300.0	3,169.2	3,199.7	3,128.7	16.4	12.4	-134.90	-475.0	379.2	785.3	761.2	24.10	32.584	
3,400.0	3,264.4	3,295.8	3,222.2	17.0	12.9	-134.84	-492.9	392.5	812.6	787.7	24.93	32.594	
3,500.0	3,359.5	3,392.0	3,315.8	17.6	13.3	-134.78	-510.9	405.7	840.0	814.2	25.76	32.604	
3,600.0	3,454.7	3,488.2	3,409.4	18.1	13.7	-134.73	-528.9	419.0	867.3	840.7	26.59	32.613	
3,700.0	3,549.8	3,584.4	3,502.9	18.7	14.1	-134.68	-546.8	432.2	894.7	867.2	27.43	32.621	
3,800.0	3,645.0	3,680.6	3,596.5	19.3	14.6	-134.63	-564.8	445.5	922.0	893.8	28.26	32.628	
3,900.0	3,740.2	3,776.8	3,690.0	19.8	15.0	-134.58	-582.7	458.7	949.4	920.3	29.09	32.636	
4,000.0	3,835.3	3,873.0	3,783.6	20.4	15.4	-134.54	-600.7	472.0	976.7	946.8	29.92	32.642	
4,100.0	3,930.5	3,969.1	3,877.1	21.0	15.9	-134.50	-618.6	485.2	1,004.1	973.3	30.75	32.649	
4,200.0	4,025.6	4,065.3	3,970.7	21.5	16.3	-134.46	-636.6	498.5	1,031.4	999.8	31.59	32.655	
4,300.0	4,120.8	4,161.5	4,064.3	22.1	16.7	-134.43	-654.5	511.7	1,058.8	1,026.4	32.42	32.661	
4,400.0	4,216.0	4,257.7	4,157.8	22.7	17.1	-134.39	-672.5	525.0	1,086.1	1,052.9	33.25	32.666	
4,500.0	4,311.1	4,353.9	4,251.4	23.2	17.6	-134.36	-690.5	538.2	1,113.5	1,079.4	34.08	32.671	
4,600.0	4,406.3	4,450.1	4,344.9	23.8	18.0	-134.33	-708.4	551.5	1,140.9	1,105.9	34.91	32.676	
4,700.0	4,501.4	4,546.2	4,438.5	24.4	18.4	-134.30	-726.4	564.7	1,168.2	1,132.5	35.75	32.680	
4,800.0	4,596.6	4,642.4	4,532.1	24.9	18.8	-134.27	-744.3	578.0	1,195.6	1,159.0	36.58	32.685	
4,900.0	4,691.8	4,738.6	4,625.6	25.5	19.3	-134.25	-762.3	591.2	1,222.9	1,185.5	37.41	32.689	
5,000.0	4,786.9	4,834.8	4,719.2	26.1	19.7	-134.22	-780.2	604.5	1,250.3	1,212.0	38.24	32.693	
5,100.0	4,882.1	4,931.0	4,812.7	26.7	20.1	-134.20	-798.2	617.7	1,277.6	1,238.6	39.08	32.697	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,027.2	4,906.3	27.2	20.5	-134.17	-816.1	631.0	1,305.0	1,265.1	39.91	32.700	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	48.86	7.6	8.8	11.6				
100.0	100.0	100.0	100.0	0.1	0.1	48.86	7.6	8.8	11.6	11.4	0.27	42.698	
200.0	200.0	200.0	200.0	0.3	0.3	48.86	7.6	8.8	11.6	11.0	0.62	18.711	CC, ES
300.0	300.0	300.1	300.0	0.5	0.5	-148.11	5.4	10.1	13.6	12.6	0.98	13.819	SF
400.0	399.6	399.8	399.4	0.7	0.7	-137.36	-1.4	14.0	19.9	18.5	1.40	14.231	
500.0	498.8	498.9	497.7	1.0	1.0	-129.50	-12.6	20.4	31.0	29.1	1.92	16.199	
600.0	597.1	597.0	594.2	1.4	1.3	-124.74	-27.9	29.3	47.0	44.4	2.56	18.326	
700.0	694.3	693.9	688.4	1.8	1.8	-121.80	-47.3	40.6	67.5	64.2	3.35	20.149	
800.0	790.2	790.8	781.9	2.3	2.2	-120.98	-69.2	53.2	91.8	87.6	4.22	21.772	
900.0	885.3	887.5	875.3	2.9	2.7	-121.91	-91.0	65.9	117.3	112.2	5.10	22.995	
1,000.0	980.5	984.1	968.6	3.4	3.2	-122.50	-112.9	78.5	142.8	136.8	6.00	23.819	
1,100.0	1,075.7	1,080.8	1,061.9	4.0	3.6	-122.92	-134.7	91.2	168.4	161.5	6.90	24.408	
1,200.0	1,170.8	1,177.5	1,155.2	4.6	4.1	-123.22	-156.6	103.8	193.9	186.1	7.81	24.848	
1,300.0	1,266.0	1,274.2	1,248.5	5.1	4.6	-123.46	-178.5	116.4	219.5	210.8	8.71	25.190	
1,400.0	1,361.1	1,370.8	1,341.9	5.7	5.0	-123.64	-200.3	129.1	245.1	235.4	9.63	25.461	
1,500.0	1,456.3	1,467.5	1,435.2	6.2	5.5	-123.79	-222.2	141.7	270.6	260.1	10.54	25.683	
1,600.0	1,551.5	1,564.2	1,528.5	6.8	6.0	-123.92	-244.0	154.4	296.2	284.8	11.45	25.866	
1,700.0	1,646.6	1,660.9	1,621.8	7.4	6.5	-124.02	-265.9	167.0	321.8	309.4	12.37	26.021	
1,800.0	1,741.8	1,757.5	1,715.1	7.9	6.9	-124.11	-287.7	179.7	347.3	334.1	13.28	26.153	
1,900.0	1,836.9	1,854.2	1,808.5	8.5	7.4	-124.19	-309.6	192.3	372.9	358.7	14.20	26.267	
2,000.0	1,932.1	1,950.9	1,901.8	9.1	7.9	-124.25	-331.4	205.0	398.5	383.4	15.11	26.367	
2,100.0	2,027.3	2,047.6	1,995.1	9.6	8.4	-124.31	-353.3	217.6	424.1	408.0	16.03	26.454	
2,200.0	2,122.4	2,144.2	2,088.4	10.2	8.8	-124.36	-375.1	230.3	449.6	432.7	16.95	26.532	
2,300.0	2,217.6	2,240.9	2,181.7	10.8	9.3	-124.41	-397.0	242.9	475.2	457.3	17.86	26.601	
2,400.0	2,312.7	2,337.6	2,275.1	11.3	9.8	-124.45	-418.8	255.5	500.8	482.0	18.78	26.663	
2,500.0	2,407.9	2,434.2	2,368.4	11.9	10.2	-124.49	-440.7	268.2	526.3	506.6	19.70	26.719	
2,600.0	2,503.1	2,530.9	2,461.7	12.5	10.7	-124.52	-462.5	280.8	551.9	531.3	20.62	26.770	
2,700.0	2,598.2	2,627.6	2,555.0	13.0	11.2	-124.56	-484.4	293.5	577.5	556.0	21.53	26.817	
2,800.0	2,693.4	2,724.3	2,648.3	13.6	11.7	-124.58	-506.2	306.1	603.1	580.6	22.45	26.859	
2,900.0	2,788.5	2,820.9	2,741.7	14.2	12.1	-124.61	-528.1	318.8	628.6	605.3	23.37	26.898	
3,000.0	2,883.7	2,917.6	2,835.0	14.7	12.6	-124.63	-549.9	331.4	654.2	629.9	24.29	26.934	
3,100.0	2,978.9	3,014.3	2,928.3	15.3	13.1	-124.66	-571.8	344.1	679.8	654.6	25.21	26.967	
3,200.0	3,074.0	3,111.0	3,021.6	15.9	13.6	-124.68	-593.6	356.7	705.4	679.2	26.13	26.998	
3,300.0	3,169.2	3,207.6	3,114.9	16.4	14.0	-124.70	-615.5	369.3	730.9	703.9	27.04	27.027	
3,400.0	3,264.4	3,304.3	3,208.3	17.0	14.5	-124.72	-637.3	382.0	756.5	728.5	27.96	27.053	
3,500.0	3,359.5	3,401.0	3,301.6	17.6	15.0	-124.73	-659.2	394.6	782.1	753.2	28.88	27.078	
3,600.0	3,454.7	3,497.7	3,394.9	18.1	15.5	-124.75	-681.0	407.3	807.6	777.8	29.80	27.102	
3,700.0	3,549.8	3,594.3	3,488.2	18.7	15.9	-124.76	-702.9	419.9	833.2	802.5	30.72	27.123	
3,800.0	3,645.0	3,691.0	3,581.5	19.3	16.4	-124.78	-724.7	432.6	858.8	827.2	31.64	27.144	
3,900.0	3,740.2	3,787.7	3,674.9	19.8	16.9	-124.79	-746.6	445.2	884.4	851.8	32.56	27.163	
4,000.0	3,835.3	3,884.4	3,768.2	20.4	17.4	-124.80	-768.4	457.9	909.9	876.5	33.48	27.182	
4,100.0	3,930.5	3,981.0	3,861.5	21.0	17.8	-124.81	-790.3	470.5	935.5	901.1	34.40	27.199	
4,200.0	4,025.6	4,077.7	3,954.8	21.5	18.3	-124.83	-812.1	483.2	961.1	925.8	35.31	27.215	
4,300.0	4,120.8	4,174.4	4,048.1	22.1	18.8	-124.84	-834.0	495.8	986.7	950.4	36.23	27.231	
4,400.0	4,216.0	4,271.1	4,141.4	22.7	19.3	-124.85	-855.9	508.4	1,012.2	975.1	37.15	27.246	
4,500.0	4,311.1	4,367.7	4,234.8	23.2	19.7	-124.85	-877.7	521.1	1,037.8	999.7	38.07	27.260	
4,600.0	4,406.3	4,464.4	4,328.1	23.8	20.2	-124.86	-899.6	533.7	1,063.4	1,024.4	38.99	27.273	
4,700.0	4,501.4	4,561.1	4,421.4	24.4	20.7	-124.87	-921.4	546.4	1,089.0	1,049.1	39.91	27.286	
4,800.0	4,596.6	4,657.8	4,514.7	24.9	21.2	-124.88	-943.3	559.0	1,114.5	1,073.7	40.83	27.298	
4,900.0	4,691.8	4,754.4	4,608.0	25.5	21.6	-124.89	-965.1	571.7	1,140.1	1,098.4	41.75	27.309	
5,000.0	4,786.9	4,851.1	4,701.4	26.1	22.1	-124.90	-987.0	584.3	1,165.7	1,123.0	42.67	27.321	
5,100.0	4,882.1	4,947.8	4,794.7	26.7	22.6	-124.90	-1,008.8	597.0	1,191.3	1,147.7	43.59	27.331	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	4,977.2	5,044.5	4,888.0	27.2	23.1	-124.91	-1,030.7	609.6	1,216.8	1,172.3	44.51	27.341	
5,300.0	5,072.4	5,141.1	4,981.3	27.8	23.5	-124.92	-1,052.5	622.2	1,242.4	1,197.0	45.42	27.351	
5,400.0	5,167.6	5,237.8	5,074.6	28.4	24.0	-124.92	-1,074.4	634.9	1,268.0	1,221.6	46.34	27.360	
5,500.0	5,262.7	5,334.5	5,168.0	28.9	24.5	-124.93	-1,096.2	647.5	1,293.6	1,246.3	47.26	27.369	

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	13.44	57.9	13.8	59.5				
100.0	100.0	100.0	100.0	0.1	0.1	13.44	57.9	13.8	59.5	59.3	0.27	218.692	
200.0	200.0	200.0	200.0	0.3	0.3	13.44	57.9	13.8	59.5	58.9	0.62	95.832	CC, ES
300.0	300.0	300.0	300.0	0.5	0.5	170.76	57.9	13.8	62.1	61.2	0.97	64.062	
400.0	399.6	399.0	399.0	0.7	0.7	173.84	57.6	16.4	70.3	69.0	1.32	53.230	
500.0	498.8	496.7	496.3	1.0	0.9	179.82	56.7	23.9	85.1	83.4	1.69	50.331	SF
600.0	597.1	593.1	592.1	1.4	1.1	-174.08	55.4	35.2	107.2	105.1	2.08	51.583	
700.0	694.3	688.8	687.1	1.8	1.3	-170.19	54.1	46.8	135.2	132.7	2.47	54.627	
800.0	790.2	783.0	780.6	2.3	1.6	-167.92	52.7	58.3	168.4	165.5	2.88	58.495	
900.0	885.3	876.4	873.2	2.9	1.8	-166.69	51.4	69.6	203.9	200.6	3.31	61.551	
1,000.0	980.5	969.8	965.9	3.4	2.1	-165.82	50.1	80.9	239.6	235.8	3.76	63.781	
1,100.0	1,075.7	1,063.2	1,058.6	4.0	2.3	-165.18	48.8	92.3	275.2	271.0	4.20	65.464	
1,200.0	1,170.8	1,156.5	1,151.3	4.6	2.6	-164.69	47.5	103.6	310.9	306.3	4.66	66.770	
1,300.0	1,266.0	1,249.9	1,244.0	5.1	2.9	-164.30	46.2	114.9	346.6	341.5	5.11	67.808	
1,400.0	1,361.1	1,343.3	1,336.7	5.7	3.1	-163.98	44.8	126.2	382.3	376.8	5.57	68.650	
1,500.0	1,456.3	1,436.7	1,429.4	6.2	3.4	-163.71	43.5	137.6	418.0	412.0	6.03	69.345	
1,600.0	1,551.5	1,530.1	1,522.1	6.8	3.6	-163.49	42.2	148.9	453.8	447.3	6.49	69.928	
1,700.0	1,646.6	1,623.5	1,614.7	7.4	3.9	-163.30	40.9	160.2	489.5	482.6	6.95	70.422	
1,800.0	1,741.8	1,716.9	1,707.4	7.9	4.1	-163.13	39.6	171.6	525.2	517.8	7.41	70.847	
1,900.0	1,836.9	1,810.3	1,800.1	8.5	4.4	-162.99	38.3	182.9	561.0	553.1	7.88	71.215	
2,000.0	1,932.1	1,903.6	1,892.8	9.1	4.6	-162.86	36.9	194.2	596.7	588.4	8.34	71.537	
2,100.0	2,027.3	1,997.0	1,985.5	9.6	4.9	-162.75	35.6	205.5	632.5	623.7	8.81	71.822	
2,200.0	2,122.4	2,090.4	2,078.2	10.2	5.2	-162.65	34.3	216.9	668.2	659.0	9.27	72.074	
2,300.0	2,217.6	2,183.8	2,170.9	10.8	5.4	-162.56	33.0	228.2	704.0	694.2	9.74	72.299	
2,400.0	2,312.7	2,277.2	2,263.5	11.3	5.7	-162.48	31.7	239.5	739.7	729.5	10.20	72.502	
2,500.0	2,407.9	2,370.6	2,356.2	11.9	5.9	-162.41	30.4	250.9	775.5	764.8	10.67	72.685	
2,600.0	2,503.1	2,464.0	2,448.9	12.5	6.2	-162.34	29.0	262.2	811.2	800.1	11.14	72.851	
2,700.0	2,598.2	2,557.3	2,541.6	13.0	6.4	-162.28	27.7	273.5	847.0	835.4	11.60	73.003	
2,800.0	2,693.4	2,650.7	2,634.3	13.6	6.7	-162.22	26.4	284.8	882.7	870.7	12.07	73.142	
2,900.0	2,788.5	2,744.1	2,727.0	14.2	7.0	-162.17	25.1	296.2	918.5	906.0	12.54	73.269	
3,000.0	2,883.7	2,837.5	2,819.7	14.7	7.2	-162.12	23.8	307.5	954.2	941.2	13.00	73.386	
3,100.0	2,978.9	2,930.9	2,912.4	15.3	7.5	-162.08	22.5	318.8	990.0	976.5	13.47	73.495	
3,200.0	3,074.0	3,024.3	3,005.0	15.9	7.7	-162.03	21.1	330.2	1,025.8	1,011.8	13.94	73.595	
3,300.0	3,169.2	3,117.7	3,097.7	16.4	8.0	-162.00	19.8	341.5	1,061.5	1,047.1	14.41	73.689	
3,400.0	3,264.4	3,211.0	3,190.4	17.0	8.3	-161.96	18.5	352.8	1,097.3	1,082.4	14.87	73.776	
3,500.0	3,359.5	3,304.4	3,283.1	17.6	8.5	-161.93	17.2	364.1	1,133.0	1,117.7	15.34	73.857	
3,600.0	3,454.7	3,397.8	3,375.8	18.1	8.8	-161.89	15.9	375.5	1,168.8	1,153.0	15.81	73.933	
3,700.0	3,549.8	3,491.2	3,468.5	18.7	9.0	-161.86	14.6	386.8	1,204.6	1,188.3	16.28	74.005	
3,800.0	3,645.0	3,584.6	3,561.2	19.3	9.3	-161.83	13.2	398.1	1,240.3	1,223.6	16.74	74.072	
3,900.0	3,740.2	3,678.0	3,653.9	19.8	9.5	-161.81	11.9	409.5	1,276.1	1,258.9	17.21	74.135	
4,000.0	3,835.3	3,771.4	3,746.5	20.4	9.8	-161.78	10.6	420.8	1,311.8	1,294.1	17.68	74.195	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	142.21	-9.1	7.1	11.5				
100.0	100.0	100.0	100.0	0.1	0.1	142.21	-9.1	7.1	11.5	11.3	0.27	42.319	
200.0	200.0	200.0	200.0	0.3	0.3	142.21	-9.1	7.1	11.5	10.9	0.62	18.544	
300.0	300.0	300.0	300.0	0.5	0.5	-73.45	-9.1	7.1	10.5	9.5	0.98	10.735	
323.8	323.7	323.6	323.6	0.5	0.5	-80.54	-9.2	7.1	10.3	9.2	1.07	9.621	CC, ES
400.0	399.6	399.3	399.3	0.7	0.7	-104.59	-11.4	8.2	12.5	11.1	1.37	9.072	SF
500.0	498.8	498.4	498.1	1.0	0.9	-121.57	-18.3	11.7	21.2	19.4	1.82	11.629	
600.0	597.1	597.1	595.9	1.4	1.1	-126.58	-29.7	17.5	35.0	32.6	2.37	14.749	
700.0	694.3	695.0	692.2	1.8	1.5	-127.46	-45.4	25.4	53.0	50.0	3.05	17.388	
800.0	790.2	791.9	786.5	2.3	1.9	-126.98	-65.3	35.5	75.1	71.3	3.87	19.419	
900.0	885.3	887.9	878.6	2.9	2.4	-125.32	-89.2	47.6	99.7	94.9	4.81	20.731	
1,000.0	980.5	984.3	970.4	3.4	2.9	-122.91	-115.8	61.1	125.1	119.3	5.80	21.565	
1,100.0	1,075.7	1,080.9	1,062.2	4.0	3.4	-121.30	-142.4	74.6	150.6	143.8	6.80	22.150	
1,200.0	1,170.8	1,177.6	1,154.1	4.6	4.0	-120.15	-169.1	88.1	176.3	168.4	7.81	22.582	
1,300.0	1,266.0	1,274.2	1,246.0	5.1	4.5	-119.30	-195.8	101.6	201.9	193.1	8.81	22.913	
1,400.0	1,361.1	1,370.8	1,337.9	5.7	5.1	-118.64	-222.4	115.1	227.6	217.8	9.82	23.174	
1,500.0	1,456.3	1,467.4	1,429.7	6.2	5.6	-118.11	-249.1	128.6	253.3	242.5	10.83	23.385	
1,600.0	1,551.5	1,564.0	1,521.6	6.8	6.2	-117.68	-275.8	142.1	279.1	267.2	11.85	23.560	
1,700.0	1,646.6	1,660.6	1,613.5	7.4	6.7	-117.32	-302.4	155.6	304.8	292.0	12.86	23.706	
1,800.0	1,741.8	1,757.2	1,705.3	7.9	7.2	-117.02	-329.1	169.1	330.6	316.7	13.87	23.830	
1,900.0	1,836.9	1,853.8	1,797.2	8.5	7.8	-116.76	-355.8	182.6	356.3	341.4	14.89	23.937	
2,000.0	1,932.1	1,950.5	1,889.1	9.1	8.3	-116.54	-382.5	196.1	382.1	366.2	15.90	24.030	
2,100.0	2,027.3	2,047.1	1,981.0	9.6	8.9	-116.34	-409.1	209.6	407.9	391.0	16.92	24.112	
2,200.0	2,122.4	2,143.7	2,072.8	10.2	9.4	-116.17	-435.8	223.1	433.7	415.7	17.93	24.184	
2,300.0	2,217.6	2,240.3	2,164.7	10.8	10.0	-116.02	-462.5	236.7	459.4	440.5	18.95	24.248	
2,400.0	2,312.7	2,336.9	2,256.6	11.3	10.5	-115.88	-489.1	250.2	485.2	465.3	19.96	24.306	
2,500.0	2,407.9	2,433.5	2,348.4	11.9	11.1	-115.76	-515.8	263.7	511.0	490.0	20.98	24.358	
2,600.0	2,503.1	2,530.1	2,440.3	12.5	11.7	-115.65	-542.5	277.2	536.8	514.8	22.00	24.405	
2,700.0	2,598.2	2,626.7	2,532.2	13.0	12.2	-115.55	-569.1	290.7	562.6	539.6	23.01	24.448	
2,800.0	2,693.4	2,723.4	2,624.1	13.6	12.8	-115.45	-595.8	304.2	588.4	564.4	24.03	24.487	
2,900.0	2,788.5	2,820.0	2,715.9	14.2	13.3	-115.37	-622.5	317.7	614.2	589.1	25.05	24.523	
3,000.0	2,883.7	2,916.6	2,807.8	14.7	13.9	-115.29	-649.1	331.2	640.0	613.9	26.06	24.556	
3,100.0	2,978.9	3,013.2	2,899.7	15.3	14.4	-115.22	-675.8	344.7	665.8	638.7	27.08	24.586	
3,200.0	3,074.0	3,109.8	2,991.5	15.9	15.0	-115.15	-702.5	358.2	691.6	663.5	28.10	24.615	
3,300.0	3,169.2	3,206.4	3,083.4	16.4	15.5	-115.09	-729.1	371.7	717.4	688.2	29.11	24.641	
3,400.0	3,264.4	3,303.0	3,175.3	17.0	16.1	-115.04	-755.8	385.2	743.2	713.0	30.13	24.665	
3,500.0	3,359.5	3,399.6	3,267.2	17.6	16.6	-114.98	-782.5	398.7	769.0	737.8	31.15	24.688	
3,600.0	3,454.7	3,496.3	3,359.0	18.1	17.2	-114.93	-809.1	412.2	794.8	762.6	32.16	24.710	
3,700.0	3,549.8	3,592.9	3,450.9	18.7	17.7	-114.89	-835.8	425.7	820.6	787.4	33.18	24.730	
3,800.0	3,645.0	3,689.5	3,542.8	19.3	18.3	-114.84	-862.5	439.2	846.4	812.2	34.20	24.748	
3,900.0	3,740.2	3,786.1	3,634.6	19.8	18.8	-114.80	-889.1	452.7	872.2	836.9	35.22	24.766	
4,000.0	3,835.3	3,882.7	3,726.5	20.4	19.4	-114.76	-915.8	466.3	898.0	861.7	36.23	24.783	
4,100.0	3,930.5	3,979.3	3,818.4	21.0	19.9	-114.73	-942.5	479.8	923.8	886.5	37.25	24.799	
4,200.0	4,025.6	4,075.9	3,910.3	21.5	20.5	-114.69	-969.1	493.3	949.6	911.3	38.27	24.814	
4,300.0	4,120.8	4,172.5	4,002.1	22.1	21.0	-114.66	-995.8	506.8	975.4	936.1	39.28	24.828	
4,400.0	4,216.0	4,269.2	4,094.0	22.7	21.6	-114.63	-1,022.5	520.3	1,001.2	960.9	40.30	24.841	
4,500.0	4,311.1	4,365.8	4,185.9	23.2	22.1	-114.60	-1,049.2	533.8	1,027.0	985.6	41.32	24.854	
4,600.0	4,406.3	4,462.4	4,277.7	23.8	22.7	-114.57	-1,075.8	547.3	1,052.8	1,010.4	42.34	24.866	
4,700.0	4,501.4	4,559.0	4,369.6	24.4	23.3	-114.54	-1,102.5	560.8	1,078.6	1,035.2	43.35	24.878	
4,800.0	4,596.6	4,655.6	4,461.5	24.9	23.8	-114.52	-1,129.2	574.3	1,104.4	1,060.0	44.37	24.889	
4,900.0	4,691.8	4,752.2	4,553.4	25.5	24.4	-114.49	-1,155.8	587.8	1,130.2	1,084.8	45.39	24.899	
5,000.0	4,786.9	4,848.8	4,645.2	26.1	24.9	-114.47	-1,182.5	601.3	1,156.0	1,109.6	46.41	24.910	

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

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,100.0	4,882.1	4,945.4	4,737.1	26.7	25.5	-114.45	-1,209.2	614.8	1,181.8	1,134.4	47.42	24.919	
5,200.0	4,977.2	5,042.1	4,829.0	27.2	26.0	-114.43	-1,235.8	628.3	1,207.6	1,159.1	48.44	24.928	
5,300.0	5,072.4	5,138.7	4,920.8	27.8	26.6	-114.40	-1,262.5	641.8	1,233.4	1,183.9	49.46	24.937	
5,400.0	5,167.6	5,235.3	5,012.7	28.4	27.1	-114.39	-1,289.2	655.3	1,259.2	1,208.7	50.48	24.946	
5,500.0	5,262.7	5,331.9	5,104.6	28.9	27.7	-114.37	-1,315.8	668.8	1,285.0	1,233.5	51.50	24.954	
5,600.0	5,357.9	5,428.5	5,196.5	29.5	28.2	-114.35	-1,342.5	682.3	1,310.8	1,258.3	52.51	24.962	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
Project:	Mamm Creek	**TVD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Reference Site:	(J16W)	**MD Reference:**	KBE @ 7667.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	HMU Federal 21-3A	**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 Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	11.44	75.4	15.3	76.9				
100.0	100.0	100.0	100.0	0.1	0.1	11.44	75.4	15.3	76.9	76.6	0.27	282.509	
200.0	200.0	200.0	200.0	0.3	0.3	11.44	75.4	15.3	76.9	76.3	0.62	123.796	CC, ES
300.0	300.0	296.7	296.7	0.5	0.5	169.79	77.0	17.1	81.5	80.5	0.97	84.237	
400.0	399.6	392.0	391.7	0.7	0.7	173.21	81.5	22.7	95.4	94.0	1.32	72.313	
500.0	498.8	484.5	483.5	1.0	1.0	177.08	88.9	31.5	118.8	117.1	1.67	71.149	SF
600.0	597.1	573.1	570.7	1.4	1.3	-179.53	98.6	43.2	151.7	149.7	2.01	75.364	
700.0	694.3	659.8	655.5	1.8	1.6	-176.81	110.3	57.4	193.2	190.9	2.34	82.521	
800.0	790.2	747.8	741.3	2.3	2.0	-174.93	122.6	72.3	240.4	237.7	2.67	90.048	
900.0	885.3	834.6	826.0	2.9	2.3	-173.79	134.8	87.0	289.8	286.8	3.02	95.872	
1,000.0	980.5	921.5	910.7	3.4	2.7	-172.99	147.0	101.7	339.2	335.9	3.38	100.403	
1,100.0	1,075.7	1,008.3	995.4	4.0	3.0	-172.39	159.2	116.4	388.7	385.0	3.74	104.012	
1,200.0	1,170.8	1,095.1	1,080.1	4.6	3.4	-171.92	171.3	131.1	438.2	434.1	4.10	106.943	
1,300.0	1,266.0	1,182.0	1,164.8	5.1	3.8	-171.55	183.5	145.8	487.8	483.3	4.46	109.366	
1,400.0	1,361.1	1,268.8	1,249.5	5.7	4.1	-171.25	195.7	160.5	537.3	532.5	4.82	111.402	
1,500.0	1,456.3	1,355.6	1,334.2	6.2	4.5	-171.00	207.8	175.2	586.9	581.7	5.19	113.135	
1,600.0	1,551.5	1,442.4	1,419.0	6.8	4.9	-170.78	220.0	189.9	636.4	630.9	5.55	114.626	
1,700.0	1,646.6	1,529.3	1,503.7	7.4	5.2	-170.60	232.2	204.6	686.0	680.1	5.92	115.921	
1,800.0	1,741.8	1,616.1	1,588.4	7.9	5.6	-170.45	244.4	219.3	735.6	729.3	6.28	117.058	
1,900.0	1,836.9	1,702.9	1,673.1	8.5	6.0	-170.31	256.5	234.0	785.2	778.5	6.65	118.061	
2,000.0	1,932.1	1,789.8	1,757.8	9.1	6.3	-170.19	268.7	248.7	834.7	827.7	7.02	118.954	
2,100.0	2,027.3	1,876.6	1,842.5	9.6	6.7	-170.08	280.9	263.4	884.3	876.9	7.38	119.753	
2,200.0	2,122.4	1,963.4	1,927.2	10.2	7.1	-169.98	293.1	278.1	933.9	926.2	7.75	120.472	
2,300.0	2,217.6	2,050.3	2,011.9	10.8	7.5	-169.90	305.2	292.8	983.5	975.4	8.12	121.123	
2,400.0	2,312.7	2,137.1	2,096.6	11.3	7.8	-169.82	317.4	307.5	1,033.1	1,024.6	8.49	121.715	
2,500.0	2,407.9	2,223.9	2,181.3	11.9	8.2	-169.75	329.6	322.2	1,082.7	1,073.8	8.86	122.256	
2,600.0	2,503.1	2,310.8	2,266.0	12.5	8.6	-169.68	341.7	336.9	1,132.3	1,123.0	9.22	122.751	
2,700.0	2,598.2	2,397.6	2,350.7	13.0	8.9	-169.62	353.9	351.6	1,181.9	1,172.3	9.59	123.206	
2,800.0	2,693.4	2,484.4	2,435.4	13.6	9.3	-169.57	366.1	366.3	1,231.4	1,221.5	9.96	123.627	
2,900.0	2,788.5	2,571.2	2,520.2	14.2	9.7	-169.52	378.3	381.0	1,281.0	1,270.7	10.33	124.016	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well HMU Federal 21-3A
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Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

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

Coordinates are relative to: HMU Federal 21-3A
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.44°