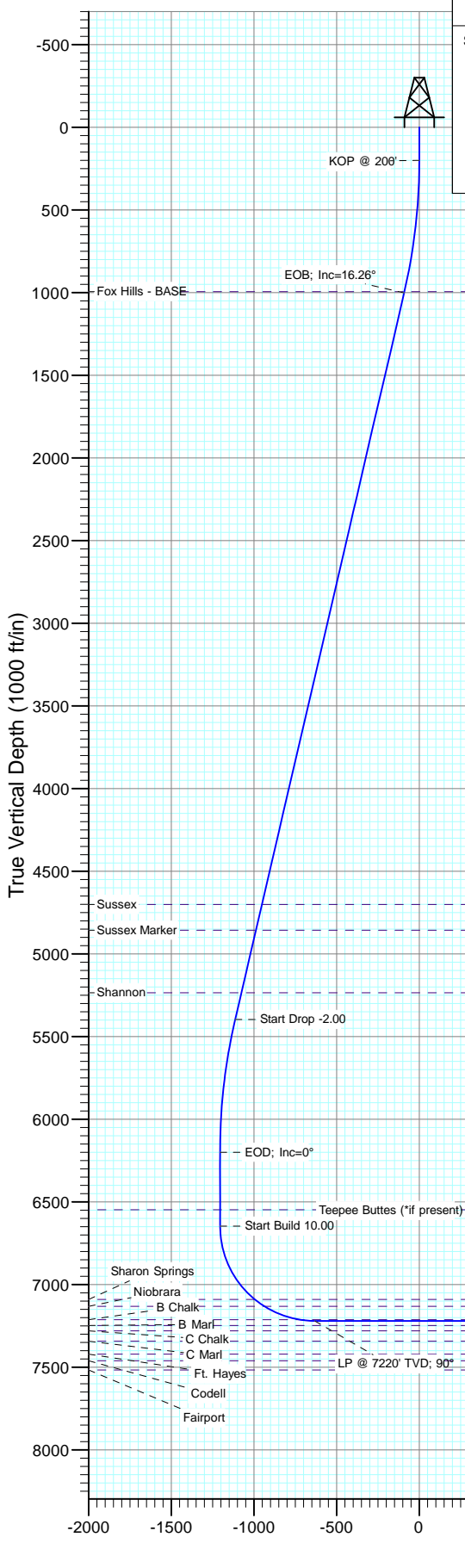
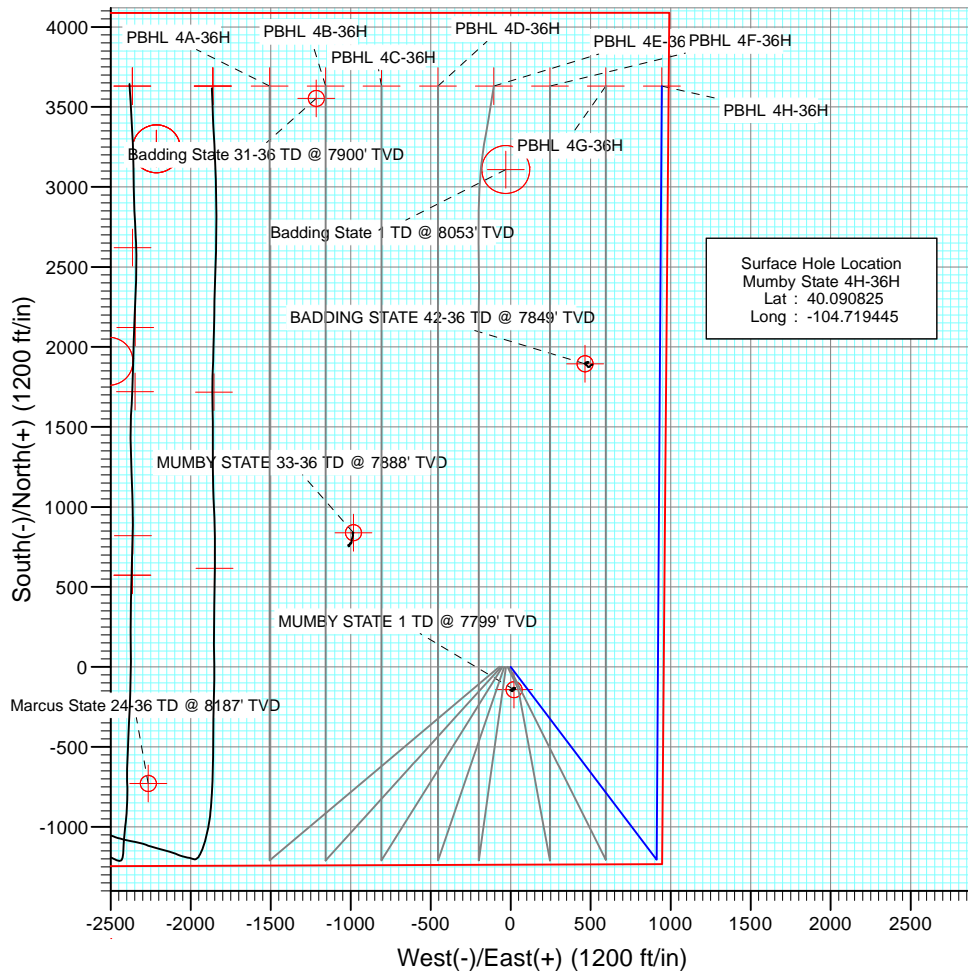




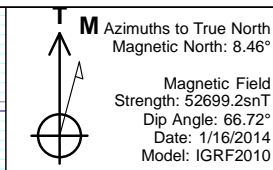
Project: DJ Wattenberg  
Site: S36 T2N-R66W (Marcus State, Mumby State)  
Well: Mumby State 4H-36H  
Wellbore: HZ  
Design: Plan #1



SECTION DETAILS											Annotation
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0		KOP @ 200'
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0		
3	1013.0	16.26	142.88	1002.1	-91.4	69.1	2.00	142.88	-91.4		EOB; Inc=16.26°
4	5591.9	16.26	142.88	5397.9	-1113.6	842.9	0.00	0.00	-1113.6		Start Drop -2.00
5	6404.9	0.00	0.00	6200.0	-1205.0	912.0	2.00	180.00	-1205.0		EOD; Inc=0°
6	6851.9	0.00	0.00	6647.0	-1205.0	912.0	0.00	0.00	-1205.0		Start Build 10.00
7	7751.9	90.00	0.38	7220.0	-632.1	915.8	10.00	0.38	-632.1		LP @ 7220' TVD; 90°
8	12014.1	90.00	0.38	7220.0	3630.1	944.1	0.00	0.00	3630.1	PBHL 4H-36H	TD at 12014.1



DESIGN TARGET DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL 4H-36H	3630.1	944.1	1280534.09	3219299.80	40.100790	-104.716070



FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
994.0	1004.5	Fox Hills - BASE
4701.0	4866.0	Sussex
4857.0	5028.5	Sussex Marker
5235.0	5422.2	Shannon
6548.0	6752.9	Teepee Buttes ('if present')
7090.0	7358.3	Sharon Springs
7132.0	7430.2	Niobrara
7213.0	7662.3	B Chalk

Plan #1  
Mumby State 4H-36H  
WELL @ 5048.0ft (Original Well Elev)  
Ground Elevation @ 5018.0  
North American Datum 1983  
Well Mumby State 4H-36H, True North

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Project:</b>	DJ Wattenberg	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>North Reference:</b>	True
<b>Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

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

Site		S36 T2N-R66W (Marcus State, Mumby State)			
Site Position:		Northing:	1,275,942.66 ft	Latitude:	40.088280
From:	Lat/Long	Easting:	3,215,403.58 ft	Longitude:	-104.730140
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.50 °

Well	Mumby State 4H-36H					
Well Position	+N/-S	0.0 ft	Northing:	1,276,895.86 ft	Latitude:	40.090825
	+E/-W	0.0 ft	Easting:	3,218,387.67 ft	Longitude:	-104.719445
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,018.0 ft

<b>Wellbore</b>	HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	1/16/2014	8.47	66.72	52,699

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	0.00

<b>Plan Sections</b>										
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	
1,013.0	16.26	142.88	1,002.1	-91.4	69.1	2.00	2.00	0.00	142.88	
5,591.9	16.26	142.88	5,397.9	-1,113.6	842.9	0.00	0.00	0.00	0.00	
6,404.9	0.00	0.00	6,200.0	-1,205.0	912.0	2.00	-2.00	0.00	180.00	
6,851.9	0.00	0.00	6,647.0	-1,205.0	912.0	0.00	0.00	0.00	0.00	
7,751.9	90.00	0.38	7,220.0	-632.1	915.8	10.00	10.00	0.00	0.38	
12,014.1	90.00	0.38	7,220.0	3,630.1	944.1	0.00	0.00	0.00	0.00	PBHL 4H-36H

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Project:</b>	DJ Wattenberg	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>North Reference:</b>	True
<b>Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
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	KOP @ 200'
300.0	2.00	142.88	300.0	-1.4	1.1	-1.4	2.00	2.00	
400.0	4.00	142.88	399.8	-5.6	4.2	-5.6	2.00	2.00	
500.0	6.00	142.88	499.5	-12.5	9.5	-12.5	2.00	2.00	
600.0	8.00	142.88	598.7	-22.2	16.8	-22.2	2.00	2.00	
700.0	10.00	142.88	697.5	-34.7	26.3	-34.7	2.00	2.00	
800.0	12.00	142.88	795.6	-49.9	37.8	-49.9	2.00	2.00	
900.0	14.00	142.88	893.1	-67.9	51.4	-67.9	2.00	2.00	
1,000.0	16.00	142.88	989.6	-88.5	67.0	-88.5	2.00	2.00	
1,004.5	16.09	142.88	994.0	-89.5	67.7	-89.5	2.00	2.00	Fox Hills - BASE
1,013.0	16.26	142.88	1,002.1	-91.4	69.1	-91.4	2.00	2.00	EOB; Inc=16.26°
1,100.0	16.26	142.88	1,085.7	-110.8	83.9	-110.8	0.00	0.00	
1,200.0	16.26	142.88	1,181.7	-133.1	100.8	-133.1	0.00	0.00	
1,300.0	16.26	142.88	1,277.7	-155.4	117.6	-155.4	0.00	0.00	
1,400.0	16.26	142.88	1,373.7	-177.8	134.5	-177.8	0.00	0.00	
1,500.0	16.26	142.88	1,469.7	-200.1	151.4	-200.1	0.00	0.00	
1,600.0	16.26	142.88	1,565.7	-222.4	168.3	-222.4	0.00	0.00	
1,700.0	16.26	142.88	1,661.7	-244.7	185.2	-244.7	0.00	0.00	
1,800.0	16.26	142.88	1,757.7	-267.1	202.1	-267.1	0.00	0.00	
1,900.0	16.26	142.88	1,853.7	-289.4	219.0	-289.4	0.00	0.00	
2,000.0	16.26	142.88	1,949.7	-311.7	235.9	-311.7	0.00	0.00	
2,100.0	16.26	142.88	2,045.7	-334.0	252.8	-334.0	0.00	0.00	
2,200.0	16.26	142.88	2,141.7	-356.4	269.7	-356.4	0.00	0.00	
2,300.0	16.26	142.88	2,237.7	-378.7	286.6	-378.7	0.00	0.00	
2,400.0	16.26	142.88	2,333.7	-401.0	303.5	-401.0	0.00	0.00	
2,500.0	16.26	142.88	2,429.7	-423.4	320.4	-423.4	0.00	0.00	
2,600.0	16.26	142.88	2,525.7	-445.7	337.3	-445.7	0.00	0.00	
2,700.0	16.26	142.88	2,621.7	-468.0	354.2	-468.0	0.00	0.00	
2,800.0	16.26	142.88	2,717.7	-490.3	371.1	-490.3	0.00	0.00	
2,900.0	16.26	142.88	2,813.7	-512.7	388.0	-512.7	0.00	0.00	
3,000.0	16.26	142.88	2,909.7	-535.0	404.9	-535.0	0.00	0.00	
3,100.0	16.26	142.88	3,005.7	-557.3	421.8	-557.3	0.00	0.00	
3,200.0	16.26	142.88	3,101.7	-579.6	438.7	-579.6	0.00	0.00	
3,300.0	16.26	142.88	3,197.7	-602.0	455.6	-602.0	0.00	0.00	
3,400.0	16.26	142.88	3,293.7	-624.3	472.5	-624.3	0.00	0.00	
3,500.0	16.26	142.88	3,389.7	-646.6	489.4	-646.6	0.00	0.00	
3,600.0	16.26	142.88	3,485.7	-668.9	506.3	-668.9	0.00	0.00	
3,700.0	16.26	142.88	3,581.7	-691.3	523.2	-691.3	0.00	0.00	
3,800.0	16.26	142.88	3,677.7	-713.6	540.1	-713.6	0.00	0.00	
3,900.0	16.26	142.88	3,773.7	-735.9	557.0	-735.9	0.00	0.00	
4,000.0	16.26	142.88	3,869.7	-758.2	573.9	-758.2	0.00	0.00	
4,100.0	16.26	142.88	3,965.7	-780.6	590.8	-780.6	0.00	0.00	
4,200.0	16.26	142.88	4,061.7	-802.9	607.7	-802.9	0.00	0.00	
4,300.0	16.26	142.88	4,157.7	-825.2	624.6	-825.2	0.00	0.00	
4,400.0	16.26	142.88	4,253.7	-847.5	641.5	-847.5	0.00	0.00	
4,500.0	16.26	142.88	4,349.7	-869.9	658.4	-869.9	0.00	0.00	
4,600.0	16.26	142.88	4,445.7	-892.2	675.2	-892.2	0.00	0.00	
4,700.0	16.26	142.88	4,541.7	-914.5	692.1	-914.5	0.00	0.00	
4,800.0	16.26	142.88	4,637.7	-936.8	709.0	-936.8	0.00	0.00	
4,866.0	16.26	142.88	4,701.0	-951.6	720.2	-951.6	0.00	0.00	Sussex

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Project:</b>	DJ Wattenberg	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>North Reference:</b>	True
<b>Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
4,900.0	16.26	142.88	4,733.7	-959.2	725.9	-959.2	0.00	0.00	
5,000.0	16.26	142.88	4,829.7	-981.5	742.8	-981.5	0.00	0.00	
5,028.5	16.26	142.88	4,857.0	-987.8	747.6	-987.8	0.00	0.00	Sussex Marker
5,100.0	16.26	142.88	4,925.7	-1,003.8	759.7	-1,003.8	0.00	0.00	
5,200.0	16.26	142.88	5,021.7	-1,026.1	776.6	-1,026.1	0.00	0.00	
5,300.0	16.26	142.88	5,117.7	-1,048.5	793.5	-1,048.5	0.00	0.00	
5,400.0	16.26	142.88	5,213.7	-1,070.8	810.4	-1,070.8	0.00	0.00	
5,422.2	16.26	142.88	5,235.0	-1,075.8	814.2	-1,075.8	0.00	0.00	Shannon
5,500.0	16.26	142.88	5,309.7	-1,093.1	827.3	-1,093.1	0.00	0.00	
5,591.9	16.26	142.88	5,397.9	-1,113.6	842.9	-1,113.6	0.00	0.00	Start Drop -2.00
5,600.0	16.10	142.88	5,405.7	-1,115.4	844.2	-1,115.4	2.00	-2.00	
5,700.0	14.10	142.88	5,502.2	-1,136.2	859.9	-1,136.2	2.00	-2.00	
5,800.0	12.10	142.88	5,599.6	-1,154.3	873.6	-1,154.3	2.00	-2.00	
5,900.0	10.10	142.88	5,697.7	-1,169.6	885.2	-1,169.6	2.00	-2.00	
6,000.0	8.10	142.88	5,796.5	-1,182.2	894.8	-1,182.2	2.00	-2.00	
6,100.0	6.10	142.88	5,895.7	-1,192.1	902.2	-1,192.1	2.00	-2.00	
6,200.0	4.10	142.88	5,995.3	-1,199.2	907.6	-1,199.2	2.00	-2.00	
6,300.0	2.10	142.88	6,095.1	-1,203.5	910.8	-1,203.5	2.00	-2.00	
6,400.0	0.10	142.88	6,195.1	-1,205.0	912.0	-1,205.0	2.00	-2.00	
6,404.9	0.00	0.00	6,200.0	-1,205.0	912.0	-1,205.0	2.00	-2.00	EOD; Inc=0°
6,500.0	0.00	0.00	6,295.1	-1,205.0	912.0	-1,205.0	0.00	0.00	
6,600.0	0.00	0.00	6,395.1	-1,205.0	912.0	-1,205.0	0.00	0.00	
6,700.0	0.00	0.00	6,495.1	-1,205.0	912.0	-1,205.0	0.00	0.00	
6,752.9	0.00	0.00	6,548.0	-1,205.0	912.0	-1,205.0	0.00	0.00	Teepee Buttes (*if present)
6,800.0	0.00	0.00	6,595.1	-1,205.0	912.0	-1,205.0	0.00	0.00	
6,851.9	0.00	0.00	6,647.0	-1,205.0	912.0	-1,205.0	0.00	0.00	Start Build 10.00
6,900.0	4.81	0.38	6,695.1	-1,203.0	912.0	-1,203.0	10.00	10.00	
7,000.0	14.81	0.38	6,793.5	-1,186.0	912.1	-1,186.0	10.00	10.00	
7,100.0	24.81	0.38	6,887.4	-1,152.1	912.4	-1,152.1	10.00	10.00	
7,200.0	34.81	0.38	6,974.1	-1,102.5	912.7	-1,102.5	10.00	10.00	
7,300.0	44.81	0.38	7,050.8	-1,038.5	913.1	-1,038.5	10.00	10.00	
7,358.3	50.63	0.38	7,090.0	-995.5	913.4	-995.5	10.00	10.00	Sharon Springs
7,400.0	54.81	0.38	7,115.3	-962.3	913.6	-962.3	10.00	10.00	
7,430.2	57.82	0.38	7,132.0	-937.2	913.8	-937.2	10.00	10.00	Niobrara
7,500.0	64.81	0.38	7,165.5	-875.9	914.2	-875.9	10.00	10.00	
7,600.0	74.81	0.38	7,200.0	-782.2	914.8	-782.2	10.00	10.00	
7,662.3	81.03	0.38	7,213.0	-721.3	915.2	-721.3	10.00	10.00	B Chalk
7,700.0	84.81	0.38	7,217.6	-683.9	915.5	-683.9	10.00	10.00	
7,751.9	90.00	0.38	7,220.0	-632.1	915.8	-632.1	10.00	10.00	LP @ 7220' TVD; 90°
7,800.0	90.00	0.38	7,220.0	-584.0	916.1	-584.0	0.00	0.00	
7,900.0	90.00	0.38	7,220.0	-484.0	916.8	-484.0	0.00	0.00	
8,000.0	90.00	0.38	7,220.0	-384.0	917.5	-384.0	0.00	0.00	
8,100.0	90.00	0.38	7,220.0	-284.0	918.1	-284.0	0.00	0.00	
8,200.0	90.00	0.38	7,220.0	-184.0	918.8	-184.0	0.00	0.00	
8,300.0	90.00	0.38	7,220.0	-84.0	919.4	-84.0	0.00	0.00	
8,400.0	90.00	0.38	7,220.0	16.0	920.1	16.0	0.00	0.00	
8,500.0	90.00	0.38	7,220.0	116.0	920.8	116.0	0.00	0.00	
8,600.0	90.00	0.38	7,220.0	216.0	921.4	216.0	0.00	0.00	
8,700.0	90.00	0.38	7,220.0	316.0	922.1	316.0	0.00	0.00	
8,800.0	90.00	0.38	7,220.0	416.0	922.8	416.0	0.00	0.00	
8,900.0	90.00	0.38	7,220.0	516.0	923.4	516.0	0.00	0.00	
9,000.0	90.00	0.38	7,220.0	616.0	924.1	616.0	0.00	0.00	

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Project:</b>	DJ Wattenberg	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>North Reference:</b>	True
<b>Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
9,100.0	90.00	0.38	7,220.0	716.0	924.8	716.0	0.00	0.00	
9,200.0	90.00	0.38	7,220.0	816.0	925.4	816.0	0.00	0.00	
9,300.0	90.00	0.38	7,220.0	916.0	926.1	916.0	0.00	0.00	
9,400.0	90.00	0.38	7,220.0	1,016.0	926.8	1,016.0	0.00	0.00	
9,500.0	90.00	0.38	7,220.0	1,116.0	927.4	1,116.0	0.00	0.00	
9,600.0	90.00	0.38	7,220.0	1,216.0	928.1	1,216.0	0.00	0.00	
9,700.0	90.00	0.38	7,220.0	1,316.0	928.7	1,316.0	0.00	0.00	
9,800.0	90.00	0.38	7,220.0	1,416.0	929.4	1,416.0	0.00	0.00	
9,900.0	90.00	0.38	7,220.0	1,516.0	930.1	1,516.0	0.00	0.00	
10,000.0	90.00	0.38	7,220.0	1,616.0	930.7	1,616.0	0.00	0.00	
10,100.0	90.00	0.38	7,220.0	1,716.0	931.4	1,716.0	0.00	0.00	
10,200.0	90.00	0.38	7,220.0	1,816.0	932.1	1,816.0	0.00	0.00	
10,300.0	90.00	0.38	7,220.0	1,916.0	932.7	1,916.0	0.00	0.00	
10,400.0	90.00	0.38	7,220.0	2,016.0	933.4	2,016.0	0.00	0.00	
10,500.0	90.00	0.38	7,220.0	2,116.0	934.1	2,116.0	0.00	0.00	
10,600.0	90.00	0.38	7,220.0	2,216.0	934.7	2,216.0	0.00	0.00	
10,700.0	90.00	0.38	7,220.0	2,316.0	935.4	2,316.0	0.00	0.00	
10,800.0	90.00	0.38	7,220.0	2,416.0	936.1	2,416.0	0.00	0.00	
10,900.0	90.00	0.38	7,220.0	2,516.0	936.7	2,516.0	0.00	0.00	
11,000.0	90.00	0.38	7,220.0	2,616.0	937.4	2,616.0	0.00	0.00	
11,100.0	90.00	0.38	7,220.0	2,716.0	938.0	2,716.0	0.00	0.00	
11,200.0	90.00	0.38	7,220.0	2,815.9	938.7	2,815.9	0.00	0.00	
11,300.0	90.00	0.38	7,220.0	2,915.9	939.4	2,915.9	0.00	0.00	
11,400.0	90.00	0.38	7,220.0	3,015.9	940.0	3,015.9	0.00	0.00	
11,500.0	90.00	0.38	7,220.0	3,115.9	940.7	3,115.9	0.00	0.00	
11,600.0	90.00	0.38	7,220.0	3,215.9	941.4	3,215.9	0.00	0.00	
11,700.0	90.00	0.38	7,220.0	3,315.9	942.0	3,315.9	0.00	0.00	
11,800.0	90.00	0.38	7,220.0	3,415.9	942.7	3,415.9	0.00	0.00	
11,900.0	90.00	0.38	7,220.0	3,515.9	943.4	3,515.9	0.00	0.00	
12,000.0	90.00	0.38	7,220.0	3,615.9	944.0	3,615.9	0.00	0.00	
12,014.1	90.00	0.38	7,220.0	3,630.1	944.1	3,630.1	0.00	0.00	TD at 12014.1

### 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									
PBHL 4H-36H	0.00	0.00	7,220.0	3,630.1	944.1	1,280,534.09	3,219,299.80	40.100790	-104.716070
- plan hits target center									
- Point									

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Project:</b>	DJ Wattenberg	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>North Reference:</b>	True
<b>Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

### Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,004.5	994.0	Fox Hills - BASE			
4,866.0	4,701.0	Sussex			
5,028.5	4,857.0	Sussex Marker			
5,422.2	5,235.0	Shannon			
6,752.9	6,548.0	Teepee Buttes (*if present)			
7,358.3	7,090.0	Sharon Springs			
7,430.2	7,132.0	Niobrara			
7,662.3	7,213.0	B Chalk			

### Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
200.0	200.0	0.0	0.0	KOP @ 200'
1,013.0	1,002.1	-91.4	69.1	EOB; Inc=16.26°
5,591.9	5,397.9	-1,113.6	842.9	Start Drop -2.00
6,404.9	6,200.0	-1,205.0	912.0	EOD; Inc=0°
6,851.9	6,647.0	-1,205.0	912.0	Start Build 10.00
7,751.9	7,220.0	-632.1	915.8	LP @ 7220' TVD; 90°
12,014.1	7,220.0	3,630.1	944.1	TD at 12014.1

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

**DJ Wattenberg**

**S36 T2N-R66W (Marcus State, Mumby State)**

**Mumby State 4H-36H**

**HZ**

**Plan #1**

## **Anticollision Report**

**16 January, 2014**

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 500.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	1/16/2014		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	12,014.1	Plan #1 (HZ)	Geolink 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						
S36 T2N-R66W (Marcus State, Mumby State)						
BADDING STATE 42-36 (EXISTING) - ENCANA WELL -	10,277.2	7,225.2	468.4	423.9	10.538	CC, ES
BADDING STATE 42-36 (EXISTING) - ENCANA WELL -	10,400.0	7,224.3	484.2	437.7	10.427	SF
Marcus State 3A-36H - HZ - FINAL						Out of range
Marcus State 3B-36H - HZ - FINAL						Out of range
Marcus State 3C-36H - HZ - FINAL						Out of range
Marcus State 3D-36H - HZ - FINAL						Out of range
Marcus State 3E-36H - HZ - FINAL						Out of range
Marcus State 3F-36H - HZ - FINAL						Out of range
MUMBY STATE 1 (EXISTING) - ENCANA WELL - GYRO	1,055.6	1,049.2	85.1	81.1	21.505	CC, ES
MUMBY STATE 1 (EXISTING) - ENCANA WELL - GYRO	1,100.0	1,091.9	86.0	81.8	20.565	SF
MUMBY STATE 33-36 (EXISTING) - ENCANA WELL - G						Out of range
Mumby State 4A-36H - HZ - Plan #1	166.3	167.3	69.9	69.5	146.451	CC
Mumby State 4A-36H - HZ - Plan #1	200.0	201.0	69.9	69.4	117.533	ES
Mumby State 4A-36H - HZ - Plan #1	800.0	778.4	154.4	151.2	48.505	SF
Mumby State 4B-36H - HZ - Plan #1	200.0	200.0	59.9	59.3	100.904	CC, ES
Mumby State 4B-36H - HZ - Plan #1	800.0	784.1	132.5	129.4	41.719	SF
Mumby State 4C-36H - HZ - Plan #1	200.0	201.0	50.1	49.5	84.156	CC, ES
Mumby State 4C-36H - HZ - Plan #1	700.0	694.5	91.7	89.1	35.156	SF
Mumby State 4D-36H - HZ - Plan #1	200.0	200.0	40.0	39.4	67.424	CC, ES
Mumby State 4D-36H - HZ - Plan #1	2,400.0	2,346.4	475.5	459.3	29.422	SF
Mumby State 4E-36H - HZ - Plan #1	200.0	200.0	29.9	29.3	50.452	CC, ES
Mumby State 4E-36H - HZ - Plan #1	500.0	499.5	41.5	39.8	24.930	SF
Mumby State 4F-36H - HZ - Plan #1	200.0	200.0	19.9	19.3	33.481	CC, ES
Mumby State 4F-36H - HZ - Plan #1	4,600.0	4,587.2	488.9	453.2	13.697	SF
Mumby State 4G-36H - HZ - Plan #1	200.0	200.0	10.1	9.5	16.984	CC, ES
Mumby State 4G-36H - HZ - Plan #1	12,014.1	12,214.7	429.9	318.0	3.841	SF



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design													S36 T2N-R66W (Marcus State, Mumby State) - BADDING STATE 42-36 (EXISTING) - ENCANA WELL				Offset Site Error:		0.0 ft	
Survey Program: 100-Gyro													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	Separation Factor								
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	Axis									
10,200.0	7,220.0	7,225.8	7,224.7	40.2	6.3	-89.97	1,896.3	464.2	474.7	431.5	43.20	10.988								
10,277.2	7,220.0	7,225.2	7,224.2	41.3	6.3	-89.90	1,896.3	464.2	468.4	423.9	44.45	10.538	CC, ES							
10,300.0	7,220.0	7,225.1	7,224.0	41.7	6.3	-89.88	1,896.3	464.2	468.9	424.1	44.81	10.464								
10,400.0	7,220.0	7,224.3	7,223.3	43.2	6.3	-89.79	1,896.3	464.2	484.2	437.7	46.44	10.427	SF							

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - MUMBY STATE 1 (EXISTING) - ENCANA WELL - GYR													Offset Site Error:	0.0 ft
Survey Program: 100-Gyro													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	4.9	4.9	0.0	0.0	-178.67	-145.0	-3.4	145.0					
100.0	100.0	103.7	103.7	0.1	0.1	-178.93	-145.5	-2.7	145.5	145.3	0.20	719.680		
200.0	200.0	205.9	205.9	0.3	0.2	-179.34	-145.5	-1.7	145.6	145.1	0.47	312.552		
300.0	300.0	304.0	304.0	0.5	0.3	37.70	-145.6	-0.4	144.2	143.5	0.73	197.981		
400.0	399.8	403.1	403.1	0.7	0.3	38.40	-146.6	1.1	141.1	140.1	1.00	141.288		
500.0	499.5	502.8	502.7	0.9	0.4	40.15	-147.9	2.5	135.6	134.3	1.28	105.593		
600.0	598.7	602.1	602.0	1.2	0.5	43.31	-149.3	3.5	127.8	126.2	1.60	80.031		
700.0	697.5	701.9	701.9	1.5	0.6	48.14	-150.4	4.6	117.7	115.8	1.96	60.091		
800.0	795.6	801.6	801.6	1.9	0.7	55.50	-150.5	5.7	105.5	103.1	2.40	43.941		
900.0	893.1	897.9	897.8	2.3	0.8	66.52	-150.3	6.1	94.0	91.1	2.96	31.791		
1,000.0	989.6	995.5	995.5	2.8	0.9	82.28	-149.9	6.2	86.4	82.8	3.62	23.898		
1,055.6	1,043.1	1,049.2	1,049.1	3.0	0.9	92.36	-149.4	6.5	85.1	81.1	3.96	21.505 CC, ES		
1,100.0	1,085.7	1,091.9	1,091.8	3.3	0.9	100.53	-149.0	6.9	86.0	81.8	4.18	20.565 SF		
1,200.0	1,181.7	1,188.1	1,188.0	3.8	1.0	116.82	-148.7	8.1	93.9	89.4	4.53	20.755		
1,300.0	1,277.7	1,284.4	1,284.3	4.3	1.1	129.31	-149.5	9.6	108.2	103.5	4.72	22.928		
1,400.0	1,373.7	1,379.9	1,379.8	4.8	1.2	138.44	-150.6	10.6	126.8	122.0	4.86	26.113		
1,500.0	1,469.7	1,475.2	1,475.1	5.3	1.3	145.26	-151.2	11.1	148.6	143.7	4.98	29.839		
1,600.0	1,565.7	1,570.3	1,570.2	5.8	1.4	150.59	-150.9	11.2	172.7	167.6	5.11	33.823		
1,700.0	1,661.7	1,665.2	1,665.0	6.4	1.4	154.68	-150.1	11.0	198.3	193.0	5.25	37.791		
1,800.0	1,757.7	1,761.2	1,761.1	6.9	1.5	157.92	-149.1	10.6	225.0	219.6	5.40	41.623		
1,900.0	1,853.7	1,860.1	1,859.9	7.4	1.6	160.51	-148.4	10.7	251.5	245.9	5.58	45.065		
2,000.0	1,949.7	1,956.3	1,956.1	7.9	1.7	162.46	-148.8	11.5	277.4	271.6	5.78	47.996		
2,100.0	2,045.7	2,049.8	2,049.6	8.5	1.8	163.86	-149.4	11.1	304.2	298.2	6.00	50.724		
2,200.0	2,141.7	2,143.6	2,143.5	9.0	1.9	165.13	-149.2	10.4	331.9	325.7	6.22	53.395		
2,300.0	2,237.7	2,239.0	2,238.9	9.5	1.9	166.28	-148.5	9.6	360.2	353.8	6.44	55.954		
2,400.0	2,333.7	2,335.8	2,335.7	10.0	2.0	167.22	-148.2	8.8	388.3	381.6	6.67	58.233		
2,500.0	2,429.7	2,431.4	2,431.3	10.5	2.1	168.00	-148.0	7.9	416.5	409.6	6.90	60.326		
2,600.0	2,525.7	2,528.3	2,528.2	11.1	2.2	168.80	-147.3	7.5	444.7	437.6	7.14	62.314		
2,700.0	2,621.7	2,626.5	2,626.3	11.6	2.3	169.42	-147.5	7.1	472.4	465.0	7.38	64.020		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4A-36H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	1.0	1.0	0.0	0.0	-89.40	0.7	-69.9	69.9					
100.0	100.0	101.0	101.0	0.1	0.1	-89.40	0.7	-69.9	69.9	69.7	0.25	284.240		
166.3	166.3	167.3	167.3	0.2	0.2	-89.40	0.7	-69.9	69.9	69.5	0.48	146.451 CC		
200.0	200.0	201.0	201.0	0.3	0.3	-89.40	0.7	-69.9	69.9	69.4	0.60	117.533 ES		
300.0	300.0	300.0	300.0	0.5	0.5	127.87	-0.4	-71.3	72.3	71.4	0.95	76.439		
400.0	399.8	396.9	396.7	0.7	0.7	128.29	-3.6	-75.1	79.5	78.1	1.31	60.567		
500.0	499.5	494.0	493.5	0.9	0.9	128.83	-9.0	-81.5	91.3	89.6	1.71	53.392		
600.0	598.7	590.2	589.0	1.2	1.1	129.36	-16.4	-90.2	107.8	105.6	2.15	50.141		
700.0	697.5	685.1	682.8	1.5	1.4	129.79	-25.7	-101.3	128.8	126.2	2.64	48.824		
800.0	795.6	778.4	774.5	1.9	1.8	130.10	-36.8	-114.5	154.4	151.2	3.18	48.505 SF		
900.0	893.1	870.0	863.9	2.3	2.2	130.27	-49.5	-129.6	184.4	180.6	3.79	48.707		
1,000.0	989.6	959.5	950.6	2.8	2.6	130.32	-63.8	-146.5	218.6	214.1	4.44	49.180		
1,100.0	1,085.7	1,047.1	1,034.8	3.3	3.0	130.58	-79.4	-165.0	256.2	251.0	5.15	49.768		
1,200.0	1,181.7	1,133.2	1,116.8	3.8	3.5	130.44	-96.3	-185.2	295.7	289.8	5.88	50.296		
1,300.0	1,277.7	1,219.7	1,198.3	4.3	4.1	129.99	-114.9	-207.2	337.1	330.4	6.64	50.784		
1,400.0	1,373.7	1,310.4	1,283.7	4.8	4.6	129.55	-134.8	-230.8	378.9	371.5	7.42	51.069		
1,500.0	1,469.7	1,401.2	1,369.0	5.3	5.2	129.19	-154.6	-254.4	420.8	412.6	8.21	51.272		
1,600.0	1,565.7	1,492.0	1,454.4	5.8	5.7	128.90	-174.5	-278.0	462.7	453.7	9.00	51.419		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4B-36H - HZ - Plan #1												Offset Site Error: 0.0 ft		
Survey Program: 0-Geolink MWD												Offset Well Error: 0.0 ft		
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-89.30	0.7	-59.9	59.9					
100.0	100.0	100.0	100.0	0.1	0.1	-89.30	0.7	-59.9	59.9	59.6	0.24	245.052		
200.0	200.0	200.0	200.0	0.3	0.3	-89.30	0.7	-59.9	59.9	59.3	0.59	100.904	CC, ES	
300.0	300.0	299.3	299.3	0.5	0.5	128.78	0.4	-60.2	61.2	60.3	0.94	64.899		
400.0	399.8	397.7	397.7	0.7	0.7	129.93	-2.1	-62.4	66.8	65.5	1.31	51.086		
500.0	499.5	495.7	495.4	0.9	0.9	130.80	-7.1	-66.9	76.7	75.0	1.70	45.130		
600.0	598.7	592.9	592.1	1.2	1.1	131.31	-14.5	-73.6	91.0	88.9	2.14	42.620		
700.0	697.5	689.1	687.4	1.5	1.4	131.53	-24.2	-82.4	109.7	107.0	2.63	41.763		
800.0	795.6	784.1	781.0	1.9	1.7	131.53	-36.1	-93.2	132.5	129.4	3.18	41.719	SF	
900.0	893.1	877.5	872.5	2.3	2.0	131.37	-50.0	-105.8	159.5	155.7	3.79	42.068		
1,000.0	989.6	969.2	961.7	2.8	2.4	131.10	-65.8	-120.2	190.6	186.1	4.47	42.601		
1,100.0	1,085.7	1,059.4	1,048.7	3.3	2.9	130.98	-83.4	-136.1	224.8	219.6	5.21	43.179		
1,200.0	1,181.7	1,149.3	1,134.7	3.8	3.3	130.43	-103.0	-153.8	260.6	254.7	5.97	43.666		
1,300.0	1,277.7	1,242.4	1,223.4	4.3	3.9	129.86	-123.7	-172.7	297.0	290.3	6.76	43.935		
1,400.0	1,373.7	1,335.6	1,312.2	4.8	4.4	129.41	-144.5	-191.5	333.5	325.9	7.56	44.113		
1,500.0	1,469.7	1,428.7	1,401.0	5.3	4.9	129.05	-165.3	-210.4	369.9	361.5	8.36	44.233		
1,600.0	1,565.7	1,521.8	1,489.8	5.8	5.4	128.75	-186.1	-229.2	406.4	397.2	9.17	44.317		
1,700.0	1,661.7	1,614.9	1,578.5	6.4	5.9	128.51	-206.9	-248.1	442.8	432.8	9.98	44.376		
1,800.0	1,757.7	1,708.0	1,667.3	6.9	6.4	128.30	-227.7	-266.9	479.3	468.5	10.79	44.419		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4C-36H - HZ - Plan #1													Offset Site Error: 0.0 ft	
Survey Program: 0-Geolink MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	1.0	1.0	0.0	0.0	-89.17	0.7	-50.1	50.1					
100.0	100.0	101.0	101.0	0.1	0.1	-89.17	0.7	-50.1	50.1	49.8	0.25	203.526		
200.0	200.0	201.0	201.0	0.3	0.3	-89.17	0.7	-50.1	50.1	49.5	0.60	84.156	CC, ES	
300.0	300.0	301.0	301.0	0.5	0.5	129.48	0.7	-50.1	51.2	50.2	0.95	54.077		
400.0	399.8	400.0	400.0	0.7	0.6	131.99	-0.8	-51.0	55.4	54.1	1.31	42.408		
500.0	499.5	498.7	498.6	0.9	0.8	133.51	-5.1	-53.7	63.7	62.0	1.69	37.585		
600.0	598.7	597.0	596.4	1.2	1.1	134.12	-12.3	-58.2	75.8	73.7	2.12	35.696		
700.0	697.5	694.5	693.3	1.5	1.3	134.08	-22.3	-64.5	91.7	89.1	2.61	35.156	SF	
800.0	795.6	791.1	788.7	1.9	1.6	133.65	-34.9	-72.4	111.5	108.3	3.16	35.233		
900.0	893.1	886.6	882.5	2.3	1.9	133.01	-50.0	-81.9	134.9	131.1	3.79	35.578		
1,000.0	989.6	980.8	974.4	2.8	2.3	132.27	-67.5	-92.8	162.0	157.5	4.50	36.025		
1,100.0	1,085.7	1,073.8	1,064.4	3.3	2.7	131.61	-87.3	-105.2	191.8	186.6	5.26	36.493		
1,200.0	1,181.7	1,168.7	1,155.8	3.8	3.2	130.74	-108.9	-118.8	222.5	216.4	6.05	36.747		
1,300.0	1,277.7	1,263.9	1,247.5	4.3	3.7	130.08	-130.6	-132.3	253.2	246.3	6.86	36.892		
1,400.0	1,373.7	1,359.0	1,339.1	4.8	4.1	129.56	-152.3	-145.9	283.9	276.2	7.68	36.977		
1,500.0	1,469.7	1,454.1	1,430.8	5.3	4.6	129.15	-173.9	-159.5	314.6	306.1	8.50	37.025		
1,600.0	1,565.7	1,549.3	1,522.4	5.8	5.1	128.81	-195.6	-173.1	345.3	336.0	9.32	37.053		
1,700.0	1,661.7	1,644.4	1,614.0	6.4	5.5	128.52	-217.3	-186.7	376.1	365.9	10.15	37.067		
1,800.0	1,757.7	1,739.6	1,705.7	6.9	6.0	128.28	-239.0	-200.2	406.8	395.8	10.97	37.072		
1,900.0	1,853.7	1,834.7	1,797.3	7.4	6.5	128.07	-260.6	-213.8	437.6	425.8	11.80	37.072		
2,000.0	1,949.7	1,929.8	1,889.0	7.9	7.0	127.89	-282.3	-227.4	468.3	455.7	12.63	37.069		
2,100.0	2,045.7	2,025.0	1,980.6	8.5	7.4	127.73	-304.0	-241.0	499.1	485.6	13.47	37.063		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4D-36H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-89.48	0.4	-40.0	40.0					
100.0	100.0	100.0	100.0	0.1	0.1	-89.48	0.4	-40.0	40.0	39.8	0.24	163.744		
200.0	200.0	200.0	200.0	0.3	0.3	-89.48	0.4	-40.0	40.0	39.4	0.59	67.424 CC, ES		
300.0	300.0	300.0	300.0	0.5	0.5	129.55	0.4	-40.0	41.1	40.2	0.94	43.508		
400.0	399.8	399.8	399.8	0.7	0.6	134.69	0.4	-40.0	44.6	43.3	1.30	34.230		
500.0	499.5	499.3	499.3	0.9	0.8	139.62	-1.3	-40.6	51.3	49.6	1.67	30.664		
600.0	598.7	598.6	598.4	1.2	1.0	142.06	-6.1	-42.2	61.2	59.1	2.07	29.629		
700.0	697.5	697.6	697.1	1.5	1.2	142.68	-14.2	-45.0	74.2	71.6	2.50	29.626		
800.0	795.6	796.2	794.9	1.9	1.5	142.18	-25.5	-48.9	90.0	87.0	3.00	29.979		
900.0	893.1	894.2	891.7	2.3	1.8	141.08	-39.9	-53.8	108.8	105.2	3.58	30.381		
1,000.0	989.6	991.4	987.3	2.8	2.1	139.69	-57.2	-59.7	130.5	126.3	4.25	30.718		
1,100.0	1,085.7	1,088.0	1,081.5	3.3	2.5	138.16	-77.4	-66.6	154.2	149.2	5.00	30.833		
1,200.0	1,181.7	1,184.6	1,174.9	3.8	2.9	136.14	-100.3	-74.4	178.4	172.6	5.82	30.667		
1,300.0	1,277.7	1,281.4	1,268.5	4.3	3.3	134.46	-123.6	-82.4	202.8	196.1	6.66	30.472		
1,400.0	1,373.7	1,378.2	1,362.2	4.8	3.8	133.15	-146.9	-90.4	227.3	219.8	7.50	30.298		
1,500.0	1,469.7	1,475.0	1,455.8	5.3	4.2	132.10	-170.3	-98.4	252.0	243.6	8.36	30.147		
1,600.0	1,565.7	1,571.9	1,549.4	5.8	4.7	131.23	-193.6	-106.4	276.7	267.5	9.22	30.017		
1,700.0	1,661.7	1,668.7	1,643.1	6.4	5.1	130.50	-216.9	-114.3	301.4	291.4	10.08	29.904		
1,800.0	1,757.7	1,765.5	1,736.7	6.9	5.6	129.89	-240.2	-122.3	326.2	315.3	10.95	29.807		
1,900.0	1,853.7	1,862.3	1,830.3	7.4	6.0	129.36	-263.5	-130.3	351.1	339.2	11.81	29.721		
2,000.0	1,949.7	1,959.1	1,924.0	7.9	6.5	128.90	-286.8	-138.3	375.9	363.2	12.68	29.646		
2,100.0	2,045.7	2,056.0	2,017.6	8.5	6.9	128.50	-310.2	-146.3	400.8	387.2	13.55	29.580		
2,200.0	2,141.7	2,152.8	2,111.2	9.0	7.4	128.14	-333.5	-154.2	425.7	411.2	14.42	29.521		
2,300.0	2,237.7	2,249.6	2,204.9	9.5	7.8	127.83	-356.8	-162.2	450.6	435.3	15.29	29.469		
2,400.0	2,333.7	2,346.4	2,298.5	10.0	8.3	127.54	-380.1	-170.2	475.5	459.3	16.16	29.422 SF		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4E-36H - HZ - Plan #1													Offset Site Error: 0.0 ft	
Survey Program: 0-Geolink 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	Separation			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	Axis	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-89.30	0.4	-29.9	29.9					
100.0	100.0	100.0	100.0	0.1	0.1	-89.30	0.4	-29.9	29.9	29.7	0.24	122.526		
200.0	200.0	200.0	200.0	0.3	0.3	-89.30	0.4	-29.9	29.9	29.3	0.59	50.452	CC, ES	
300.0	300.0	300.0	300.0	0.5	0.5	130.35	0.4	-29.9	31.0	30.1	0.94	32.860		
400.0	399.8	399.8	399.8	0.7	0.6	136.90	0.4	-29.9	34.7	33.4	1.30	26.612		
500.0	499.5	499.5	499.5	0.9	0.8	145.07	0.4	-29.9	41.5	39.8	1.66	24.930	SF	
600.0	598.7	599.2	599.2	1.2	1.0	150.89	-1.3	-30.2	51.4	49.4	2.03	25.384		
700.0	697.5	699.0	698.9	1.5	1.2	153.15	-6.5	-30.9	63.8	61.4	2.41	26.482		
800.0	795.6	798.8	798.2	1.9	1.4	153.31	-15.0	-32.1	78.1	75.3	2.83	27.645		
900.0	893.1	898.3	897.1	2.3	1.6	152.32	-27.0	-33.8	94.5	91.2	3.30	28.608		
1,000.0	989.6	997.7	995.2	2.8	1.9	150.70	-42.3	-35.9	112.9	109.1	3.86	29.257		
1,100.0	1,085.7	1,096.8	1,092.5	3.3	2.2	148.67	-61.0	-38.6	132.3	127.8	4.51	29.327		
1,200.0	1,181.7	1,195.3	1,188.6	3.8	2.6	146.11	-82.3	-41.6	151.3	146.0	5.25	28.823		
1,300.0	1,277.7	1,293.3	1,284.1	4.3	3.0	144.00	-103.9	-44.6	170.3	164.3	6.01	28.322		
1,400.0	1,373.7	1,391.3	1,379.7	4.8	3.4	142.32	-125.5	-47.6	189.6	182.8	6.80	27.886		
1,500.0	1,469.7	1,489.3	1,475.2	5.3	3.8	140.95	-147.1	-50.7	209.0	201.4	7.60	27.511		
1,600.0	1,565.7	1,587.3	1,570.7	5.8	4.2	139.81	-168.7	-53.7	228.5	220.1	8.40	27.191		
1,700.0	1,661.7	1,685.3	1,666.3	6.4	4.6	138.86	-190.3	-56.7	248.1	238.8	9.22	26.917		
1,800.0	1,757.7	1,783.2	1,761.8	6.9	5.0	138.04	-211.8	-59.8	267.7	257.6	10.03	26.681		
1,900.0	1,853.7	1,881.2	1,857.4	7.4	5.4	137.33	-233.4	-62.8	287.3	276.5	10.85	26.476		
2,000.0	1,949.7	1,979.2	1,952.9	7.9	5.8	136.71	-255.0	-65.8	307.0	295.4	11.68	26.297		
2,100.0	2,045.7	2,077.2	2,048.4	8.5	6.2	136.17	-276.6	-68.9	326.8	314.3	12.50	26.140		
2,200.0	2,141.7	2,175.2	2,144.0	9.0	6.6	135.69	-298.2	-71.9	346.5	333.2	13.33	26.000		
2,300.0	2,237.7	2,273.2	2,239.5	9.5	7.0	135.26	-319.8	-74.9	366.3	352.2	14.16	25.877		
2,400.0	2,333.7	2,371.2	2,335.0	10.0	7.4	134.88	-341.4	-78.0	386.1	371.1	14.99	25.766		
2,500.0	2,429.7	2,469.2	2,430.6	10.5	7.8	134.53	-363.0	-81.0	405.9	390.1	15.82	25.666		
2,600.0	2,525.7	2,567.2	2,526.1	11.1	8.3	134.22	-384.6	-84.0	425.7	409.1	16.65	25.576		
2,700.0	2,621.7	2,665.2	2,621.6	11.6	8.7	133.93	-406.1	-87.0	445.6	428.1	17.48	25.494		
2,800.0	2,717.7	2,763.1	2,717.2	12.1	9.1	133.67	-427.7	-90.1	465.4	447.1	18.31	25.419		
2,900.0	2,813.7	2,861.1	2,812.7	12.6	9.5	133.43	-449.3	-93.1	485.3	466.1	19.14	25.351		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4F-36H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total Uncertainty Axis	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
0.0	0.0	0.0	0.0	0.0	0.0	-88.95	0.4	-19.9	19.9					
100.0	100.0	100.0	100.0	0.1	0.1	-88.95	0.4	-19.9	19.9	19.6	0.24	81.310		
200.0	200.0	200.0	200.0	0.3	0.3	-88.95	0.4	-19.9	19.9	19.3	0.59	33.481 CC, ES		
300.0	300.0	300.0	300.0	0.5	0.5	131.90	0.4	-19.9	21.0	20.0	0.94	22.225		
400.0	399.8	399.8	399.8	0.7	0.6	140.89	0.4	-19.9	24.8	23.5	1.30	19.066		
500.0	499.5	499.9	499.9	0.9	0.8	149.70	-0.4	-19.5	31.4	29.7	1.66	18.929		
600.0	598.7	599.9	599.9	1.2	1.0	155.97	-2.8	-18.3	40.2	38.2	2.01	19.961		
700.0	697.5	699.9	699.8	1.5	1.2	160.27	-6.7	-16.4	51.1	48.7	2.37	21.574		
800.0	795.6	799.9	799.6	1.9	1.4	163.21	-12.2	-13.7	64.0	61.3	2.72	23.496		
900.0	893.1	899.9	899.2	2.3	1.6	165.24	-19.2	-10.3	78.8	75.7	3.08	25.588		
1,000.0	989.6	999.8	998.7	2.8	1.8	166.66	-27.8	-6.1	95.4	92.0	3.43	27.779		
1,100.0	1,085.7	1,100.0	1,098.3	3.3	2.1	167.60	-38.0	-1.1	112.6	108.8	3.81	29.584		
1,200.0	1,181.7	1,200.7	1,198.1	3.8	2.3	167.99	-49.8	4.6	128.2	124.1	4.19	30.611		
1,300.0	1,277.7	1,301.9	1,298.2	4.3	2.6	168.02	-63.3	11.2	142.3	137.7	4.58	31.034		
1,400.0	1,373.7	1,403.6	1,398.5	4.8	2.9	167.78	-78.4	18.6	154.7	149.7	5.00	30.972		
1,500.0	1,469.7	1,505.6	1,498.8	5.3	3.3	167.33	-95.2	26.8	165.5	160.1	5.42	30.516		
1,600.0	1,565.7	1,607.8	1,598.9	5.8	3.7	166.69	-113.6	35.7	174.7	168.8	5.88	29.728		
1,700.0	1,661.7	1,708.7	1,697.3	6.4	4.1	165.39	-134.3	44.0	182.8	176.4	6.40	28.561		
1,800.0	1,757.7	1,809.4	1,794.9	6.9	4.5	163.16	-158.0	50.6	190.4	183.4	7.05	27.008		
1,900.0	1,853.7	1,909.1	1,891.0	7.4	5.0	160.24	-184.1	55.7	197.9	190.1	7.84	25.244		
2,000.0	1,949.7	2,008.3	1,986.5	7.9	5.4	157.43	-210.5	60.5	205.9	197.2	8.70	23.653		
2,100.0	2,045.7	2,107.5	2,082.0	8.5	5.9	154.83	-236.8	65.4	214.3	204.6	9.62	22.275		
2,200.0	2,141.7	2,206.7	2,177.5	9.0	6.4	152.43	-263.2	70.2	223.1	212.5	10.57	21.094		
2,300.0	2,237.7	2,305.9	2,273.0	9.5	6.8	150.21	-289.6	75.1	232.2	220.7	11.56	20.085		
2,400.0	2,333.7	2,405.1	2,368.5	10.0	7.3	148.17	-315.9	80.0	241.7	229.1	12.57	19.225		
2,500.0	2,429.7	2,504.3	2,464.0	10.5	7.8	146.28	-342.3	84.8	251.5	237.9	13.60	18.491		
2,600.0	2,525.7	2,603.5	2,559.5	11.1	8.3	144.53	-368.7	89.7	261.5	246.9	14.64	17.862		
2,700.0	2,621.7	2,702.6	2,655.0	11.6	8.8	142.91	-395.0	94.6	271.8	256.1	15.69	17.322		
2,800.0	2,717.7	2,801.8	2,750.5	12.1	9.3	141.41	-421.4	99.4	282.2	265.5	16.74	16.855		
2,900.0	2,813.7	2,901.0	2,846.0	12.6	9.7	140.02	-447.8	104.3	292.8	275.0	17.80	16.450		
3,000.0	2,909.7	3,000.2	2,941.5	13.2	10.2	138.72	-474.1	109.1	303.6	284.8	18.86	16.096		
3,100.0	3,005.7	3,099.4	3,037.0	13.7	10.7	137.52	-500.5	114.0	314.6	294.6	19.92	15.787		
3,200.0	3,101.7	3,198.6	3,132.5	14.2	11.2	136.39	-526.9	118.9	325.6	304.6	20.99	15.516		
3,300.0	3,197.7	3,297.8	3,228.0	14.7	11.7	135.34	-553.2	123.7	336.8	314.7	22.05	15.276		
3,400.0	3,293.7	3,397.0	3,323.5	15.3	12.2	134.36	-579.6	128.6	348.1	325.0	23.11	15.063		
3,500.0	3,389.7	3,496.2	3,419.0	15.8	12.7	133.44	-606.0	133.4	359.5	335.3	24.17	14.874		
3,600.0	3,485.7	3,595.3	3,514.5	16.3	13.2	132.57	-632.3	138.3	370.9	345.7	25.22	14.705		
3,700.0	3,581.7	3,694.5	3,610.0	16.8	13.7	131.76	-658.7	143.2	382.5	356.2	26.28	14.553		
3,800.0	3,677.7	3,793.7	3,705.5	17.4	14.2	131.00	-685.1	148.0	394.1	366.7	27.33	14.417		
3,900.0	3,773.7	3,892.9	3,801.0	17.9	14.7	130.28	-711.4	152.9	405.7	377.4	28.39	14.294		
4,000.0	3,869.7	3,992.1	3,896.5	18.4	15.2	129.59	-737.8	157.7	417.5	388.1	29.44	14.183		
4,100.0	3,965.7	4,091.3	3,992.0	18.9	15.7	128.95	-764.2	162.6	429.3	398.8	30.48	14.082		
4,200.0	4,061.7	4,190.5	4,087.5	19.5	16.2	128.34	-790.5	167.5	441.1	409.6	31.53	13.991		
4,300.0	4,157.7	4,289.7	4,183.0	20.0	16.7	127.76	-816.9	172.3	453.0	420.4	32.57	13.907		
4,400.0	4,253.7	4,388.9	4,278.5	20.5	17.2	127.22	-843.3	177.2	464.9	431.3	33.62	13.831		
4,500.0	4,349.7	4,488.1	4,374.0	21.0	17.6	126.70	-869.6	182.0	476.9	442.3	34.66	13.761		
4,600.0	4,445.7	4,587.2	4,469.5	21.6	18.1	126.20	-896.0	186.9	488.9	453.2	35.70	13.697 SF		

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



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4G-36H - HZ - Plan #1													Offset Site Error: 0.0 ft	
Survey Program: 0-Geolink MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-87.93	0.4	-10.1	10.1					
100.0	100.0	100.0	100.0	0.1	0.1	-87.93	0.4	-10.1	10.1	9.8	0.24	41.248		
200.0	200.0	200.0	200.0	0.3	0.3	-87.93	0.4	-10.1	10.1	9.5	0.59	16.984	CC, ES	
300.0	300.0	300.0	300.0	0.5	0.5	136.07	0.4	-10.1	11.3	10.3	0.94	11.929		
400.0	399.8	400.2	400.2	0.7	0.6	145.02	-1.2	-9.3	14.2	12.9	1.30	10.909		
500.0	499.5	500.5	500.4	0.9	0.8	149.08	-5.9	-6.9	17.7	16.0	1.67	10.607		
600.0	598.7	601.0	600.4	1.2	1.1	150.35	-13.8	-3.0	21.6	19.6	2.06	10.503		
700.0	697.5	701.5	700.2	1.5	1.3	150.02	-24.7	2.5	25.9	23.4	2.48	10.423		
800.0	795.6	802.2	799.6	1.9	1.6	148.77	-38.9	9.6	30.5	27.6	2.97	10.290		
900.0	893.1	902.9	898.5	2.3	2.0	147.00	-56.1	18.3	35.5	32.0	3.52	10.079		
1,000.0	989.6	1,003.5	996.5	2.8	2.4	144.99	-76.4	28.4	41.0	36.8	4.17	9.810		
1,100.0	1,085.7	1,103.3	1,093.4	3.3	2.8	143.98	-97.6	39.1	47.3	42.5	4.85	9.762		
1,200.0	1,181.7	1,203.1	1,190.4	3.8	3.3	143.24	-118.8	49.7	53.7	48.2	5.54	9.700		
1,300.0	1,277.7	1,302.9	1,287.3	4.3	3.7	142.65	-140.0	60.3	60.1	53.9	6.24	9.633		
1,400.0	1,373.7	1,402.7	1,384.2	4.8	4.1	142.17	-161.2	71.0	66.5	59.6	6.96	9.568		
1,500.0	1,469.7	1,502.5	1,481.2	5.3	4.6	141.78	-182.4	81.6	73.0	65.3	7.67	9.507		
1,600.0	1,565.7	1,602.3	1,578.1	5.8	5.0	141.46	-203.6	92.2	79.4	71.0	8.40	9.452		
1,700.0	1,661.7	1,702.1	1,675.0	6.4	5.5	141.18	-224.8	102.9	85.8	76.7	9.13	9.401		
1,800.0	1,757.7	1,801.9	1,772.0	6.9	5.9	140.94	-246.0	113.5	92.2	82.4	9.86	9.356		
1,900.0	1,853.7	1,901.7	1,868.9	7.4	6.4	140.73	-267.2	124.1	98.7	88.1	10.59	9.314		
2,000.0	1,949.7	2,001.5	1,965.8	7.9	6.8	140.55	-288.5	134.7	105.1	93.8	11.33	9.277		
2,100.0	2,045.7	2,101.3	2,062.8	8.5	7.3	140.38	-309.7	145.4	111.5	99.4	12.06	9.243		
2,200.0	2,141.7	2,201.1	2,159.7	9.0	7.7	140.24	-330.9	156.0	117.9	105.1	12.80	9.211		
2,300.0	2,237.7	2,300.9	2,256.6	9.5	8.1	140.11	-352.1	166.6	124.4	110.8	13.54	9.183		
2,400.0	2,333.7	2,400.6	2,353.6	10.0	8.6	139.99	-373.3	177.3	130.8	116.5	14.28	9.157		
2,500.0	2,429.7	2,500.4	2,450.5	10.5	9.0	139.89	-394.5	187.9	137.2	122.2	15.02	9.133		
2,600.0	2,525.7	2,600.2	2,547.4	11.1	9.5	139.79	-415.7	198.5	143.7	127.9	15.77	9.111		
2,700.0	2,621.7	2,700.0	2,644.4	11.6	9.9	139.70	-436.9	209.2	150.1	133.6	16.51	9.090		
2,800.0	2,717.7	2,799.8	2,741.3	12.1	10.4	139.62	-458.1	219.8	156.5	139.3	17.25	9.072		
2,900.0	2,813.7	2,899.6	2,838.2	12.6	10.8	139.55	-479.3	230.4	162.9	144.9	18.00	9.054		
3,000.0	2,909.7	2,999.4	2,935.2	13.2	11.3	139.48	-500.5	241.1	169.4	150.6	18.74	9.038		
3,100.0	3,005.7	3,099.2	3,032.1	13.7	11.7	139.42	-521.7	251.7	175.8	156.3	19.49	9.022		
3,200.0	3,101.7	3,199.0	3,129.0	14.2	12.2	139.36	-542.9	262.3	182.2	162.0	20.23	9.008		
3,300.0	3,197.7	3,298.8	3,226.0	14.7	12.6	139.30	-564.1	272.9	188.7	167.7	20.98	8.995		
3,400.0	3,293.7	3,398.6	3,322.9	15.3	13.1	139.25	-585.3	283.6	195.1	173.4	21.72	8.982		
3,500.0	3,389.7	3,498.4	3,419.8	15.8	13.5	139.20	-606.5	294.2	201.5	179.1	22.47	8.970		
3,600.0	3,485.7	3,598.2	3,516.8	16.3	14.0	139.16	-627.7	304.8	208.0	184.8	23.21	8.959		
3,700.0	3,581.7	3,698.0	3,613.7	16.8	14.4	139.11	-648.9	315.5	214.4	190.4	23.96	8.948		
3,800.0	3,677.7	3,797.7	3,710.6	17.4	14.9	139.07	-670.1	326.1	220.8	196.1	24.71	8.939		
3,900.0	3,773.7	3,897.5	3,807.6	17.9	15.3	139.04	-691.3	336.7	227.3	201.8	25.45	8.929		
4,000.0	3,869.7	3,997.3	3,904.5	18.4	15.8	139.00	-712.5	347.4	233.7	207.5	26.20	8.920		
4,100.0	3,965.7	4,097.1	4,001.4	18.9	16.2	138.97	-733.7	358.0	240.1	213.2	26.95	8.912		
4,200.0	4,061.7	4,196.9	4,098.4	19.5	16.7	138.93	-754.9	368.6	246.6	218.9	27.69	8.904		
4,300.0	4,157.7	4,296.7	4,195.3	20.0	17.1	138.90	-776.1	379.2	253.0	224.6	28.44	8.896		
4,400.0	4,253.7	4,396.5	4,292.2	20.5	17.6	138.87	-797.3	389.9	259.4	230.2	29.19	8.889		
4,500.0	4,349.7	4,496.3	4,389.2	21.0	18.0	138.85	-818.5	400.5	265.9	235.9	29.93	8.882		
4,600.0	4,445.7	4,596.1	4,486.1	21.6	18.5	138.82	-839.7	411.1	272.3	241.6	30.68	8.875		
4,700.0	4,541.7	4,695.9	4,583.0	22.1	18.9	138.80	-860.9	421.8	278.7	247.3	31.43	8.869		
4,800.0	4,637.7	4,795.7	4,680.0	22.6	19.4	138.77	-882.1	432.4	285.2	253.0	32.18	8.863		
4,900.0	4,733.7	4,895.5	4,776.9	23.1	19.9	138.75	-903.3	443.0	291.6	258.7	32.92	8.857		
5,000.0	4,829.7	4,995.3	4,873.8	23.7	20.3	138.73	-924.5	453.7	298.0	264.4	33.67	8.851		
5,100.0	4,925.7	5,095.1	4,970.8	24.2	20.8	138.71	-945.7	464.3	304.5	270.0	34.42	8.846		

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

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4G-36H - HZ - Plan #1													Offset Site Error: 0.0 ft	
Survey Program: 0-Geolink 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	5,021.7	5,194.8	5,067.7	24.7	21.2	138.69	-966.9	474.9	310.9	275.7	35.17	8.841		
5,300.0	5,117.7	5,294.6	5,164.6	25.2	21.7	138.67	-988.1	485.6	317.3	281.4	35.91	8.836		
5,400.0	5,213.7	5,394.4	5,261.6	25.8	22.1	138.65	-1,009.3	496.2	323.8	287.1	36.66	8.831		
5,500.0	5,309.7	5,494.2	5,358.5	26.3	22.6	138.63	-1,030.5	506.8	330.2	292.8	37.41	8.826		
5,600.0	5,405.7	5,594.0	5,455.4	26.8	23.0	138.62	-1,051.7	517.4	336.6	298.5	38.16	8.822		
5,700.0	5,502.2	5,693.9	5,552.4	27.3	23.5	138.44	-1,072.9	528.1	341.5	302.6	38.97	8.763		
5,800.0	5,599.6	5,793.8	5,649.5	27.7	23.9	137.85	-1,094.2	538.7	343.9	303.9	39.95	8.606		
5,900.0	5,697.7	5,893.6	5,746.4	28.0	24.4	136.84	-1,115.4	549.4	343.7	302.6	41.10	8.362		
6,000.0	5,796.5	5,991.6	5,841.7	28.3	24.8	135.43	-1,136.1	559.8	341.2	298.8	42.39	8.047		
6,100.0	5,895.7	6,084.9	5,932.8	28.6	25.2	133.97	-1,153.9	568.7	337.7	294.1	43.61	7.745		
6,200.0	5,995.3	6,178.5	6,024.8	28.7	25.5	132.49	-1,169.2	576.3	333.9	289.2	44.73	7.465		
6,300.0	6,095.1	6,272.3	6,117.6	28.9	25.7	131.00	-1,181.7	582.6	329.7	283.9	45.77	7.204		
6,400.0	6,195.1	6,366.5	6,211.1	28.9	26.0	129.49	-1,191.6	587.6	325.1	278.4	46.71	6.960		
6,500.0	6,295.1	6,461.0	6,305.3	29.0	26.1	-88.88	-1,198.7	591.2	321.1	273.4	47.65	6.738		
6,600.0	6,395.1	6,556.0	6,400.2	29.1	26.2	-89.65	-1,203.1	593.3	318.7	270.5	48.18	6.615		
6,700.0	6,495.1	6,651.2	6,495.4	29.1	26.3	-89.93	-1,204.6	594.1	317.9	269.4	48.47	6.558		
6,735.0	6,530.2	6,686.0	6,530.2	29.2	26.4	-89.93	-1,204.6	594.1	317.9	269.3	48.53	6.550		
6,800.0	6,595.1	6,751.0	6,595.1	29.2	26.4	-89.93	-1,204.6	594.1	317.9	269.2	48.64	6.536		
6,843.0	6,638.1	6,794.0	6,638.1	29.2	26.4	-90.45	-1,204.6	594.1	317.9	269.3	48.59	6.543		
6,900.0	6,695.1	6,850.9	6,695.1	29.2	26.5	-90.68	-1,204.6	594.1	317.9	269.2	48.74	6.522		
7,000.0	6,793.5	6,949.4	6,793.5	29.0	26.6	-93.62	-1,204.6	594.1	318.5	268.9	49.69	6.410		
7,100.0	6,887.4	7,043.3	6,887.4	28.6	26.6	-98.87	-1,204.6	594.1	322.5	271.7	50.82	6.347		
7,200.0	6,974.1	7,145.9	6,989.6	28.1	26.6	-105.52	-1,197.1	594.1	332.7	281.7	51.02	6.521		
7,300.0	7,050.8	7,260.0	7,099.6	27.4	26.2	-111.84	-1,167.6	594.1	347.5	298.1	49.46	7.027		
7,400.0	7,115.3	7,387.3	7,212.7	26.6	25.5	-117.52	-1,109.8	594.1	365.2	318.9	46.25	7.895		
7,500.0	7,165.5	7,530.0	7,320.9	25.8	24.3	-122.29	-1,017.2	594.1	382.8	341.0	41.79	9.160		
7,600.0	7,200.0	7,688.7	7,410.2	24.9	22.9	-125.80	-886.6	594.1	397.4	360.6	36.79	10.802		
7,700.0	7,217.6	7,860.4	7,462.6	24.1	21.3	-127.65	-723.8	594.2	406.0	373.7	32.21	12.603		
7,800.0	7,220.0	8,000.6	7,470.0	23.5	20.1	-127.83	-584.0	594.2	407.6	377.8	29.80	13.680		
7,900.0	7,220.0	8,100.6	7,470.0	22.9	19.5	-127.77	-484.0	594.2	408.1	379.3	28.83	14.155		
8,000.0	7,220.0	8,200.6	7,470.0	22.4	18.9	-127.72	-384.0	594.2	408.7	380.6	28.11	14.538		
8,100.0	7,220.0	8,300.6	7,470.0	22.1	18.5	-127.66	-284.0	594.2	409.2	381.5	27.65	14.800		
8,200.0	7,220.0	8,400.6	7,470.0	21.9	18.3	-127.60	-184.0	594.2	409.7	382.2	27.46	14.921		
8,300.0	7,220.0	8,500.6	7,470.0	21.8	18.3	-127.55	-84.0	594.2	410.2	382.7	27.55	14.890		
8,400.0	7,220.0	8,600.6	7,470.0	21.9	18.4	-127.49	16.0	594.2	410.7	382.8	27.92	14.710		
8,500.0	7,220.0	8,700.6	7,470.0	22.1	18.6	-127.44	116.0	594.2	411.3	382.7	28.56	14.398		
8,600.0	7,220.0	8,800.6	7,470.0	22.4	19.1	-127.38	216.0	594.2	411.8	382.3	29.46	13.978		
8,700.0	7,220.0	8,900.6	7,470.0	22.9	19.7	-127.33	316.0	594.2	412.3	381.7	30.59	13.480		
8,800.0	7,220.0	9,000.6	7,470.0	23.6	20.4	-127.27	416.0	594.2	412.8	380.9	31.92	12.932		
8,900.0	7,220.0	9,100.6	7,470.0	24.3	21.3	-127.21	516.0	594.2	413.4	379.9	33.44	12.360		
9,000.0	7,220.0	9,200.6	7,470.0	25.1	22.2	-127.16	616.0	594.2	413.9	378.8	35.13	11.782		
9,100.0	7,220.0	9,300.6	7,470.0	26.1	23.3	-127.10	716.0	594.3	414.4	377.5	36.95	11.215		
9,200.0	7,220.0	9,400.6	7,470.0	27.1	24.4	-127.05	816.0	594.3	414.9	376.0	38.90	10.668		
9,300.0	7,220.0	9,500.6	7,470.0	28.2	25.6	-127.00	916.0	594.3	415.5	374.5	40.95	10.147		
9,400.0	7,220.0	9,600.6	7,470.0	29.3	26.9	-126.94	1,016.0	594.3	416.0	372.9	43.09	9.655		
9,500.0	7,220.0	9,700.6	7,470.0	30.6	28.2	-126.89	1,116.0	594.3	416.5	371.2	45.31	9.193		
9,600.0	7,220.0	9,800.6	7,470.0	31.8	29.5	-126.83	1,216.0	594.3	417.0	369.4	47.59	8.762		
9,700.0	7,220.0	9,900.6	7,470.0	33.1	30.9	-126.78	1,316.0	594.3	417.6	367.6	49.94	8.361		
9,800.0	7,220.0	10,000.6	7,470.0	34.5	32.4	-126.72	1,416.0	594.3	418.1	365.7	52.34	7.988		
9,900.0	7,220.0	10,100.6	7,470.0	35.9	33.8	-126.67	1,516.0	594.3	418.6	363.8	54.79	7.641		
10,000.0	7,220.0	10,200.6	7,470.0	37.3	35.3	-126.62	1,616.0	594.3	419.1	361.9	57.27	7.318		
10,100.0	7,220.0	10,300.6	7,470.0	38.7	36.8	-126.56	1,716.0	594.3	419.7	359.9	59.79	7.019		

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

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S36 T2N-R66W (Marcus State, Mumby State) - Mumby State 4G-36H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance				Total		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Separation Factor		
10,200.0	7,220.0	10,400.6	7,470.0	40.2	38.4	-126.51	1,816.0	594.3	420.2	357.9	62.35	6.739		
10,300.0	7,220.0	10,500.6	7,470.0	41.7	39.9	-126.46	1,916.0	594.3	420.7	355.8	64.93	6.480		
10,400.0	7,220.0	10,600.6	7,470.0	43.2	41.5	-126.40	2,016.0	594.3	421.3	353.7	67.54	6.237		
10,500.0	7,220.0	10,700.6	7,470.0	44.7	43.1	-126.35	2,116.0	594.3	421.8	351.6	70.17	6.011		
10,600.0	7,220.0	10,800.6	7,470.0	46.3	44.7	-126.30	2,216.0	594.4	422.3	349.5	72.83	5.799		
10,700.0	7,220.0	10,900.6	7,470.0	47.8	46.3	-126.24	2,316.0	594.4	422.9	347.3	75.50	5.601		
10,800.0	7,220.0	11,000.6	7,470.0	49.4	47.9	-126.19	2,416.0	594.4	423.4	345.2	78.19	5.415		
10,900.0	7,220.0	11,100.6	7,470.0	51.0	49.5	-126.14	2,516.0	594.4	423.9	343.0	80.90	5.240		
11,000.0	7,220.0	11,200.6	7,470.0	52.6	51.2	-126.09	2,616.0	594.4	424.4	340.8	83.62	5.076		
11,100.0	7,220.0	11,300.6	7,470.0	54.2	52.8	-126.03	2,716.0	594.4	425.0	338.6	86.36	4.921		
11,200.0	7,220.0	11,400.6	7,470.0	55.8	54.5	-125.98	2,816.0	594.4	425.5	336.4	89.11	4.775		
11,300.0	7,220.0	11,500.6	7,470.0	57.4	56.1	-125.93	2,916.0	594.4	426.0	334.2	91.87	4.637		
11,400.0	7,220.0	11,600.6	7,470.0	59.0	57.8	-125.88	3,016.0	594.4	426.6	331.9	94.65	4.507		
11,500.0	7,220.0	11,700.6	7,470.0	60.7	59.4	-125.83	3,116.0	594.4	427.1	329.7	97.43	4.384		
11,600.0	7,220.0	11,800.6	7,470.0	62.3	61.1	-125.78	3,216.0	594.4	427.6	327.4	100.23	4.267		
11,700.0	7,220.0	11,900.6	7,470.0	64.0	62.8	-125.72	3,316.0	594.4	428.2	325.1	103.03	4.156		
11,800.0	7,220.0	12,000.6	7,470.0	65.6	64.5	-125.67	3,416.0	594.4	428.7	322.9	105.85	4.050		
11,900.0	7,220.0	12,100.6	7,470.0	67.3	66.2	-125.62	3,516.0	594.4	429.2	320.6	108.67	3.950		
12,000.0	7,220.0	12,200.6	7,470.0	68.9	67.8	-125.57	3,616.0	594.4	429.8	318.3	111.50	3.854		
12,014.1	7,220.0	12,214.7	7,470.0	69.2	68.1	-125.56	3,630.1	594.4	429.9	318.0	111.90	3.841 SF		

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Mumby State 4H-36H
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Reference Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Mumby State 4H-36H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 5048.0ft (Original Well Elev)  
 Offset Depths are relative to Offset Datum  
 Central Meridian is -105.500000 °

Coordinates are relative to: Mumby State 4H-36H  
 Coordinate System is US State Plane 1983, Colorado Northern Zone  
 Grid Convergence at Surface is: 0.50°

