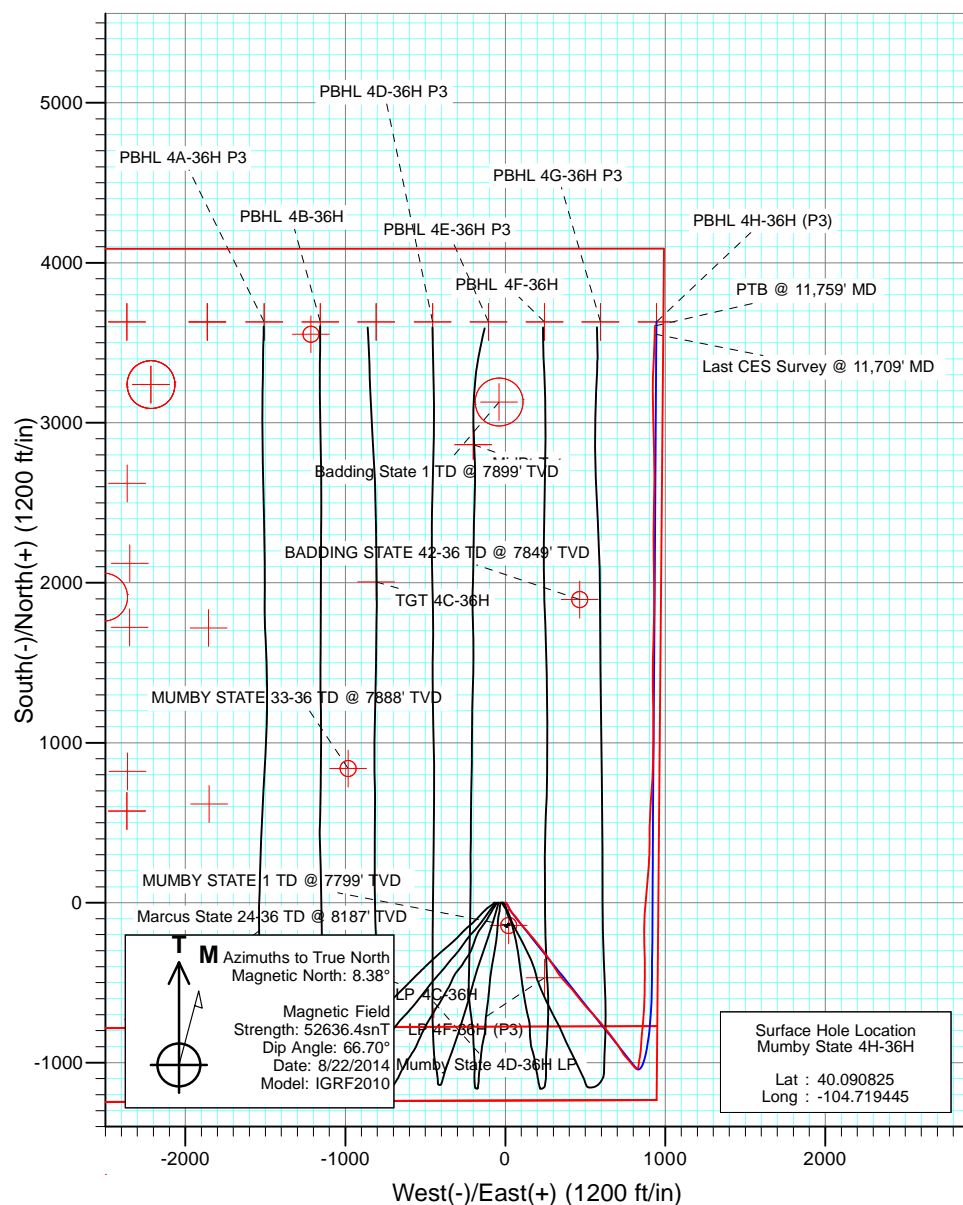
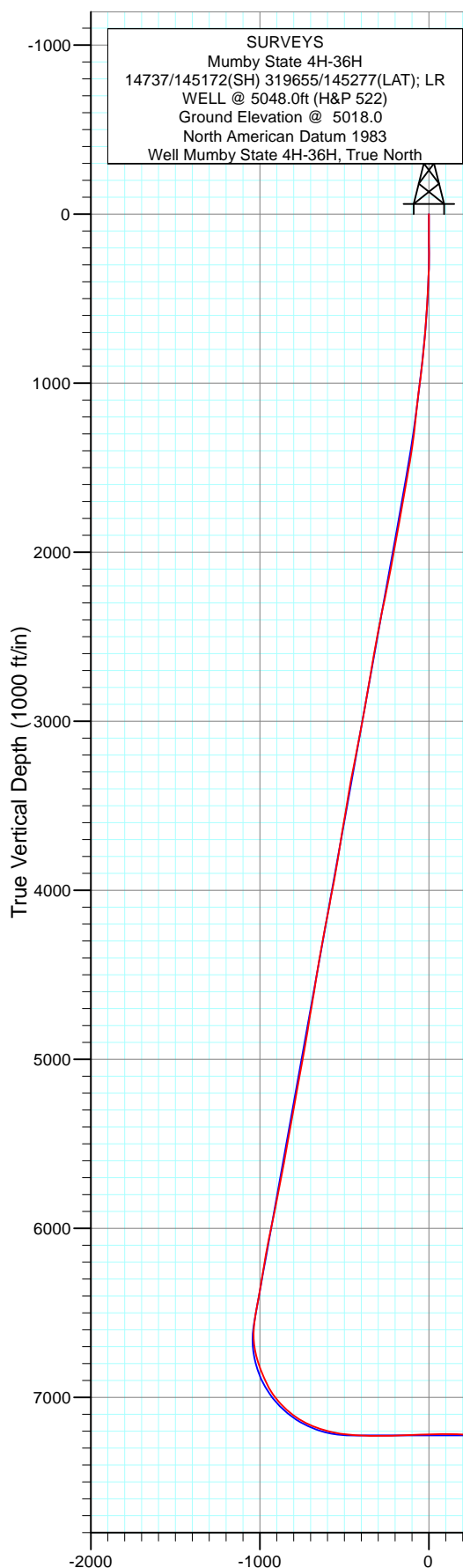
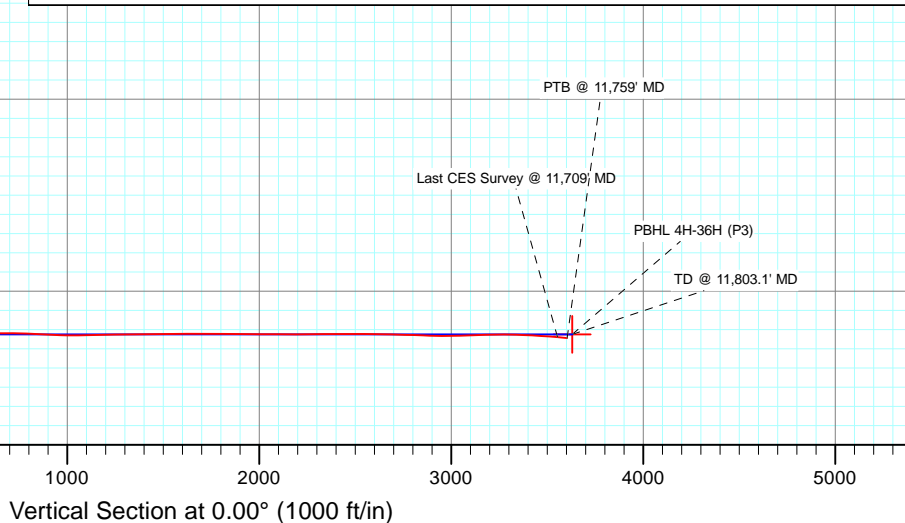




Project: DJ Wattenberg  
 Site: S36 T2N-R66W (Marcus State, Mumby State)  
 Well: Mumby State 4H-36H  
 Wellbore: HZ  
 Design: SURVEYS



DESIGN TARGET DETAILS					
Name	+N/-S	+E/-W	Northing	Easting	Latitude
PBHL 4H-36H (P3)	3630.1	944.1	1280534.09	3219299.80	40.100790
					Longitude
					-104.716070



## Survey 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 (H&P 522)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (H&P 522)
<b>Well:</b>	Mumby State 4H-36H	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

<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	8/22/2014	8.39	66.70	52,636

<b>Design</b>	SURVEYS				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	0.00	

<b>Survey Program</b>	<b>Date</b>	8/30/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
170.0	11,759.0	Survey #1 (HZ)	Geolink MWD	Geolink MWD	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
170.0	0.75	30.82	170.0	1.0	0.6	1.0	0.44	0.44		
233.0	0.88	84.17	233.0	1.4	1.3	1.4	1.18	0.21		
325.0	2.42	136.64	325.0	0.0	3.3	0.0	2.18	1.67		
417.0	3.91	136.82	416.8	-3.7	6.8	-3.7	1.62	1.62		
509.0	4.26	142.44	508.6	-8.7	11.0	-8.7	0.58	0.38		
601.0	4.04	153.87	600.3	-14.3	14.5	-14.3	0.93	-0.24		
693.0	4.57	155.63	692.1	-20.5	17.5	-20.5	0.59	0.58		
785.0	6.15	157.74	783.7	-28.4	20.8	-28.4	1.73	1.72		
877.0	7.10	152.00	875.1	-38.0	25.4	-38.0	1.26	1.03		
969.0	8.80	145.40	966.2	-48.8	32.0	-48.8	2.09	1.85		
1,061.0	8.90	145.40	1,057.1	-60.5	40.1	-60.5	0.11	0.11		
1,093.0	8.70	142.50	1,088.7	-64.4	43.0	-64.4	1.52	-0.62		

## Survey 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 (H&P 522)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (H&P 522)
<b>Well:</b>	Mumby State 4H-36H	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
1,205.0	7.50	133.40	1,199.6	-76.2	53.4	-76.2	1.56	-1.07	
1,296.0	9.40	141.70	1,289.6	-86.1	62.3	-86.1	2.48	2.09	
1,388.0	10.50	140.20	1,380.2	-98.4	72.4	-98.4	1.23	1.20	
1,480.0	11.40	145.40	1,470.5	-112.4	82.9	-112.4	1.45	0.98	
1,572.0	13.20	143.00	1,560.4	-128.2	94.4	-128.2	2.03	1.96	
1,664.0	13.10	141.60	1,650.0	-144.8	107.2	-144.8	0.36	-0.11	
1,756.0	12.90	140.20	1,739.7	-160.9	120.2	-160.9	0.41	-0.22	
1,848.0	13.20	139.50	1,829.3	-176.7	133.6	-176.7	0.37	0.33	
1,940.0	12.70	135.70	1,918.9	-192.0	147.5	-192.0	1.07	-0.54	
2,032.0	13.60	138.00	2,008.5	-207.2	161.8	-207.2	1.13	0.98	
2,124.0	14.60	139.80	2,097.8	-224.1	176.5	-224.1	1.19	1.09	
2,216.0	14.90	143.80	2,186.7	-242.5	191.0	-242.5	1.15	0.33	
2,308.0	14.70	142.00	2,275.7	-261.3	205.2	-261.3	0.54	-0.22	
2,399.0	14.50	140.20	2,363.7	-279.1	219.6	-279.1	0.54	-0.22	
2,491.0	13.30	146.10	2,453.0	-296.8	232.9	-296.8	2.02	-1.30	
2,583.0	12.40	144.60	2,542.7	-313.6	244.5	-313.6	1.04	-0.98	
2,675.0	12.10	143.70	2,632.6	-329.4	255.9	-329.4	0.39	-0.33	
2,767.0	11.50	141.80	2,722.7	-344.4	267.3	-344.4	0.78	-0.65	
2,859.0	12.30	147.00	2,812.7	-359.8	278.3	-359.8	1.45	0.87	
2,951.0	11.50	145.30	2,902.7	-375.6	288.9	-375.6	0.95	-0.87	
3,043.0	12.60	148.60	2,992.7	-391.7	299.3	-391.7	1.41	1.20	
3,135.0	12.20	147.40	3,082.6	-408.4	309.8	-408.4	0.52	-0.43	
3,227.0	13.00	148.10	3,172.4	-425.4	320.5	-425.4	0.89	0.87	
3,321.0	13.90	144.60	3,263.8	-443.6	332.6	-443.6	1.29	0.96	
3,416.0	12.80	143.60	3,356.2	-461.4	345.5	-461.4	1.18	-1.16	
3,511.0	12.90	139.50	3,448.8	-477.9	358.6	-477.9	0.97	0.11	
3,605.0	12.10	135.50	3,540.6	-492.9	372.3	-492.9	1.25	-0.85	
3,700.0	12.80	139.50	3,633.4	-508.0	386.1	-508.0	1.17	0.74	
3,794.0	13.30	137.30	3,724.9	-523.9	400.2	-523.9	0.75	0.53	
3,889.0	11.90	136.00	3,817.7	-539.0	414.4	-539.0	1.50	-1.47	
3,984.0	12.40	144.90	3,910.5	-554.4	427.1	-554.4	2.04	0.53	
4,078.0	14.20	140.90	4,002.0	-571.6	440.2	-571.6	2.15	1.91	
4,173.0	12.70	141.60	4,094.4	-588.8	454.0	-588.8	1.59	-1.58	
4,268.0	14.50	140.90	4,186.7	-606.2	468.0	-606.2	1.90	1.89	
4,362.0	13.40	139.80	4,278.0	-623.7	482.5	-623.7	1.20	-1.17	
4,457.0	13.20	140.40	4,370.4	-640.4	496.5	-640.4	0.26	-0.21	
4,552.0	12.30	139.80	4,463.1	-656.5	509.9	-656.5	0.96	-0.95	
4,646.0	12.40	135.10	4,554.9	-671.3	523.5	-671.3	1.07	0.11	
4,741.0	13.80	136.60	4,647.4	-686.8	538.5	-686.8	1.52	1.47	
4,835.0	12.70	136.60	4,738.9	-702.4	553.3	-702.4	1.17	-1.17	
4,930.0	11.70	136.40	4,831.8	-717.0	567.1	-717.0	1.05	-1.05	
5,025.0	13.30	142.10	4,924.5	-732.6	580.5	-732.6	2.12	1.68	
5,119.0	13.30	142.10	5,016.0	-749.6	593.8	-749.6	0.00	0.00	
5,214.0	12.40	140.90	5,108.6	-766.2	606.9	-766.2	0.99	-0.95	
5,308.0	14.10	138.50	5,200.1	-782.6	620.9	-782.6	1.90	1.81	
5,403.0	13.20	138.70	5,292.4	-799.4	635.7	-799.4	0.95	-0.95	
5,498.0	12.90	140.80	5,385.0	-815.8	649.5	-815.8	0.59	-0.32	
5,592.0	12.60	146.70	5,476.7	-832.5	661.8	-832.5	1.42	-0.32	
5,687.0	13.50	141.30	5,569.2	-849.8	674.4	-849.8	1.59	0.95	
5,782.0	12.50	140.60	5,661.8	-866.4	687.9	-866.4	1.07	-1.05	
5,876.0	12.60	147.20	5,753.5	-882.9	699.9	-882.9	1.53	0.11	
5,971.0	13.00	151.60	5,846.2	-901.0	710.6	-901.0	1.11	0.42	
6,066.0	14.70	148.30	5,938.4	-920.6	722.0	-920.6	1.97	1.79	

## Survey 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 (H&P 522)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (H&P 522)
<b>Well:</b>	Mumby State 4H-36H	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
6,160.0	12.90	147.00	6,029.7	-939.6	734.0	-939.6	1.94	-1.91	
6,255.0	14.30	139.50	6,122.0	-957.4	747.4	-957.4	2.37	1.47	
6,349.0	12.30	138.70	6,213.5	-973.7	761.5	-973.7	2.14	-2.13	
6,444.0	12.10	140.20	6,306.4	-989.0	774.6	-989.0	0.39	-0.21	
6,539.0	12.70	141.70	6,399.2	-1,004.8	787.4	-1,004.8	0.72	0.63	
6,633.0	13.80	138.80	6,490.6	-1,021.4	801.2	-1,021.4	1.37	1.17	
6,657.0	13.10	137.50	6,514.0	-1,025.6	805.0	-1,025.6	3.18	-2.92	
6,728.0	9.80	124.80	6,583.6	-1,034.9	815.4	-1,034.9	5.82	-4.65	
6,776.0	8.00	79.20	6,631.1	-1,036.6	822.0	-1,036.6	14.73	-3.75	
6,823.0	9.10	43.00	6,677.6	-1,033.3	827.8	-1,033.3	11.48	2.34	
6,871.0	10.50	16.50	6,724.9	-1,026.3	831.6	-1,026.3	9.74	2.92	
6,917.0	14.60	5.70	6,769.8	-1,016.5	833.4	-1,016.5	10.23	8.91	
6,965.0	19.20	5.90	6,815.7	-1,002.7	834.8	-1,002.7	9.58	9.58	
7,012.0	23.40	8.80	6,859.5	-985.7	837.0	-985.7	9.21	8.94	
7,060.0	25.90	8.80	6,903.1	-966.0	840.0	-966.0	5.21	5.21	
7,106.0	28.50	8.80	6,944.0	-945.2	843.3	-945.2	5.65	5.65	
7,154.0	35.40	6.60	6,984.7	-920.0	846.6	-920.0	14.58	14.37	
7,201.0	40.80	3.30	7,021.7	-891.2	849.1	-891.2	12.28	11.49	
7,249.0	45.40	3.30	7,056.7	-858.4	851.0	-858.4	9.58	9.58	
7,296.0	50.30	5.70	7,088.3	-823.7	853.7	-823.7	11.09	10.43	
7,344.0	55.80	5.10	7,117.1	-785.5	857.3	-785.5	11.50	11.46	
7,390.0	60.90	4.70	7,141.2	-746.5	860.7	-746.5	11.11	11.09	
7,438.0	66.00	3.80	7,162.7	-703.7	863.8	-703.7	10.76	10.62	
7,485.0	69.30	3.60	7,180.6	-660.3	866.6	-660.3	7.03	7.02	
7,533.0	74.20	1.50	7,195.6	-614.8	868.7	-614.8	11.02	10.21	
7,579.0	77.80	1.20	7,206.7	-570.2	869.7	-570.2	7.85	7.83	
7,627.0	81.40	0.90	7,215.4	-523.0	870.6	-523.0	7.53	7.50	
7,675.0	85.50	1.00	7,220.8	-475.3	871.4	-475.3	8.54	8.54	
7,793.0	88.20	359.00	7,227.3	-357.5	871.4	-357.5	2.85	2.29	
7,888.0	90.30	358.00	7,228.6	-262.6	868.9	-262.6	2.45	2.21	
7,982.0	93.00	0.10	7,225.9	-168.6	867.3	-168.6	3.64	2.87	
8,077.0	93.10	3.80	7,220.8	-73.9	870.5	-73.9	3.89	0.11	
8,172.0	90.20	5.50	7,218.1	20.8	878.2	20.8	3.54	-3.05	
8,266.0	89.50	4.90	7,218.3	114.4	886.8	114.4	0.98	-0.74	
8,361.0	88.40	4.60	7,220.1	209.1	894.6	209.1	1.20	-1.16	
8,456.0	88.30	1.60	7,222.8	303.9	899.8	303.9	3.16	-0.11	
8,550.0	90.70	359.80	7,223.6	397.8	900.9	397.8	3.19	2.55	
8,645.0	92.20	2.00	7,221.2	492.8	902.4	492.8	2.80	1.58	
8,740.0	89.30	3.40	7,220.0	587.7	906.9	587.7	3.39	-3.05	
8,834.0	90.70	3.80	7,220.0	681.5	912.8	681.5	1.55	1.49	
8,929.0	88.40	3.60	7,220.7	776.3	918.9	776.3	2.43	-2.42	
9,023.0	86.50	1.70	7,224.9	870.1	923.2	870.1	2.86	-2.02	
9,118.0	87.90	0.70	7,229.5	964.9	925.2	964.9	1.81	1.47	
9,212.0	90.70	359.70	7,230.7	1,058.9	925.6	1,058.9	3.16	2.98	
9,307.0	91.00	359.30	7,229.3	1,153.9	924.7	1,153.9	0.53	0.32	
9,402.0	91.90	359.40	7,226.9	1,248.9	923.7	1,248.9	0.95	0.95	
9,496.0	90.90	358.90	7,224.6	1,342.8	922.3	1,342.8	1.19	-1.06	
9,590.0	91.00	0.60	7,223.0	1,436.8	921.8	1,436.8	1.81	0.11	
9,685.0	89.60	1.20	7,222.5	1,531.8	923.3	1,531.8	1.60	-1.47	
9,780.0	90.20	1.30	7,222.7	1,626.8	925.4	1,626.8	0.64	0.63	
9,874.0	90.30	0.90	7,222.3	1,720.7	927.2	1,720.7	0.44	0.11	
9,968.0	89.60	0.90	7,222.4	1,814.7	928.7	1,814.7	0.74	-0.74	
10,063.0	89.20	0.60	7,223.4	1,909.7	929.9	1,909.7	0.53	-0.42	

## Survey 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 (H&P 522)
<b>Site:</b>	S36 T2N-R66W (Marcus State, Mumby State)	<b>MD Reference:</b>	WELL @ 5048.0ft (H&P 522)
<b>Well:</b>	Mumby State 4H-36H	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
10,158.0	89.60	359.00	7,224.4	2,004.7	929.6	2,004.7	1.74	0.42	
10,252.0	89.80	359.40	7,224.8	2,098.7	928.3	2,098.7	0.48	0.21	
10,346.0	89.60	359.00	7,225.3	2,192.7	927.0	2,192.7	0.48	-0.21	
10,441.0	91.20	359.90	7,224.7	2,287.7	926.1	2,287.7	1.93	1.68	
10,535.0	90.30	1.50	7,223.4	2,381.7	927.2	2,381.7	1.95	-0.96	
10,630.0	90.30	0.90	7,222.9	2,476.6	929.2	2,476.6	0.63	0.00	
10,724.0	89.10	0.30	7,223.4	2,570.6	930.2	2,570.6	1.43	-1.28	
10,819.0	88.20	0.70	7,225.7	2,665.6	931.0	2,665.6	1.04	-0.95	
10,913.0	89.20	359.00	7,227.8	2,759.6	930.8	2,759.6	2.10	1.06	
11,008.0	88.10	359.00	7,230.0	2,854.5	929.1	2,854.5	1.16	-1.16	
11,102.0	88.80	357.50	7,232.6	2,948.4	926.2	2,948.4	1.76	0.74	
11,197.0	91.90	359.40	7,232.0	3,043.4	923.7	3,043.4	3.83	3.26	
11,291.0	92.20	358.80	7,228.6	3,137.3	922.2	3,137.3	0.71	0.32	
11,386.0	90.60	0.80	7,226.3	3,232.3	921.9	3,232.3	2.70	-1.68	
11,480.0	88.60	2.60	7,227.0	3,326.2	924.7	3,326.2	2.86	-2.13	
11,575.0	87.00	2.70	7,230.6	3,421.1	929.0	3,421.1	1.69	-1.68	
11,669.0	85.60	1.80	7,236.7	3,514.8	932.7	3,514.8	1.77	-1.49	
11,709.0	85.10	1.60	7,239.9	3,554.6	933.9	3,554.6	1.35	-1.25	Last CES Survey @ 11,709' MD
11,759.0	85.10	1.60	7,244.2	3,604.4	935.3	3,604.4	0.00	0.00	PTB @ 11,759' MD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL 4H-36H (P3)	0.00	0.00	7,225.0	3,630.1	944.1	1,280,534.09	3,219,299.80	40.100790	-104.716070
- survey misses target center by 33.2ft at 11759.0ft MD (7244.2 TVD, 3604.4 N, 935.3 E)									
- Point									
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
- survey misses target center by 36.3ft at 11759.0ft MD (7244.2 TVD, 3604.4 N, 935.3 E)									
- Point									

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
11,709.0	7,239.9	3,554.6	933.9	Last CES Survey @ 11,709' MD	
11,759.0	7,244.2	3,604.4	935.3	PTB @ 11,759' MD	

Checked By: _____	Approved By: _____	Date: _____
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