

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Grattan 4B-30H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KBE @ 4945.0ft (Original Well Elev)
Project:	DJ Wattenberg	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site:	SESE S30-T2N-R64W (Grattan)	North Reference:	True
Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

Project	DJ Wattenberg		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		SESE S30-T2N-R64W (Grattan)			
Site Position:		Northing:	1,281,949.98 ft	Latitude:	40.103720
From:	Lat/Long	Easting:	3,255,698.10 ft	Longitude:	-104.585910
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.59 °

Well	Grattan 4B-30H					
Well Position	+N/-S	0.0 ft	Northing:	1,281,953.33 ft	Latitude:	40.103730
	+E/-W	0.0 ft	Easting:	3,255,670.09 ft	Longitude:	-104.586010
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,933.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/26/2011	8.73	66.84	52,982

Design	Plan #3			
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	344.63

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	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,520.4	15.61	232.73	3,514.0	-42.7	-56.1	3.00	3.00	0.00	232.73	
6,461.9	15.61	232.73	6,347.0	-522.0	-686.1	0.00	0.00	0.00	0.00	
7,451.7	90.50	356.00	6,987.0	37.6	-876.5	10.00	7.57	12.45	122.17	
11,686.7	90.50	356.00	6,950.0	4,262.1	-1,171.9	0.00	0.00	0.00	0.00	Grattan 4B-30 PBHL

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Site:	SESE S30-T2N-R64W (Grattan)	North Reference:	True
Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

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	
100.0	0.00	0.00	100.0	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	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	KOP @ 3000'
3,100.0	3.00	232.73	3,100.0	-1.6	-2.1	-1.0	3.00	3.00	
3,200.0	6.00	232.73	3,199.6	-6.3	-8.3	-3.9	3.00	3.00	
3,300.0	9.00	232.73	3,298.8	-14.2	-18.7	-8.8	3.00	3.00	
3,400.0	12.00	232.73	3,397.1	-25.3	-33.2	-15.6	3.00	3.00	
3,500.0	15.00	232.73	3,494.3	-39.4	-51.8	-24.3	3.00	3.00	
3,520.4	15.61	232.73	3,514.0	-42.7	-56.1	-26.3	3.00	3.00	EOB; Inc=15.6°
3,600.0	15.61	232.73	3,590.6	-55.6	-73.1	-34.3	0.00	0.00	
3,700.0	15.61	232.73	3,687.0	-71.9	-94.5	-44.3	0.00	0.00	
3,800.0	15.61	232.73	3,783.3	-88.2	-116.0	-54.3	0.00	0.00	
3,900.0	15.61	232.73	3,879.6	-104.5	-137.4	-64.4	0.00	0.00	
4,000.0	15.61	232.73	3,975.9	-120.8	-158.8	-74.4	0.00	0.00	
4,100.0	15.61	232.73	4,072.2	-137.1	-180.2	-84.4	0.00	0.00	
4,200.0	15.61	232.73	4,168.5	-153.4	-201.6	-94.5	0.00	0.00	
4,300.0	15.61	232.73	4,264.8	-169.7	-223.0	-104.5	0.00	0.00	
4,400.0	15.61	232.73	4,361.1	-186.0	-244.5	-114.6	0.00	0.00	
4,415.4	15.61	232.73	4,376.0	-188.5	-247.8	-116.1	0.00	0.00	Sussex
4,500.0	15.61	232.73	4,457.4	-202.3	-265.9	-124.6	0.00	0.00	
4,600.0	15.61	232.73	4,553.8	-218.6	-287.3	-134.6	0.00	0.00	
4,700.0	15.61	232.73	4,650.1	-234.9	-308.7	-144.7	0.00	0.00	
4,761.2	15.61	232.73	4,709.0	-244.9	-321.8	-150.8	0.00	0.00	Sussex Marker
4,800.0	15.61	232.73	4,746.4	-251.2	-330.1	-154.7	0.00	0.00	

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Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

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
4,900.0	15.61	232.73	4,842.7	-267.5	-351.5	-164.7	0.00	0.00	
5,000.0	15.61	232.73	4,939.0	-283.8	-373.0	-174.8	0.00	0.00	
5,100.0	15.61	232.73	5,035.3	-300.1	-394.4	-184.8	0.00	0.00	
5,200.0	15.61	232.73	5,131.6	-316.4	-415.8	-194.8	0.00	0.00	
5,260.6	15.61	232.73	5,190.0	-326.3	-428.8	-200.9	0.00	0.00	Shannon
5,300.0	15.61	232.73	5,227.9	-332.7	-437.2	-204.9	0.00	0.00	
5,400.0	15.61	232.73	5,324.2	-349.0	-458.6	-214.9	0.00	0.00	
5,500.0	15.61	232.73	5,420.5	-365.3	-480.0	-224.9	0.00	0.00	
5,600.0	15.61	232.73	5,516.9	-381.6	-501.5	-235.0	0.00	0.00	
5,700.0	15.61	232.73	5,613.2	-397.9	-522.9	-245.0	0.00	0.00	
5,800.0	15.61	232.73	5,709.5	-414.2	-544.3	-255.1	0.00	0.00	
5,900.0	15.61	232.73	5,805.8	-430.5	-565.7	-265.1	0.00	0.00	
6,000.0	15.61	232.73	5,902.1	-446.8	-587.1	-275.1	0.00	0.00	
6,100.0	15.61	232.73	5,998.4	-463.1	-608.5	-285.2	0.00	0.00	
6,200.0	15.61	232.73	6,094.7	-479.4	-630.0	-295.2	0.00	0.00	
6,300.0	15.61	232.73	6,191.0	-495.7	-651.4	-305.2	0.00	0.00	
6,400.0	15.61	232.73	6,287.3	-512.0	-672.8	-315.3	0.00	0.00	
6,461.9	15.61	232.73	6,347.0	-522.0	-686.1	-321.5	0.00	0.00	Start 10° Build @ 6461' MD
6,500.0	13.95	246.21	6,383.8	-527.0	-694.3	-324.1	10.00	-4.36	
6,600.0	14.19	288.21	6,481.1	-528.0	-717.1	-319.0	10.00	0.24	
6,700.0	20.12	316.19	6,576.7	-511.8	-740.7	-297.1	10.00	5.92	
6,800.0	28.36	330.20	6,667.9	-478.7	-764.5	-258.9	10.00	8.24	
6,900.0	37.42	338.08	6,751.8	-429.7	-787.7	-205.5	10.00	9.06	
6,971.6	44.12	341.92	6,806.0	-385.8	-803.5	-159.0	10.00	9.37	Sharon Springs
7,000.0	46.81	343.20	6,825.9	-366.5	-809.6	-138.7	10.00	9.48	
7,017.9	48.52	343.95	6,838.0	-353.8	-813.3	-125.5	10.00	9.51	Niobrara
7,100.0	56.38	346.93	6,888.0	-290.8	-829.6	-60.5	10.00	9.58	
7,200.0	66.03	349.91	6,936.1	-205.1	-847.1	26.8	10.00	9.65	
7,236.8	69.60	350.89	6,950.0	-171.5	-852.7	60.7	10.00	9.69	Target
7,300.0	75.74	352.47	6,968.8	-111.8	-861.4	120.6	10.00	9.71	
7,400.0	85.47	354.82	6,985.1	-13.9	-872.3	217.9	10.00	9.73	
7,451.7	90.50	356.00	6,987.0	37.6	-876.5	268.6	10.00	9.73	Landing Pt @ 6987' TVD; 90.5° - ICP
7,500.0	90.50	356.00	6,986.5	85.8	-879.8	316.0	0.00	0.00	
7,600.0	90.50	356.00	6,985.7	185.5	-886.8	414.0	0.00	0.00	
7,700.0	90.50	356.00	6,984.8	285.3	-893.8	512.0	0.00	0.00	
7,800.0	90.50	356.00	6,983.9	385.0	-900.7	610.1	0.00	0.00	
7,900.0	90.50	356.00	6,983.0	484.8	-907.7	708.1	0.00	0.00	
8,000.0	90.50	356.00	6,982.2	584.5	-914.7	806.1	0.00	0.00	
8,100.0	90.50	356.00	6,981.3	684.3	-921.7	904.1	0.00	0.00	
8,200.0	90.50	356.00	6,980.4	784.0	-928.6	1,002.2	0.00	0.00	
8,300.0	90.50	356.00	6,979.6	883.8	-935.6	1,100.2	0.00	0.00	
8,400.0	90.50	356.00	6,978.7	983.5	-942.6	1,198.2	0.00	0.00	
8,500.0	90.50	356.00	6,977.8	1,083.3	-949.6	1,296.3	0.00	0.00	
8,600.0	90.50	356.00	6,976.9	1,183.1	-956.6	1,394.3	0.00	0.00	
8,700.0	90.50	356.00	6,976.1	1,282.8	-963.5	1,492.3	0.00	0.00	
8,800.0	90.50	356.00	6,975.2	1,382.6	-970.5	1,590.4	0.00	0.00	
8,900.0	90.50	356.00	6,974.3	1,482.3	-977.5	1,688.4	0.00	0.00	
9,000.0	90.50	356.00	6,973.4	1,582.1	-984.5	1,786.4	0.00	0.00	
9,100.0	90.50	356.00	6,972.6	1,681.8	-991.4	1,884.5	0.00	0.00	
9,200.0	90.50	356.00	6,971.7	1,781.6	-998.4	1,982.5	0.00	0.00	
9,300.0	90.50	356.00	6,970.8	1,881.3	-1,005.4	2,080.5	0.00	0.00	
9,400.0	90.50	356.00	6,970.0	1,981.1	-1,012.4	2,178.6	0.00	0.00	

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Project:	DJ Wattenberg	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site:	SESE S30-T2N-R64W (Grattan)	North Reference:	True
Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

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
9,500.0	90.50	356.00	6,969.1	2,080.8	-1,019.3	2,276.6	0.00	0.00	
9,600.0	90.50	356.00	6,968.2	2,180.6	-1,026.3	2,374.6	0.00	0.00	
9,700.0	90.50	356.00	6,967.3	2,280.3	-1,033.3	2,472.7	0.00	0.00	
9,800.0	90.50	356.00	6,966.5	2,380.1	-1,040.3	2,570.7	0.00	0.00	
9,900.0	90.50	356.00	6,965.6	2,479.8	-1,047.2	2,668.7	0.00	0.00	
10,000.0	90.50	356.00	6,964.7	2,579.6	-1,054.2	2,766.8	0.00	0.00	
10,100.0	90.50	356.00	6,963.8	2,679.3	-1,061.2	2,864.8	0.00	0.00	
10,200.0	90.50	356.00	6,963.0	2,779.1	-1,068.2	2,962.8	0.00	0.00	
10,300.0	90.50	356.00	6,962.1	2,878.8	-1,075.1	3,060.9	0.00	0.00	
10,400.0	90.50	356.00	6,961.2	2,978.6	-1,082.1	3,158.9	0.00	0.00	
10,500.0	90.50	356.00	6,960.4	3,078.4	-1,089.1	3,256.9	0.00	0.00	
10,600.0	90.50	356.00	6,959.5	3,178.1	-1,096.1	3,355.0	0.00	0.00	
10,700.0	90.50	356.00	6,958.6	3,277.9	-1,103.0	3,453.0	0.00	0.00	
10,800.0	90.50	356.00	6,957.7	3,377.6	-1,110.0	3,551.0	0.00	0.00	
10,900.0	90.50	356.00	6,956.9	3,477.4	-1,117.0	3,649.1	0.00	0.00	
11,000.0	90.50	356.00	6,956.0	3,577.1	-1,124.0	3,747.1	0.00	0.00	
11,100.0	90.50	356.00	6,955.1	3,676.9	-1,130.9	3,845.1	0.00	0.00	
11,200.0	90.50	356.00	6,954.2	3,776.6	-1,137.9	3,943.2	0.00	0.00	
11,300.0	90.50	356.00	6,953.4	3,876.4	-1,144.9	4,041.2	0.00	0.00	
11,400.0	90.50	356.00	6,952.5	3,976.1	-1,151.9	4,139.2	0.00	0.00	
11,500.0	90.50	356.00	6,951.6	4,075.9	-1,158.8	4,237.3	0.00	0.00	
11,600.0	90.50	356.00	6,950.8	4,175.6	-1,165.8	4,335.3	0.00	0.00	
11,686.7	90.50	356.00	6,950.0	4,262.1	-1,171.9	4,420.3	0.00	0.00	TD at 11686.7 - Grattan 4B-30 PBHL

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Grattan 4B-30 PBHL	0.00	0.00	6,950.0	4,262.1	-1,171.9	1,286,203.12	3,254,454.37	40.115430	-104.590200
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
7,451.7	6,987.0	ICP	0.000	0.000	

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Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KBE @ 4945.0ft (Original Well Elev)
Project:	DJ Wattenberg	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site:	SESE S30-T2N-R64W (Grattan)	North Reference:	True
Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #3		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,415.4	4,376.0	Sussex			
4,761.2	4,709.0	Sussex Marker			
5,260.6	5,190.0	Shannon			
6,971.6	6,806.0	Sharon Springs			
7,017.9	6,838.0	Niobrara			
7,236.8	6,950.0	Target			

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
3,000.0	3,000.0	0.0	0.0	KOP @ 3000'	
3,520.4	3,514.0	-42.7	-56.1	EOB; Inc=15.6°	
6,461.9	6,347.0	-522.0	-686.1	Start 10° Build @ 6461' MD	
7,451.7	6,987.0	37.6	-876.5	Landing Pt @ 6987' TVD; 90.5°	
11,686.7	6,950.0	4,262.1	-1,171.9	TD at 11686.7	

EnCana Oil & Gas (USA) Inc

DJ Wattenberg

SESE S30-T2N-R64W (Grattan)

Grattan 4B-30H

HZ

Plan #3

Anticollision Report

29 July, 2011

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Grattan 4B-30H
Project:	DJ Wattenberg	TVD Reference:	KBE @ 4945.0ft (Original Well Elev)
Reference Site:	SESE S30-T2N-R64W (Grattan)	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	Offset TVD Reference:	Offset Datum

Reference	Plan #3		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 500.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date	7/29/2011		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,686.7	Plan #3 (HZ)	MWD	Geolink MWD

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
SESE S30-T2N-R64W (Grattan)						
Grattan #1 (Existing) - DD - DD	7,949.9	6,988.6	431.1	401.4	14.503	CC, ES
Grattan #1 (Existing) - DD - DD	8,000.0	6,988.2	434.0	403.7	14.309	SF
Grattan 4A-30H - HZ - Plan #3	3,000.0	3,000.0	28.2	17.8	2.705	CC, ES, SF

Anticollision Report

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Project:	DJ Wattenberg	TVD Reference:	KBE @ 4945.0ft (Original Well Elev)
Reference Site:	SESE S30-T2N-R64W (Grattan)	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	Offset TVD Reference:	Offset Datum

Offset Design												SESE S30-T2N-R64W (Grattan) - Grattan #1 (Existing) - DD - DD		Offset Site Error:		0.0 ft	
Survey Program: 9000-MWD														Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance						Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor					
							+N/-S (ft)	+E/-W (ft)									
7,700.0	6,984.8	6,990.8	6,990.8	21.6	12.2	90.29	564.6	-481.1	498.3	471.3	27.03	18.435					
7,800.0	6,983.9	6,989.9	6,989.9	22.2	12.2	90.17	564.6	-481.1	456.4	428.4	28.01	16.294					
7,900.0	6,983.0	6,989.0	6,989.0	23.0	12.2	90.06	564.6	-481.1	434.0	404.9	29.12	14.903					
7,949.9	6,982.6	6,988.6	6,988.6	23.5	12.2	90.00	564.6	-481.1	431.1	401.4	29.73	14.503	CC, ES				
8,000.0	6,982.2	6,988.2	6,988.2	23.9	12.2	89.94	564.6	-481.1	434.0	403.7	30.33	14.309	SF				
8,100.0	6,981.3	6,987.3	6,987.3	24.9	12.2	89.83	564.6	-481.1	456.5	424.9	31.63	14.434					
8,200.0	6,980.4	6,986.4	6,986.4	26.0	12.2	89.71	564.6	-481.1	498.4	465.4	32.99	15.108					

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Grattan 4B-30H
Project:	DJ Wattenberg	TVD Reference:	KBE @ 4945.0ft (Original Well Elev)
Reference Site:	SESE S30-T2N-R64W (Grattan)	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	Offset TVD Reference:	Offset Datum

Offset Design SESE S30-T2N-R64W (Grattan) - Grattan 4A-30H - HZ - Plan #3													Offset Site Error: 0.0 ft	
Survey Program: 0-MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Total Uncertainty Axis	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)				
0.0	0.0	0.0	0.0	0.0	0.0	97.41	-3.6	28.0	28.2					
100.0	100.0	100.0	100.0	0.2	0.2	97.41	-3.6	28.0	28.2	27.9	0.31	91.831		
200.0	200.0	200.0	200.0	0.3	0.3	97.41	-3.6	28.0	28.2	27.6	0.66	42.985		
300.0	300.0	300.0	300.0	0.5	0.5	97.41	-3.6	28.0	28.2	27.2	1.01	28.059		
400.0	400.0	400.0	400.0	0.7	0.7	97.41	-3.6	28.0	28.2	26.9	1.35	20.828		
500.0	500.0	500.0	500.0	0.9	0.9	97.41	-3.6	28.0	28.2	26.5	1.70	16.560		
600.0	600.0	600.0	600.0	1.0	1.0	97.41	-3.6	28.0	28.2	26.2	2.05	13.743		
700.0	700.0	700.0	700.0	1.2	1.2	97.41	-3.6	28.0	28.2	25.8	2.40	11.746		
800.0	800.0	800.0	800.0	1.4	1.4	97.41	-3.6	28.0	28.2	25.5	2.75	10.255		
900.0	900.0	900.0	900.0	1.5	1.5	97.41	-3.6	28.0	28.2	25.1	3.10	9.100		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	97.41	-3.6	28.0	28.2	24.8	3.45	8.179		
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	97.41	-3.6	28.0	28.2	24.4	3.80	7.428		
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	97.41	-3.6	28.0	28.2	24.1	4.15	6.802		
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	97.41	-3.6	28.0	28.2	23.7	4.50	6.274		
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	97.41	-3.6	28.0	28.2	23.4	4.85	5.822		
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	97.41	-3.6	28.0	28.2	23.0	5.19	5.431		
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	97.41	-3.6	28.0	28.2	22.7	5.54	5.089		
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	97.41	-3.6	28.0	28.2	22.3	5.89	4.787		
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	97.41	-3.6	28.0	28.2	22.0	6.24	4.520		
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	97.41	-3.6	28.0	28.2	21.6	6.59	4.280		
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	97.41	-3.6	28.0	28.2	21.3	6.94	4.065		
2,100.0	2,100.0	2,100.0	2,100.0	3.6	3.6	97.41	-3.6	28.0	28.2	20.9	7.29	3.870		
2,200.0	2,200.0	2,200.0	2,200.0	3.8	3.8	97.41	-3.6	28.0	28.2	20.6	7.64	3.693		
2,300.0	2,300.0	2,300.0	2,300.0	4.0	4.0	97.41	-3.6	28.0	28.2	20.2	7.99	3.532		
2,400.0	2,400.0	2,400.0	2,400.0	4.2	4.2	97.41	-3.6	28.0	28.2	19.9	8.34	3.384		
2,500.0	2,500.0	2,500.0	2,500.0	4.3	4.3	97.41	-3.6	28.0	28.2	19.5	8.68	3.248		
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	97.41	-3.6	28.0	28.2	19.2	9.03	3.123		
2,700.0	2,700.0	2,700.0	2,700.0	4.7	4.7	97.41	-3.6	28.0	28.2	18.8	9.38	3.006		
2,800.0	2,800.0	2,800.0	2,800.0	4.9	4.9	97.41	-3.6	28.0	28.2	18.5	9.73	2.899		
2,900.0	2,900.0	2,900.0	2,900.0	5.0	5.0	97.41	-3.6	28.0	28.2	18.1	10.08	2.798		
3,000.0	3,000.0	3,000.0	3,000.0	5.2	5.2	97.41	-3.6	28.0	28.2	17.8	10.43	2.705 CC, ES, SF		
3,100.0	3,100.0	3,099.8	3,099.7	5.4	5.4	-133.85	-6.2	27.9	30.4	19.6	10.78	2.818		
3,200.0	3,199.6	3,199.3	3,198.9	5.6	5.6	-130.47	-14.0	27.8	36.9	25.8	11.12	3.321		
3,300.0	3,298.8	3,298.1	3,296.9	5.8	5.8	-126.86	-26.9	27.6	48.0	36.5	11.48	4.180		
3,400.0	3,397.1	3,397.0	3,394.5	6.0	6.0	-125.86	-42.5	27.3	62.9	51.1	11.86	5.305		
3,500.0	3,494.3	3,495.2	3,491.6	6.2	6.2	-128.08	-58.0	27.0	81.0	68.7	12.25	6.610		
3,600.0	3,590.6	3,593.0	3,588.1	6.5	6.4	-131.25	-73.4	26.7	101.4	88.8	12.68	8.000		
3,700.0	3,687.0	3,690.7	3,684.6	6.8	6.6	-133.46	-88.9	26.4	122.2	109.0	13.14	9.299		
3,800.0	3,783.3	3,788.5	3,781.1	7.2	6.9	-135.02	-104.3	26.2	143.0	129.4	13.61	10.508		
3,900.0	3,879.6	3,886.2	3,877.6	7.5	7.1	-136.19	-119.8	25.9	164.0	149.9	14.10	11.627		
4,000.0	3,975.9	3,983.9	3,974.1	7.9	7.3	-137.09	-135.2	25.6	185.0	170.3	14.60	12.664		
4,100.0	4,072.2	4,081.7	4,070.6	8.3	7.6	-137.81	-150.7	25.3	206.0	190.9	15.12	13.624		
4,200.0	4,168.5	4,179.4	4,167.1	8.7	7.9	-138.40	-166.1	25.0	227.0	211.4	15.64	14.513		
4,300.0	4,264.8	4,277.2	4,263.6	9.1	8.1	-138.88	-181.6	24.8	248.1	231.9	16.17	15.337		
4,400.0	4,361.1	4,374.9	4,360.2	9.5	8.4	-139.29	-197.0	24.5	269.2	252.4	16.72	16.102		
4,500.0	4,457.4	4,472.6	4,456.7	10.0	8.7	-139.64	-212.5	24.2	290.2	273.0	17.26	16.812		
4,600.0	4,553.8	4,570.4	4,553.2	10.4	8.9	-139.95	-227.9	23.9	311.3	293.5	17.82	17.473		
4,700.0	4,650.1	4,668.1	4,649.7	10.9	9.2	-140.21	-243.3	23.6	332.5	314.1	18.38	18.088		
4,800.0	4,746.4	4,765.8	4,746.2	11.3	9.5	-140.44	-258.8	23.4	353.6	334.6	18.95	18.662		
4,900.0	4,842.7	4,863.6	4,842.7	11.8	9.8	-140.65	-274.2	23.1	374.7	355.2	19.52	19.198		
5,000.0	4,939.0	4,961.3	4,939.2	12.2	10.0	-140.83	-289.7	22.8	395.8	375.7	20.09	19.700		
5,100.0	5,035.3	5,059.1	5,035.7	12.7	10.3	-141.00	-305.1	22.5	416.9	396.3	20.67	20.169		

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

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Grattan 4B-30H
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Reference Site:	SESE S30-T2N-R64W (Grattan)	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
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Reference Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	Offset TVD Reference:	Offset Datum

Offset Design													SESE S30-T2N-R64W (Grattan) - Grattan 4A-30H - HZ - Plan #3		Offset Site Error:		0.0 ft
Survey Program: 0-MWD													Offset Well Error:		0.0 ft		
Reference		Offset		Semi Major Axis			Distance							Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor					
5,200.0	5,131.6	5,156.8	5,132.2	13.2	10.6	-141.15	-320.6	22.2	438.1	416.8	21.25	20.610					
5,300.0	5,227.9	5,254.5	5,228.7	13.6	10.9	-141.29	-336.0	22.0	459.2	437.3	21.84	21.024					
5,400.0	5,324.2	5,352.3	5,325.2	14.1	11.2	-141.41	-351.5	21.7	480.3	457.9	22.43	21.413					

Anticollision Report

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Reference Site:	SESE S30-T2N-R64W (Grattan)	MD Reference:	KBE @ 4945.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Grattan 4B-30H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #3	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KBE @ 4945.0ft (Original Well Elev)
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °

Coordinates are relative to: Grattan 4B-30H
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.59°

