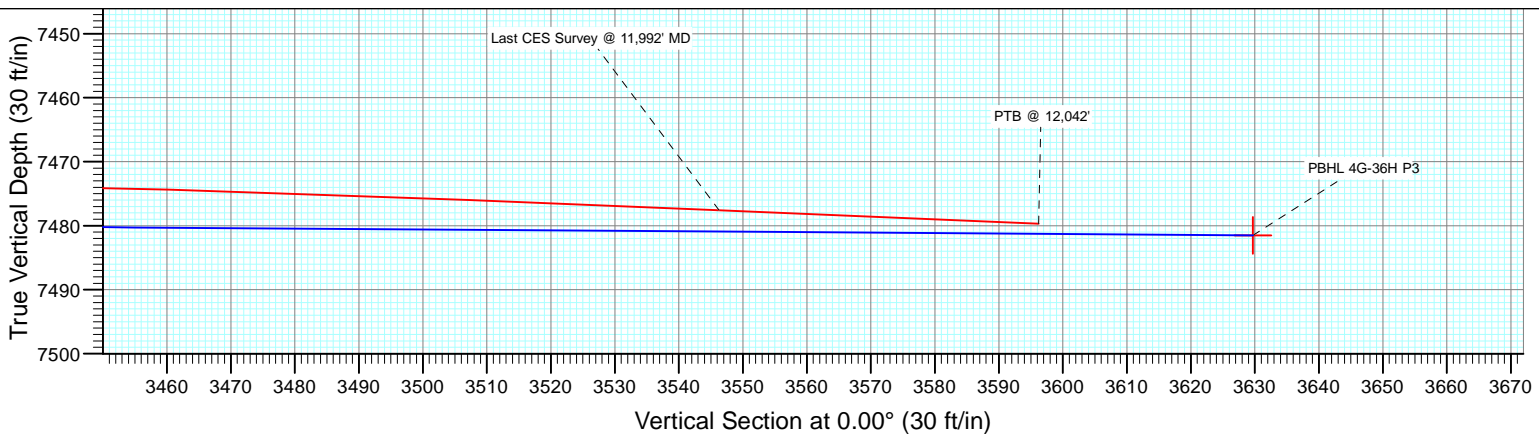
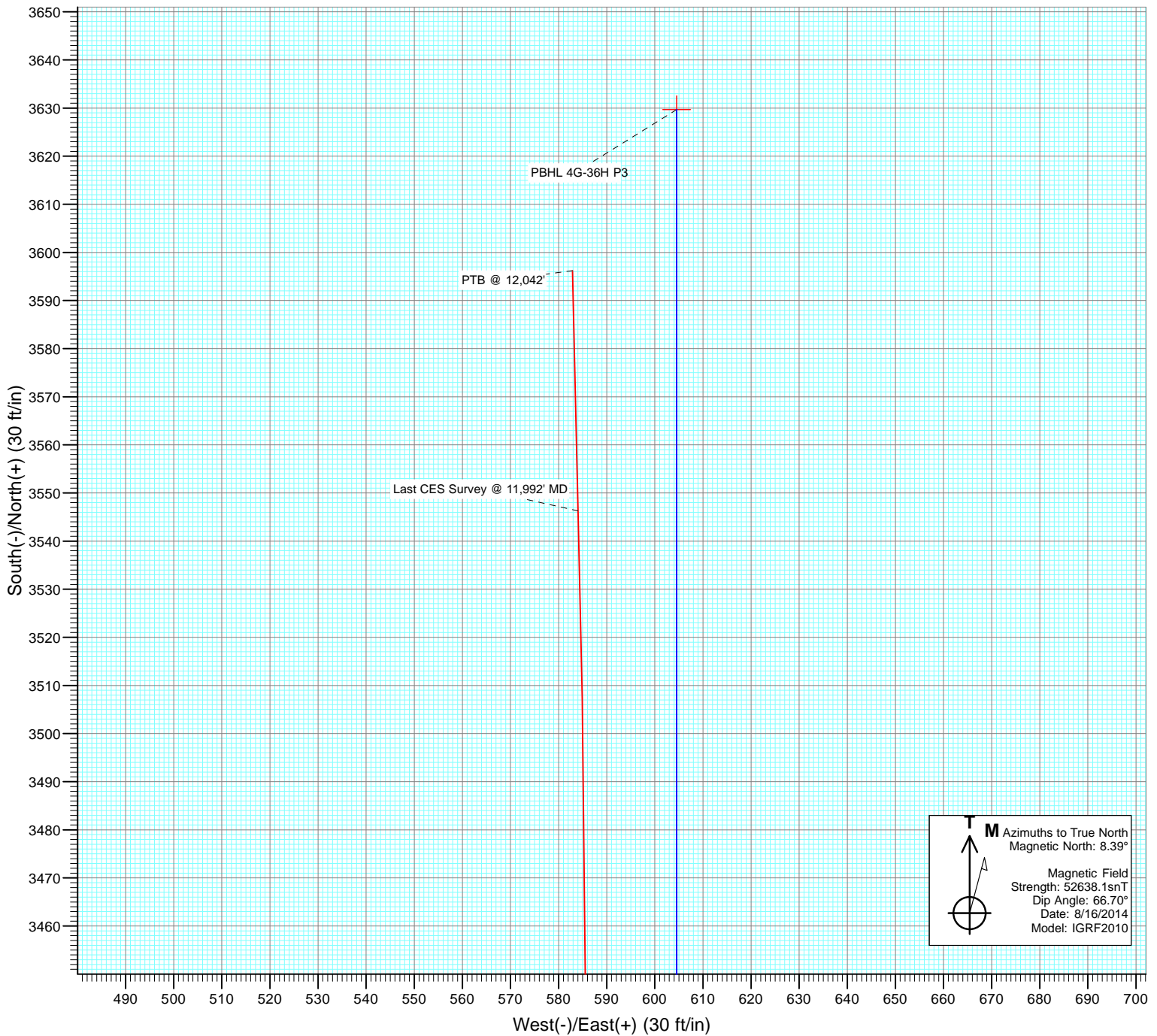




Project: DJ Wattenberg
Site: S36 T2N-R66W (Marcus State, Mumby State)
Well: Mumby State 4G-36H
Wellbore: HZ
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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		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 4G-36H					
Well Position	+N/-S	0.0 ft	Northing:	1,276,896.13 ft	Latitude:	40.090826
	+E/-W	0.0 ft	Easting:	3,218,377.60 ft	Longitude:	-104.719481
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,018.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/16/2014	8.39	66.70	52,638

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

Survey Program	Date	8/21/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
141.0	12,042.0	Survey #1 (HZ)	Geolink MWD	Geolink MWD	

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	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
141.0	0.18	25.81	141.0	0.2	0.1	0.2	0.13	0.13		
233.0	0.44	354.79	233.0	0.7	0.1	0.7	0.33	0.28		
325.0	1.32	147.28	325.0	0.1	0.7	0.1	1.87	0.96		
417.0	2.20	145.43	416.9	-2.2	2.2	-2.2	0.96	0.96		
509.0	3.30	147.80	508.8	-5.9	4.7	-5.9	1.20	1.20		
601.0	3.78	155.80	600.7	-10.9	7.3	-10.9	0.75	0.52		
693.0	4.48	161.60	692.4	-17.1	9.7	-17.1	0.89	0.76		
785.0	4.83	162.22	784.1	-24.2	12.0	-24.2	0.38	0.38		
877.0	5.27	163.27	875.8	-31.9	14.4	-31.9	0.49	0.48		
969.0	6.28	159.32	967.3	-40.7	17.4	-40.7	1.18	1.10		
1,061.0	7.38	155.89	1,058.6	-50.8	21.6	-50.8	1.27	1.20		
1,090.0	7.34	151.58	1,087.4	-54.1	23.2	-54.1	1.91	-0.14		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
1,204.0	6.80	150.00	1,200.5	-66.3	30.1	-66.3	0.50	-0.47	
1,296.0	9.70	163.20	1,291.6	-78.5	35.0	-78.5	3.75	3.15	
1,388.0	9.40	161.30	1,382.3	-93.0	39.7	-93.0	0.47	-0.33	
1,480.0	10.40	156.40	1,472.9	-107.8	45.4	-107.8	1.42	1.09	
1,572.0	10.60	154.70	1,563.4	-123.0	52.4	-123.0	0.40	0.22	
1,663.0	10.80	154.60	1,652.8	-138.3	59.6	-138.3	0.22	0.22	
1,755.0	13.20	152.30	1,742.8	-155.4	68.2	-155.4	2.66	2.61	
1,847.0	13.50	154.50	1,832.3	-174.4	77.7	-174.4	0.64	0.33	
1,939.0	13.30	151.80	1,921.8	-193.4	87.3	-193.4	0.71	-0.22	
2,031.0	13.20	151.50	2,011.4	-211.9	97.3	-211.9	0.13	-0.11	
2,123.0	13.00	149.30	2,101.0	-230.1	107.6	-230.1	0.58	-0.22	
2,215.0	13.60	151.10	2,190.5	-248.4	118.1	-248.4	0.79	0.65	
2,307.0	14.50	153.70	2,279.7	-268.2	128.5	-268.2	1.19	0.98	
2,399.0	13.60	154.90	2,369.0	-288.3	138.1	-288.3	1.03	-0.98	
2,491.0	13.20	155.10	2,458.5	-307.7	147.2	-307.7	0.44	-0.43	
2,583.0	12.70	154.40	2,548.2	-326.3	155.9	-326.3	0.57	-0.54	
2,675.0	12.20	156.90	2,638.0	-344.4	164.1	-344.4	0.80	-0.54	
2,767.0	11.80	155.60	2,728.0	-361.9	171.8	-361.9	0.52	-0.43	
2,859.0	11.30	155.10	2,818.1	-378.6	179.5	-378.6	0.55	-0.54	
2,951.0	11.30	163.20	2,908.3	-395.4	185.9	-395.4	1.72	0.00	
3,043.0	10.60	161.70	2,998.7	-412.1	191.2	-412.1	0.82	-0.76	
3,135.0	12.40	165.70	3,088.8	-429.7	196.3	-429.7	2.14	1.96	
3,226.0	14.00	165.80	3,177.4	-449.8	201.4	-449.8	1.76	1.76	
3,321.0	13.50	166.10	3,269.7	-471.8	206.9	-471.8	0.53	-0.53	
3,415.0	14.80	159.00	3,360.8	-493.6	213.8	-493.6	2.30	1.38	
3,510.0	14.20	158.50	3,452.8	-515.8	222.4	-515.8	0.65	-0.63	
3,605.0	13.50	156.50	3,545.0	-536.8	231.1	-536.8	0.89	-0.74	
3,699.0	12.70	157.20	3,636.6	-556.4	239.5	-556.4	0.87	-0.85	
3,794.0	11.60	157.00	3,729.5	-574.8	247.3	-574.8	1.16	-1.16	
3,888.0	12.70	153.10	3,821.4	-592.7	255.6	-592.7	1.46	1.17	
3,983.0	11.90	155.10	3,914.2	-610.9	264.5	-610.9	0.95	-0.84	
4,078.0	11.00	154.00	4,007.3	-627.9	272.6	-627.9	0.97	-0.95	
4,172.0	10.20	154.80	4,099.7	-643.5	280.1	-643.5	0.87	-0.85	
4,267.0	11.60	156.20	4,193.0	-659.9	287.5	-659.9	1.50	1.47	
4,362.0	13.60	151.70	4,285.7	-678.5	296.7	-678.5	2.34	2.11	
4,456.0	13.80	151.60	4,377.0	-698.1	307.2	-698.1	0.21	0.21	
4,551.0	13.00	152.80	4,469.4	-717.5	317.5	-717.5	0.89	-0.84	
4,646.0	11.80	152.90	4,562.2	-735.7	326.8	-735.7	1.26	-1.26	
4,740.0	13.10	152.50	4,654.0	-753.7	336.1	-753.7	1.39	1.38	
4,835.0	12.30	151.10	4,746.7	-772.1	346.0	-772.1	0.90	-0.84	
4,930.0	12.40	156.30	4,839.5	-790.3	355.0	-790.3	1.18	0.11	
5,024.0	11.80	154.10	4,931.4	-808.2	363.2	-808.2	0.80	-0.64	
5,119.0	13.60	156.90	5,024.1	-827.2	371.8	-827.2	2.00	1.89	
5,213.0	12.80	156.70	5,115.6	-846.9	380.3	-846.9	0.85	-0.85	
5,308.0	11.70	156.50	5,208.4	-865.4	388.3	-865.4	1.16	-1.16	
5,402.0	12.10	158.00	5,300.4	-883.3	395.8	-883.3	0.54	0.43	
5,497.0	13.70	152.10	5,393.0	-902.5	404.8	-902.5	2.18	1.68	
5,591.0	13.20	152.30	5,484.4	-921.8	415.0	-921.8	0.53	-0.53	
5,686.0	12.10	153.70	5,577.1	-940.3	424.4	-940.3	1.20	-1.16	
5,781.0	11.30	154.00	5,670.1	-957.6	432.9	-957.6	0.84	-0.84	
5,876.0	11.30	153.60	5,763.3	-974.3	441.1	-974.3	0.08	0.00	
5,970.0	12.50	157.60	5,855.3	-992.0	449.1	-992.0	1.55	1.28	
6,065.0	11.90	151.90	5,948.1	-1,010.1	457.6	-1,010.1	1.42	-0.63	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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	12.50	154.00	6,041.0	-1,028.0	466.8	-1,028.0	0.79	0.63	
6,254.0	13.80	155.70	6,132.5	-1,047.4	475.8	-1,047.4	1.44	1.38	
6,349.0	12.10	154.90	6,225.1	-1,066.7	484.7	-1,066.7	1.80	-1.79	
6,444.0	13.00	154.80	6,317.8	-1,085.4	493.5	-1,085.4	0.95	0.95	
6,538.0	12.60	158.30	6,409.5	-1,104.5	501.8	-1,104.5	0.93	-0.43	
6,633.0	13.40	159.40	6,502.1	-1,124.4	509.5	-1,124.4	0.88	0.84	
6,680.0	12.30	159.60	6,547.9	-1,134.2	513.2	-1,134.2	2.34	-2.34	
6,727.0	11.20	158.00	6,593.9	-1,143.2	516.6	-1,143.2	2.44	-2.34	
6,774.0	10.10	129.30	6,640.1	-1,150.0	521.5	-1,150.0	11.40	-2.34	
6,822.0	10.20	107.50	6,687.4	-1,153.9	528.8	-1,153.9	7.96	0.21	
6,869.0	11.30	93.70	6,733.6	-1,155.5	537.4	-1,155.5	5.94	2.34	
6,917.0	13.50	84.50	6,780.4	-1,155.3	547.7	-1,155.3	6.15	4.58	
6,964.0	16.00	78.10	6,825.9	-1,153.4	559.5	-1,153.4	6.34	5.32	
7,011.0	19.30	68.70	6,870.7	-1,149.2	573.1	-1,149.2	9.26	7.02	
7,058.0	22.10	51.80	6,914.7	-1,140.9	587.3	-1,140.9	13.98	5.96	
7,106.0	25.50	39.60	6,958.6	-1,127.4	600.9	-1,127.4	12.43	7.08	
7,153.0	28.20	29.10	7,000.6	-1,109.9	612.8	-1,109.9	11.59	5.74	
7,200.0	30.60	18.40	7,041.5	-1,088.8	622.0	-1,088.8	12.27	5.11	
7,247.0	32.60	5.90	7,081.6	-1,064.8	627.1	-1,064.8	14.55	4.26	
7,295.0	34.10	357.40	7,121.7	-1,038.5	627.8	-1,038.5	10.22	3.12	
7,342.0	38.50	1.40	7,159.6	-1,010.7	627.6	-1,010.7	10.63	9.36	
7,389.0	41.40	2.40	7,195.6	-980.5	628.6	-980.5	6.32	6.17	
7,436.0	45.00	3.20	7,229.9	-948.4	630.1	-948.4	7.75	7.66	
7,484.0	47.80	2.30	7,263.0	-913.7	631.8	-913.7	5.99	5.83	
7,531.0	50.50	1.30	7,293.7	-878.2	632.9	-878.2	5.97	5.74	
7,579.0	53.60	1.90	7,323.2	-840.3	634.0	-840.3	6.53	6.46	
7,626.0	59.10	1.40	7,349.3	-801.2	635.1	-801.2	11.74	11.70	
7,673.0	65.40	0.40	7,371.2	-759.7	635.7	-759.7	13.54	13.40	
7,720.0	69.60	0.70	7,389.1	-716.3	636.2	-716.3	8.96	8.94	
7,768.0	73.20	359.40	7,404.4	-670.8	636.2	-670.8	7.93	7.50	
7,815.0	75.50	358.60	7,417.1	-625.5	635.4	-625.5	5.16	4.89	
7,862.0	78.10	358.20	7,427.9	-579.8	634.1	-579.8	5.59	5.53	
7,909.0	80.40	358.00	7,436.6	-533.7	632.6	-533.7	4.91	4.89	
7,957.0	83.10	357.60	7,443.5	-486.2	630.8	-486.2	5.69	5.62	
8,015.0	86.90	357.50	7,448.6	-428.5	628.3	-428.5	6.55	6.55	
8,078.0	88.40	357.80	7,451.1	-365.6	625.7	-365.6	2.43	2.38	
8,172.0	88.70	357.80	7,453.5	-271.7	622.1	-271.7	0.32	0.32	
8,267.0	88.70	359.30	7,455.7	-176.7	619.7	-176.7	1.58	0.00	
8,362.0	90.10	359.40	7,456.7	-81.7	618.6	-81.7	1.48	1.47	
8,456.0	89.80	359.60	7,456.8	12.2	617.8	12.2	0.38	-0.32	
8,551.0	89.90	359.90	7,457.0	107.2	617.4	107.2	0.33	0.11	
8,646.0	89.80	0.40	7,457.3	202.2	617.6	202.2	0.54	-0.11	
8,740.0	89.30	0.10	7,458.0	296.2	618.0	296.2	0.62	-0.53	
8,835.0	88.80	358.80	7,459.6	391.2	617.1	391.2	1.47	-0.53	
8,930.0	89.30	359.50	7,461.1	486.2	615.7	486.2	0.91	0.53	
9,024.0	89.10	359.50	7,462.5	580.2	614.9	580.2	0.21	-0.21	
9,119.0	88.80	358.90	7,464.2	675.2	613.6	675.2	0.71	-0.32	
9,213.0	89.80	359.50	7,465.3	769.1	612.3	769.1	1.24	1.06	
9,308.0	89.50	359.40	7,465.9	864.1	611.4	864.1	0.33	-0.32	
9,402.0	89.70	359.40	7,466.6	958.1	610.4	958.1	0.21	0.21	
9,497.0	89.50	359.60	7,467.2	1,053.1	609.5	1,053.1	0.30	-0.21	
9,591.0	89.20	0.00	7,468.3	1,147.1	609.2	1,147.1	0.53	-0.32	
9,686.0	90.20	359.20	7,468.8	1,242.1	608.6	1,242.1	1.35	1.05	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
9,780.0	89.90	358.70	7,468.7	1,336.1	606.8	1,336.1	0.62	-0.32	
9,875.0	89.80	359.40	7,469.0	1,431.1	605.3	1,431.1	0.74	-0.11	
9,969.0	89.30	359.00	7,469.7	1,525.1	603.9	1,525.1	0.68	-0.53	
10,064.0	88.80	359.40	7,471.3	1,620.0	602.6	1,620.0	0.67	-0.53	
10,158.0	89.90	359.90	7,472.4	1,714.0	602.0	1,714.0	1.29	1.17	
10,253.0	89.90	0.00	7,472.5	1,809.0	602.0	1,809.0	0.11	0.00	
10,347.0	89.90	359.50	7,472.7	1,903.0	601.5	1,903.0	0.53	0.00	
10,442.0	90.20	359.40	7,472.6	1,998.0	600.6	1,998.0	0.33	0.32	
10,536.0	90.50	358.70	7,472.0	2,092.0	599.1	2,092.0	0.81	0.32	
10,631.0	90.50	357.70	7,471.2	2,187.0	596.1	2,187.0	1.05	0.00	
10,725.0	89.80	359.10	7,470.9	2,280.9	593.5	2,280.9	1.67	-0.74	
10,819.0	87.80	355.40	7,472.9	2,374.8	589.0	2,374.8	4.47	-2.13	
10,914.0	88.80	357.20	7,475.7	2,469.5	582.8	2,469.5	2.17	1.05	
11,008.0	89.20	357.50	7,477.4	2,563.4	578.5	2,563.4	0.53	0.43	
11,103.0	88.20	358.30	7,479.5	2,658.3	575.0	2,658.3	1.35	-1.05	
11,197.0	89.50	359.50	7,481.4	2,752.3	573.2	2,752.3	1.88	1.38	
11,292.0	86.50	358.70	7,484.7	2,847.2	571.7	2,847.2	3.27	-3.16	
11,386.0	88.60	0.90	7,488.8	2,941.1	571.4	2,941.1	3.23	2.23	
11,481.0	90.10	1.70	7,489.8	3,036.1	573.5	3,036.1	1.79	1.58	
11,575.0	92.30	1.20	7,487.9	3,130.0	575.9	3,130.0	2.40	2.34	
11,670.0	93.50	3.00	7,483.1	3,224.8	579.4	3,224.8	2.28	1.26	
11,764.0	94.60	2.40	7,476.4	3,318.5	583.8	3,318.5	1.33	1.17	
11,859.0	89.10	0.10	7,473.4	3,413.4	585.9	3,413.4	6.27	-5.79	
11,953.0	87.70	358.70	7,476.0	3,507.3	584.9	3,507.3	2.11	-1.49	
11,992.0	87.60	358.70	7,477.6	3,546.3	584.0	3,546.3	0.26	-0.26	Last CES Survey @ 11,992' MD
12,042.0	87.60	358.70	7,479.7	3,596.2	582.9	3,596.2	0.00	0.00	PTB @ 12,042'

Targets

Target Name	- hit/miss target	- Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
PBHL 4G-36H P3			0.00	0.00	7,481.5	3,629.7	604.5	1,280,531.00	3,218,950.14	40.100790	-104.717320
- actual wellpath misses target center by 39.9ft at 12042.0ft MD (7479.7 TVD, 3596.2 N, 582.9 E)											
- Point											
PBHL 4G-36H			0.00	0.00	7,470.0	3,629.7	604.5	1,280,531.00	3,218,950.14	40.100790	-104.717320
- actual wellpath misses target center by 41.0ft at 12042.0ft MD (7479.7 TVD, 3596.2 N, 582.9 E)											
- Point											

Design Annotations

	Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
			+N/-S (ft)	+E/-W (ft)	
	11,992.0	7,477.6	3,546.3	584.0	Last CES Survey @ 11,992' MD
	12,042.0	7,479.7	3,596.2	582.9	PTB @ 12,042'

Checked By: _____ Approved By: _____ Date: _____

EnCana Oil & Gas (USA) Inc

DJ Wattenberg

S36 T2N-R66W (Marcus State, Mumby State)

Mumby State 4G-36H

HZ

Design: FINAL

Survey Report - Geographic

21 August, 2014

Cathedral Energy Services

Survey Report - Geographic

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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	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 4G-36H					
Well Position	+N/-S	0.0 ft	Northing:	1,276,896.13 ft	Latitude:	40.090826
	+E/-W	0.0 ft	Easting:	3,218,377.60 ft	Longitude:	-104.719481
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,018.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/16/2014	8.39	66.70	52,638

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

Survey Program	Date	8/21/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
141.0	12,042.0	Survey #1 (HZ)	Geolink MWD	Geolink MWD	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude	
0.0	0.00	0.00	0.0	0.0	0.0	1,276,896.13	3,218,377.60	40.090826	-104.719481	
141.0	0.18	25.81	141.0	0.2	0.1	1,276,896.33	3,218,377.69	40.090827	-104.719481	
233.0	0.44	354.79	233.0	0.7	0.1	1,276,896.81	3,218,377.72	40.090828	-104.719481	
325.0	1.32	147.28	325.0	0.1	0.7	1,276,896.28	3,218,378.27	40.090826	-104.719479	
417.0	2.20	145.43	416.9	-2.2	2.2	1,276,893.95	3,218,379.86	40.090820	-104.719473	
509.0	3.30	147.80	508.8	-5.9	4.7	1,276,890.27	3,218,382.31	40.090810	-104.719465	
601.0	3.78	155.80	600.7	-10.9	7.3	1,276,885.29	3,218,385.00	40.090796	-104.719455	
693.0	4.48	161.60	692.4	-17.1	9.7	1,276,879.14	3,218,387.44	40.090779	-104.719447	
785.0	4.83	162.22	784.1	-24.2	12.0	1,276,872.06	3,218,389.82	40.090760	-104.719438	
877.0	5.27	163.27	875.8	-31.9	14.4	1,276,864.35	3,218,392.28	40.090738	-104.719430	
969.0	6.28	159.32	967.3	-40.7	17.4	1,276,855.62	3,218,395.35	40.090714	-104.719419	
1,061.0	7.38	155.89	1,058.6	-50.8	21.6	1,276,845.55	3,218,399.63	40.090687	-104.719404	

Cathedral Energy Services

Survey Report - Geographic

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
1,090.0	7.34	151.58	1,087.4	-54.1	23.2	1,276,842.24	3,218,401.30	40.090678	-104.719398
1,204.0	6.80	150.00	1,200.5	-66.3	30.1	1,276,830.05	3,218,408.25	40.090644	-104.719374
1,296.0	9.70	163.20	1,291.6	-78.5	35.0	1,276,817.95	3,218,413.32	40.090611	-104.719356
1,388.0	9.40	161.30	1,382.3	-93.0	39.7	1,276,803.46	3,218,418.10	40.090571	-104.719339
1,480.0	10.40	156.40	1,472.9	-107.8	45.4	1,276,788.78	3,218,423.96	40.090530	-104.719319
1,572.0	10.60	154.70	1,563.4	-123.0	52.4	1,276,773.59	3,218,431.04	40.090488	-104.719294
1,663.0	10.80	154.60	1,652.8	-138.3	59.6	1,276,758.38	3,218,438.41	40.090446	-104.719268
1,755.0	13.20	152.30	1,742.8	-155.4	68.2	1,276,741.37	3,218,447.14	40.090400	-104.719238
1,847.0	13.50	154.50	1,832.3	-174.4	77.7	1,276,722.46	3,218,456.81	40.090347	-104.719204
1,939.0	13.30	151.80	1,921.8	-193.4	87.3	1,276,703.53	3,218,466.60	40.090295	-104.719169
2,031.0	13.20	151.50	2,011.4	-211.9	97.3	1,276,685.06	3,218,476.78	40.090244	-104.719133
2,123.0	13.00	149.30	2,101.0	-230.1	107.6	1,276,667.02	3,218,487.23	40.090194	-104.719097
2,215.0	13.60	151.10	2,190.5	-248.4	118.1	1,276,648.75	3,218,497.90	40.090144	-104.719059
2,307.0	14.50	153.70	2,279.7	-268.2	128.5	1,276,629.04	3,218,508.41	40.090090	-104.719022
2,399.0	13.60	154.90	2,369.0	-288.3	138.1	1,276,609.01	3,218,518.28	40.090034	-104.718988
2,491.0	13.20	155.10	2,458.5	-307.7	147.2	1,276,589.77	3,218,527.46	40.089981	-104.718955
2,583.0	12.70	154.40	2,548.2	-326.3	155.9	1,276,571.20	3,218,536.41	40.089930	-104.718924
2,675.0	12.20	156.90	2,638.0	-344.4	164.1	1,276,553.21	3,218,544.75	40.089881	-104.718895
2,767.0	11.80	155.60	2,728.0	-361.9	171.8	1,276,535.77	3,218,552.61	40.089833	-104.718867
2,859.0	11.30	155.10	2,818.1	-378.6	179.5	1,276,519.09	3,218,560.44	40.089787	-104.718840
2,951.0	11.30	163.20	2,908.3	-395.4	185.9	1,276,502.34	3,218,566.98	40.089741	-104.718817
3,043.0	10.60	161.70	2,998.7	-412.1	191.2	1,276,485.73	3,218,572.39	40.089695	-104.718798
3,135.0	12.40	165.70	3,088.8	-429.7	196.3	1,276,468.17	3,218,577.65	40.089646	-104.718780
3,226.0	14.00	165.80	3,177.4	-449.8	201.4	1,276,448.07	3,218,582.94	40.089591	-104.718761
3,321.0	13.50	166.10	3,269.7	-471.8	206.9	1,276,426.22	3,218,588.61	40.089531	-104.718742
3,415.0	14.80	159.00	3,360.8	-493.6	213.8	1,276,404.42	3,218,595.74	40.089471	-104.718717
3,510.0	14.20	158.50	3,452.8	-515.8	222.4	1,276,382.32	3,218,604.56	40.089410	-104.718686
3,605.0	13.50	156.50	3,545.0	-536.8	231.1	1,276,361.39	3,218,613.43	40.089352	-104.718655
3,699.0	12.70	157.20	3,636.6	-556.4	239.5	1,276,341.88	3,218,621.98	40.089299	-104.718625
3,794.0	11.60	157.00	3,729.5	-574.8	247.3	1,276,323.53	3,218,629.93	40.089248	-104.718597
3,888.0	12.70	153.10	3,821.4	-592.7	255.6	1,276,305.69	3,218,638.45	40.089199	-104.718568
3,983.0	11.90	155.10	3,914.2	-610.9	264.5	1,276,287.57	3,218,647.46	40.089149	-104.718536
4,078.0	11.00	154.00	4,007.3	-627.9	272.6	1,276,270.61	3,218,655.71	40.089102	-104.718507
4,172.0	10.20	154.80	4,099.7	-643.5	280.1	1,276,255.08	3,218,663.32	40.089059	-104.718480
4,267.0	11.60	156.20	4,193.0	-659.9	287.5	1,276,238.80	3,218,670.90	40.089015	-104.718454
4,362.0	13.60	151.70	4,285.7	-678.5	296.7	1,276,220.31	3,218,680.21	40.088964	-104.718421
4,456.0	13.80	151.60	4,377.0	-698.1	307.2	1,276,200.81	3,218,690.96	40.088910	-104.718383
4,551.0	13.00	152.80	4,469.4	-717.5	317.5	1,276,181.43	3,218,701.40	40.088856	-104.718346
4,646.0	11.80	152.90	4,562.2	-735.7	326.8	1,276,163.36	3,218,710.87	40.088807	-104.718313
4,740.0	13.10	152.50	4,654.0	-753.7	336.1	1,276,145.44	3,218,720.32	40.088757	-104.718280
4,835.0	12.30	151.10	4,746.7	-772.1	346.0	1,276,127.11	3,218,730.35	40.088707	-104.718245
4,930.0	12.40	156.30	4,839.5	-790.3	355.0	1,276,108.99	3,218,739.50	40.088657	-104.718213
5,024.0	11.80	154.10	4,931.4	-808.2	363.2	1,276,091.18	3,218,747.91	40.088607	-104.718183
5,119.0	13.60	156.90	5,024.1	-827.2	371.8	1,276,072.24	3,218,756.70	40.088555	-104.718152
5,213.0	12.80	156.70	5,115.6	-846.9	380.3	1,276,052.59	3,218,765.33	40.088501	-104.718122
5,308.0	11.70	156.50	5,208.4	-865.4	388.3	1,276,034.16	3,218,773.50	40.088450	-104.718093
5,402.0	12.10	158.00	5,300.4	-883.3	395.8	1,276,016.35	3,218,781.15	40.088401	-104.718067
5,497.0	13.70	152.10	5,393.0	-902.5	404.8	1,275,997.26	3,218,790.31	40.088349	-104.718035
5,591.0	13.20	152.30	5,484.4	-921.8	415.0	1,275,978.01	3,218,800.68	40.088296	-104.717998
5,686.0	12.10	153.70	5,577.1	-940.3	424.4	1,275,959.56	3,218,810.29	40.088245	-104.717964
5,781.0	11.30	154.00	5,670.1	-957.6	432.9	1,275,942.34	3,218,818.94	40.088197	-104.717934
5,876.0	11.30	153.60	5,763.3	-974.3	441.1	1,275,925.71	3,218,827.30	40.088151	-104.717905
5,970.0	12.50	157.60	5,855.3	-992.0	449.1	1,275,908.13	3,218,835.43	40.088103	-104.717876
6,065.0	11.90	151.90	5,948.1	-1,010.1	457.6	1,275,890.06	3,218,844.12	40.088053	-104.717846
6,160.0	12.50	154.00	6,041.0	-1,028.0	466.8	1,275,872.26	3,218,853.40	40.088004	-104.717813

Cathedral Energy Services

Survey Report - Geographic

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
6,254.0	13.80	155.70	6,132.5	-1,047.4	475.8	1,275,852.98	3,218,862.64	40.087951	-104.717781
6,349.0	12.10	154.90	6,225.1	-1,066.7	484.7	1,275,833.71	3,218,871.70	40.087898	-104.717749
6,444.0	13.00	154.80	6,317.8	-1,085.4	493.5	1,275,815.11	3,218,880.64	40.087846	-104.717717
6,538.0	12.60	158.30	6,409.5	-1,104.5	501.8	1,275,796.09	3,218,889.10	40.087794	-104.717688
6,633.0	13.40	159.40	6,502.1	-1,124.4	509.5	1,275,776.22	3,218,896.98	40.087739	-104.717660
6,680.0	12.30	159.60	6,547.9	-1,134.2	513.2	1,275,766.47	3,218,900.72	40.087712	-104.717647
6,727.0	11.20	158.00	6,593.9	-1,143.2	516.6	1,275,757.57	3,218,904.26	40.087688	-104.717635
6,774.0	10.10	129.30	6,640.1	-1,150.0	521.5	1,275,750.77	3,218,909.22	40.087669	-104.717617
6,822.0	10.20	107.50	6,687.4	-1,153.9	528.8	1,275,746.89	3,218,916.57	40.087658	-104.717591
6,869.0	11.30	93.70	6,733.6	-1,155.5	537.4	1,275,745.41	3,218,925.15	40.087654	-104.717561
6,917.0	13.50	84.50	6,780.4	-1,155.3	547.7	1,275,745.74	3,218,935.42	40.087655	-104.717524
6,964.0	16.00	78.10	6,825.9	-1,153.4	559.5	1,275,747.70	3,218,947.20	40.087660	-104.717482
7,011.0	19.30	68.70	6,870.7	-1,149.2	573.1	1,275,751.98	3,218,960.74	40.087671	-104.717433
7,058.0	22.10	51.80	6,914.7	-1,140.9	587.3	1,275,760.40	3,218,974.87	40.087694	-104.717382
7,106.0	25.50	39.60	6,958.6	-1,127.4	600.9	1,275,774.08	3,218,988.44	40.087731	-104.717333
7,153.0	28.20	29.10	7,000.6	-1,109.9	612.8	1,275,791.70	3,219,000.15	40.087779	-104.717291
7,200.0	30.60	18.40	7,041.5	-1,088.8	622.0	1,275,812.85	3,219,009.15	40.087837	-104.717258
7,247.0	32.60	5.90	7,081.6	-1,064.8	627.1	1,275,836.87	3,219,014.02	40.087903	-104.717240
7,295.0	34.10	357.40	7,121.7	-1,038.5	627.8	1,275,863.19	3,219,014.51	40.087975	-104.717237
7,342.0	38.50	1.40	7,159.6	-1,010.7	627.6	1,275,890.99	3,219,014.02	40.088052	-104.717238
7,389.0	41.40	2.40	7,195.6	-980.5	628.6	1,275,921.16	3,219,014.77	40.088134	-104.717235
7,436.0	45.00	3.20	7,229.9	-948.4	630.1	1,275,953.30	3,219,016.06	40.088222	-104.717229
7,484.0	47.80	2.30	7,263.0	-913.7	631.8	1,275,988.03	3,219,017.42	40.088318	-104.717223
7,531.0	50.50	1.30	7,293.7	-878.2	632.9	1,276,023.57	3,219,018.21	40.088415	-104.717219
7,579.0	53.60	1.90	7,323.2	-840.3	634.0	1,276,061.41	3,219,018.94	40.088519	-104.717215
7,626.0	59.10	1.40	7,349.3	-801.2	635.1	1,276,100.51	3,219,019.72	40.088626	-104.717211
7,673.0	65.40	0.40	7,371.2	-759.7	635.7	1,276,142.08	3,219,020.00	40.088741	-104.717209
7,720.0	69.60	0.70	7,389.1	-716.3	636.2	1,276,185.49	3,219,020.03	40.088860	-104.717208
7,768.0	73.20	359.40	7,404.4	-670.8	636.2	1,276,230.98	3,219,019.67	40.088985	-104.717207
7,815.0	75.50	358.60	7,417.1	-625.5	635.4	1,276,276.21	3,219,018.48	40.089109	-104.717210
7,862.0	78.10	358.20	7,427.9	-579.8	634.1	1,276,321.94	3,219,016.79	40.089234	-104.717215
7,909.0	80.40	358.00	7,436.6	-533.7	632.6	1,276,368.07	3,219,014.86	40.089361	-104.717220
7,957.0	83.10	357.60	7,443.5	-486.2	630.8	1,276,415.51	3,219,012.62	40.089491	-104.717227
8,015.0	86.90	357.50	7,448.6	-428.5	628.3	1,276,473.21	3,219,009.64	40.089650	-104.717236
8,078.0	88.40	357.80	7,451.1	-365.6	625.7	1,276,536.07	3,219,006.50	40.089822	-104.717245
8,172.0	88.70	357.80	7,453.5	-271.7	622.1	1,276,629.94	3,219,002.07	40.090080	-104.717258
8,267.0	88.70	359.30	7,455.7	-176.7	619.7	1,276,724.86	3,218,998.83	40.090341	-104.717266
8,362.0	90.10	359.40	7,456.7	-81.7	618.6	1,276,819.83	3,218,996.92	40.090602	-104.717270
8,456.0	89.80	359.60	7,456.8	12.2	617.8	1,276,913.81	3,218,995.27	40.090860	-104.717273
8,551.0	89.90	359.90	7,457.0	107.2	617.4	1,277,008.81	3,218,994.02	40.091120	-104.717275
8,646.0	89.80	0.40	7,457.3	202.2	617.6	1,277,103.80	3,218,993.43	40.091381	-104.717274
8,740.0	89.30	0.10	7,458.0	296.2	618.0	1,277,197.80	3,218,993.01	40.091639	-104.717272
8,835.0	88.80	358.80	7,459.6	391.2	617.1	1,277,292.77	3,218,991.27	40.091900	-104.717275
8,930.0	89.30	359.50	7,461.1	486.2	615.7	1,277,387.73	3,218,989.02	40.092161	-104.717280
9,024.0	89.10	359.50	7,462.5	580.2	614.9	1,277,481.70	3,218,987.37	40.092419	-104.717283
9,119.0	88.80	358.90	7,464.2	675.2	613.6	1,277,576.66	3,218,985.21	40.092679	-104.717288
9,213.0	89.80	359.50	7,465.3	769.1	612.3	1,277,670.63	3,218,983.07	40.092937	-104.717293
9,308.0	89.50	359.40	7,465.9	864.1	611.4	1,277,765.61	3,218,981.33	40.093198	-104.717296
9,402.0	89.70	359.40	7,466.6	958.1	610.4	1,277,859.59	3,218,979.51	40.093456	-104.717300
9,497.0	89.50	359.60	7,467.2	1,053.1	609.5	1,277,954.57	3,218,977.85	40.093717	-104.717303
9,591.0	89.20	0.00	7,468.3	1,147.1	609.2	1,278,048.56	3,218,976.69	40.093975	-104.717304
9,686.0	90.20	359.20	7,468.8	1,242.1	608.6	1,278,143.55	3,218,975.19	40.094236	-104.717306
9,780.0	89.90	358.70	7,468.7	1,336.1	606.8	1,278,237.51	3,218,972.64	40.094494	-104.717312
9,875.0	89.80	359.40	7,469.0	1,431.1	605.3	1,278,332.48	3,218,970.23	40.094755	-104.717318
9,969.0	89.30	359.00	7,469.7	1,525.1	603.9	1,278,426.45	3,218,968.09	40.095013	-104.717323

Cathedral Energy Services

Survey Report - Geographic

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Mumby State 4G-36H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5048.0ft (H&P 522)
Site:	S36 T2N-R66W (Marcus State, Mumby State)	MD Reference:	WELL @ 5048.0ft (H&P 522)
Well:	Mumby State 4G-36H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
10,064.0	88.80	359.40	7,471.3	1,620.0	602.6	1,278,521.41	3,218,965.93	40.095273	-104.717327
10,158.0	89.90	359.90	7,472.4	1,714.0	602.0	1,278,615.40	3,218,964.53	40.095531	-104.717329
10,253.0	89.90	0.00	7,472.5	1,809.0	602.0	1,278,710.39	3,218,963.61	40.095792	-104.717330
10,347.0	89.90	359.50	7,472.7	1,903.0	601.5	1,278,804.38	3,218,962.37	40.096050	-104.717331
10,442.0	90.20	359.40	7,472.6	1,998.0	600.6	1,278,899.37	3,218,960.63	40.096311	-104.717334
10,536.0	90.50	358.70	7,472.0	2,092.0	599.1	1,278,993.33	3,218,958.24	40.096569	-104.717340
10,631.0	90.50	357.70	7,471.2	2,187.0	596.1	1,279,088.25	3,218,954.42	40.096830	-104.717351
10,725.0	89.80	359.10	7,470.9	2,280.9	593.5	1,279,182.19	3,218,950.97	40.097088	-104.717360
10,819.0	87.80	355.40	7,472.9	2,374.8	589.0	1,279,275.99	3,218,945.64	40.097345	-104.717376
10,914.0	88.80	357.20	7,475.7	2,469.5	582.8	1,279,370.69	3,218,938.67	40.097605	-104.717398
11,008.0	89.20	357.50	7,477.4	2,563.4	578.5	1,279,464.53	3,218,933.50	40.097863	-104.717413
11,103.0	88.20	358.30	7,479.5	2,658.3	575.0	1,279,559.41	3,218,929.19	40.098124	-104.717426
11,197.0	89.50	359.50	7,481.4	2,752.3	573.2	1,279,653.35	3,218,926.56	40.098381	-104.717432
11,292.0	86.50	358.70	7,484.7	2,847.2	571.7	1,279,748.25	3,218,924.23	40.098642	-104.717438
11,386.0	88.60	0.90	7,488.8	2,941.1	571.4	1,279,842.15	3,218,923.08	40.098900	-104.717439
11,481.0	90.10	1.70	7,489.8	3,036.1	573.5	1,279,937.13	3,218,924.40	40.099161	-104.717431
11,575.0	92.30	1.20	7,487.9	3,130.0	575.9	1,280,031.09	3,218,925.95	40.099418	-104.717423
11,670.0	93.50	3.00	7,483.1	3,224.8	579.4	1,280,125.92	3,218,928.59	40.099679	-104.717410
11,764.0	94.60	2.40	7,476.4	3,318.5	583.8	1,280,219.62	3,218,932.18	40.099936	-104.717394
11,859.0	89.10	0.10	7,473.4	3,413.4	585.9	1,280,314.52	3,218,933.41	40.100196	-104.717387
11,953.0	87.70	358.70	7,476.0	3,507.3	584.9	1,280,408.46	3,218,931.60	40.100454	-104.717390
11,992.0	87.60	358.70	7,477.6	3,546.3	584.0	1,280,447.41	3,218,930.38	40.100561	-104.717394
Last CES Survey @ 11,992' MD									
12,042.0	87.60	358.70	7,479.7	3,596.2	582.9	1,280,497.34	3,218,928.80	40.100698	-104.717398
PTB @ 12,042'									

Design 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 4G-36H P3	0.00	0.00	7,481.5	3,629.7	604.5	1,280,531.00	3,218,950.15	40.100790	-104.717320
- actual wellpath misses target center by 39.9ft at 12042.0ft MD (7479.7 TVD, 3596.2 N, 582.9 E)									
- Point									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
11,992.0	7,477.6	3,546.3	584.0	Last CES Survey @ 11,992' MD	
12,042.0	7,479.7	3,596.2	582.9	PTB @ 12,042'	

Checked By: _____ Approved By: _____ Date: _____