



Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 2D-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Well:	lone 2D-2H	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		S2-T2N-R66W (lone.)			
Site Position:		Northing:	1,306,798.50 ft	Latitude:	40.173110
From:	Lat/Long	Easting:	3,209,901.52 ft	Longitude:	-104.748870
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.49 °

Well	lone 2D-2H					
Well Position	+N/-S	0.0 ft	Northing:	1,306,798.72 ft	Latitude:	40.173110
	+E/-W	0.0 ft	Easting:	3,209,932.26 ft	Longitude:	-104.748760
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,046.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/1/2013	8.62	66.81	52,840

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	180.00	

Survey Program	Date	3/22/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
139.0	11,853.0	Survey #1 (HZ)	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	
139.0	0.60	130.10	139.0	-0.5	0.6	0.5	0.43	0.43	
203.0	0.30	124.20	203.0	-0.8	1.0	0.8	0.47	-0.47	
265.0	0.30	11.00	265.0	-0.7	1.1	0.7	0.81	0.00	
327.0	0.70	358.40	327.0	-0.2	1.1	0.2	0.67	0.65	
389.0	1.10	358.60	389.0	0.8	1.1	-0.8	0.65	0.65	
451.0	1.80	7.00	451.0	2.4	1.2	-2.4	1.18	1.13	
513.0	2.10	355.30	512.9	4.5	1.2	-4.5	0.80	0.48	
575.0	2.80	358.50	574.9	7.1	1.1	-7.1	1.15	1.13	
637.0	3.20	2.00	636.8	10.4	1.1	-10.4	0.71	0.65	
730.0	4.20	4.30	729.6	16.3	1.5	-16.3	1.09	1.08	
823.0	5.40	5.70	822.3	24.1	2.2	-24.1	1.30	1.29	
916.0	6.20	11.20	914.8	33.4	3.6	-33.4	1.05	0.86	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 2D-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Well:	lone 2D-2H	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
1,000.0	7.10	11.80	998.2	42.9	5.5	-42.9	1.07	1.07	
1,112.0	7.30	8.10	1,109.3	56.7	7.9	-56.7	0.45	0.18	
1,205.0	8.90	15.70	1,201.4	69.5	10.7	-69.5	2.07	1.72	
1,293.0	8.50	13.80	1,288.4	82.4	14.1	-82.4	0.56	-0.45	
1,391.0	9.10	12.60	1,385.2	97.0	17.5	-97.0	0.64	0.61	
1,484.0	10.70	17.10	1,476.9	112.4	21.7	-112.4	1.91	1.72	
1,577.0	11.30	12.30	1,568.2	129.6	26.2	-129.6	1.18	0.65	
1,670.0	11.40	10.00	1,659.3	147.5	29.7	-147.5	0.50	0.11	
1,763.0	11.00	9.70	1,750.6	165.3	32.8	-165.3	0.43	-0.43	
1,856.0	11.30	11.50	1,841.8	183.0	36.1	-183.0	0.49	0.32	
1,949.0	11.30	6.00	1,933.0	201.0	38.9	-201.0	1.16	0.00	
2,044.0	11.70	8.40	2,026.1	219.8	41.2	-219.8	0.66	0.42	
2,139.0	10.90	7.70	2,119.3	238.2	43.8	-238.2	0.85	-0.84	
2,234.0	10.10	2.30	2,212.7	255.4	45.4	-255.4	1.33	-0.84	
2,329.0	10.00	1.20	2,306.2	272.0	45.9	-272.0	0.23	-0.11	
2,424.0	7.70	1.40	2,400.1	286.6	46.2	-286.6	2.42	-2.42	
2,519.0	7.60	7.70	2,494.2	299.2	47.2	-299.2	0.89	-0.11	
2,614.0	5.80	10.30	2,588.6	310.1	48.9	-310.1	1.92	-1.89	
2,709.0	4.60	7.00	2,683.2	318.6	50.2	-318.6	1.30	-1.26	
2,804.0	3.30	22.50	2,778.0	324.9	51.8	-324.9	1.76	-1.37	
2,899.0	3.10	25.10	2,872.8	329.8	53.9	-329.8	0.26	-0.21	
2,994.0	2.80	16.40	2,967.7	334.3	55.6	-334.3	0.57	-0.32	
3,089.0	2.80	14.50	3,062.6	338.8	56.9	-338.8	0.10	0.00	
3,184.0	3.50	26.80	3,157.4	343.7	58.8	-343.7	1.02	0.74	
3,279.0	3.80	18.90	3,252.2	349.2	61.1	-349.2	0.62	0.32	
3,374.0	3.10	352.20	3,347.1	354.7	61.8	-354.7	1.82	-0.74	
3,469.0	3.40	346.20	3,441.9	360.0	60.7	-360.0	0.48	0.32	
3,532.0	3.10	359.80	3,504.8	363.5	60.3	-363.5	1.31	-0.48	
3,596.0	2.10	8.50	3,568.8	366.4	60.5	-366.4	1.68	-1.56	
3,659.0	2.60	40.00	3,631.7	368.7	61.5	-368.7	2.16	0.79	
3,754.0	1.60	82.10	3,726.6	370.5	64.2	-370.5	1.87	-1.05	
3,849.0	1.30	247.20	3,821.6	370.3	64.6	-370.3	3.03	-0.32	
3,944.0	0.90	125.50	3,916.6	369.4	64.2	-369.4	2.03	-0.42	
4,039.0	0.40	148.40	4,011.6	368.7	65.0	-368.7	0.58	-0.53	
4,134.0	0.30	233.40	4,106.6	368.3	64.9	-368.3	0.50	-0.11	
4,229.0	0.40	237.30	4,201.6	367.9	64.5	-367.9	0.11	0.11	
4,324.0	0.60	250.10	4,296.6	367.6	63.7	-367.6	0.24	0.21	
4,419.0	1.20	243.90	4,391.6	367.0	62.3	-367.0	0.64	0.63	
4,514.0	1.20	265.90	4,486.6	366.5	60.5	-366.5	0.48	0.00	
4,609.0	0.90	342.00	4,581.6	367.1	59.2	-367.1	1.38	-0.32	
4,704.0	1.20	33.90	4,676.5	368.6	59.6	-368.6	1.01	0.32	
4,799.0	0.70	356.70	4,771.5	370.1	60.1	-370.1	0.81	-0.53	
4,894.0	1.60	55.00	4,866.5	371.4	61.1	-371.4	1.44	0.95	
4,989.0	2.40	116.10	4,961.5	371.3	64.0	-371.3	2.26	0.84	
5,084.0	1.50	155.30	5,056.4	369.3	66.3	-369.3	1.64	-0.95	
5,180.0	2.60	237.50	5,152.4	367.0	65.0	-367.0	2.94	1.15	
5,275.0	1.90	218.20	5,247.3	364.6	62.2	-364.6	1.08	-0.74	
5,370.0	0.60	166.20	5,342.3	362.8	61.4	-362.8	1.69	-1.37	
5,465.0	1.40	31.20	5,437.3	363.4	62.1	-363.4	1.97	0.84	
5,560.0	1.10	22.40	5,532.2	365.2	63.0	-365.2	0.37	-0.32	
5,655.0	0.90	8.00	5,627.2	366.8	63.5	-366.8	0.34	-0.21	
5,750.0	0.60	359.60	5,722.2	368.0	63.6	-368.0	0.34	-0.32	
5,845.0	0.70	313.70	5,817.2	368.9	63.2	-368.9	0.54	0.11	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 2D-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Well:	lone 2D-2H	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
5,940.0	1.20	63.60	5,912.2	369.8	63.6	-369.8	1.66	0.53	
6,035.0	0.50	53.90	6,007.2	370.4	64.8	-370.4	0.75	-0.74	
6,130.0	0.60	322.40	6,102.2	371.1	64.9	-371.1	0.83	0.11	
6,224.0	0.60	239.10	6,196.2	371.2	64.2	-371.2	0.85	0.00	
6,319.0	0.90	211.90	6,291.2	370.3	63.3	-370.3	0.48	0.32	
6,414.0	0.70	218.50	6,386.2	369.2	62.6	-369.2	0.23	-0.21	
6,509.0	0.70	215.20	6,481.2	368.3	61.9	-368.3	0.04	0.00	
6,604.0	0.90	188.40	6,576.2	367.1	61.4	-367.1	0.44	0.21	
6,700.0	0.90	171.60	6,672.1	365.6	61.4	-365.6	0.27	0.00	
6,794.0	1.10	182.40	6,766.1	364.0	61.5	-364.0	0.29	0.21	
6,826.0	2.30	174.80	6,798.1	363.0	61.6	-363.0	3.81	3.75	
6,858.0	4.10	179.60	6,830.1	361.2	61.6	-361.2	5.68	5.62	
6,889.0	6.50	184.00	6,860.9	358.4	61.5	-358.4	7.85	7.74	
6,921.0	9.70	184.40	6,892.6	353.9	61.2	-353.9	10.00	10.00	
6,953.0	13.00	182.70	6,924.0	347.6	60.8	-347.6	10.36	10.31	
6,984.0	16.60	180.90	6,953.9	339.7	60.6	-339.7	11.71	11.61	
7,016.0	19.10	181.30	6,984.4	329.9	60.4	-329.9	7.82	7.81	
7,048.0	20.50	180.90	7,014.5	319.0	60.2	-319.0	4.40	4.37	
7,079.0	22.90	178.20	7,043.3	307.6	60.3	-307.6	8.38	7.74	
7,111.0	26.50	176.10	7,072.4	294.2	61.0	-294.2	11.58	11.25	
7,143.0	30.20	174.10	7,100.5	279.1	62.3	-279.1	11.94	11.56	
7,175.0	31.50	174.10	7,128.0	262.8	64.0	-262.8	4.06	4.06	
7,206.0	34.40	174.80	7,154.0	246.0	65.6	-246.0	9.43	9.35	
7,238.0	36.60	174.40	7,180.1	227.5	67.3	-227.5	6.91	6.87	
7,270.0	37.90	172.70	7,205.5	208.3	69.5	-208.3	5.18	4.06	
7,301.0	38.20	173.20	7,230.0	189.3	71.9	-189.3	1.39	0.97	
7,333.0	39.00	174.60	7,255.0	169.4	74.0	-169.4	3.70	2.50	
7,365.0	41.00	175.80	7,279.5	149.0	75.7	-149.0	6.70	6.25	
7,396.0	43.60	176.10	7,302.4	128.1	77.2	-128.1	8.41	8.39	
7,428.0	47.30	175.30	7,324.8	105.4	78.9	-105.4	11.70	11.56	
7,460.0	51.10	175.40	7,345.8	81.3	80.8	-81.3	11.88	11.87	
7,492.0	54.00	175.30	7,365.2	55.9	82.9	-55.9	9.07	9.06	
7,523.0	55.60	175.40	7,383.1	30.7	85.0	-30.7	5.17	5.16	
7,555.0	58.90	175.20	7,400.4	3.9	87.2	-3.9	10.33	10.31	
7,587.0	63.30	175.80	7,415.8	-24.0	89.4	24.0	13.85	13.75	
7,618.0	66.50	177.80	7,429.0	-52.1	90.9	52.1	11.86	10.32	
7,650.0	68.40	179.10	7,441.3	-81.6	91.7	81.6	7.02	5.94	
7,682.0	69.90	179.70	7,452.7	-111.5	92.0	111.5	5.00	4.69	
7,713.0	71.90	180.30	7,462.8	-140.8	92.0	140.8	6.71	6.45	
7,745.0	74.60	180.00	7,472.0	-171.4	91.9	171.4	8.49	8.44	
7,777.0	77.50	178.90	7,479.7	-202.5	92.2	202.5	9.66	9.06	
7,808.0	80.70	179.40	7,485.6	-232.9	92.7	232.9	10.44	10.32	
7,818.0	82.30	179.20	7,487.1	-242.8	92.8	242.8	16.12	16.00	
7,890.0	89.90	179.00	7,492.0	-314.6	93.9	314.6	10.56	10.56	
7,953.0	91.70	179.00	7,491.1	-377.6	95.0	377.6	2.86	2.86	
8,017.0	92.60	177.50	7,488.7	-441.5	97.0	441.5	2.73	1.41	
8,048.0	93.10	177.00	7,487.1	-472.4	98.5	472.4	2.28	1.61	
8,080.0	93.10	176.40	7,485.4	-504.3	100.3	504.3	1.87	0.00	
8,112.0	91.80	175.10	7,484.0	-536.2	102.7	536.2	5.74	-4.06	
8,143.0	90.00	173.70	7,483.6	-567.0	105.7	567.0	7.36	-5.81	
8,175.0	89.70	173.30	7,483.6	-598.8	109.3	598.8	1.56	-0.94	
8,238.0	88.90	173.30	7,484.4	-661.4	116.7	661.4	1.27	-1.27	
8,302.0	88.90	173.20	7,485.6	-724.9	124.2	724.9	0.16	0.00	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 2D-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Well:	lone 2D-2H	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
8,365.0	89.10	173.20	7,486.7	-787.5	131.7	787.5	0.32	0.32	
8,428.0	89.00	174.80	7,487.8	-850.1	138.2	850.1	2.54	-0.16	
8,523.0	89.50	178.20	7,489.0	-944.9	144.0	944.9	3.62	0.53	
8,618.0	91.30	180.00	7,488.4	-1,039.9	145.5	1,039.9	2.68	1.89	
8,714.0	91.50	180.30	7,486.0	-1,135.9	145.3	1,135.9	0.38	0.21	
8,809.0	90.60	179.80	7,484.3	-1,230.9	145.2	1,230.9	1.08	-0.95	
8,904.0	90.10	177.30	7,483.7	-1,325.8	147.6	1,325.8	2.68	-0.53	
8,999.0	89.40	175.00	7,484.1	-1,420.6	154.0	1,420.6	2.53	-0.74	
9,094.0	90.50	177.30	7,484.2	-1,515.4	160.4	1,515.4	2.68	1.16	
9,189.0	89.70	179.10	7,484.0	-1,610.3	163.3	1,610.3	2.07	-0.84	
9,284.0	90.50	180.70	7,483.9	-1,705.3	163.5	1,705.3	1.88	0.84	
9,379.0	89.80	179.10	7,483.6	-1,800.3	163.7	1,800.3	1.84	-0.74	
9,474.0	88.70	179.10	7,484.9	-1,895.3	165.2	1,895.3	1.16	-1.16	
9,570.0	88.50	179.00	7,487.2	-1,991.3	166.8	1,991.3	0.23	-0.21	
9,665.0	89.10	180.10	7,489.2	-2,086.2	167.5	2,086.2	1.32	0.63	
9,759.0	89.20	180.80	7,490.6	-2,180.2	166.8	2,180.2	0.75	0.11	
9,854.0	89.60	181.10	7,491.6	-2,275.2	165.2	2,275.2	0.53	0.42	
9,949.0	90.00	182.20	7,491.9	-2,370.2	162.5	2,370.2	1.23	0.42	
10,044.0	90.60	183.70	7,491.4	-2,465.0	157.6	2,465.0	1.70	0.63	
10,139.0	89.80	184.60	7,491.1	-2,559.8	150.7	2,559.8	1.27	-0.84	
10,234.0	89.80	184.40	7,491.4	-2,654.5	143.2	2,654.5	0.21	0.00	
10,329.0	90.00	184.60	7,491.6	-2,749.2	135.8	2,749.2	0.30	0.21	
10,424.0	90.30	184.90	7,491.3	-2,843.9	127.9	2,843.9	0.45	0.32	
10,519.0	89.50	182.50	7,491.5	-2,938.7	121.8	2,938.7	2.66	-0.84	
10,582.0	90.60	183.00	7,491.4	-3,001.6	118.8	3,001.6	1.92	1.75	
10,646.0	91.60	183.40	7,490.2	-3,065.5	115.2	3,065.5	1.68	1.56	
10,709.0	90.30	180.40	7,489.2	-3,128.4	113.1	3,128.4	5.19	-2.06	
10,772.0	89.50	179.10	7,489.3	-3,191.4	113.4	3,191.4	2.42	-1.27	
10,836.0	88.00	180.20	7,490.7	-3,255.4	113.8	3,255.4	2.91	-2.34	
10,899.0	88.90	181.10	7,492.4	-3,318.4	113.1	3,318.4	2.02	1.43	
10,963.0	89.20	181.30	7,493.4	-3,382.3	111.7	3,382.3	0.56	0.47	
11,026.0	89.40	181.50	7,494.2	-3,445.3	110.2	3,445.3	0.45	0.32	
11,089.0	89.50	181.50	7,494.8	-3,508.3	108.5	3,508.3	0.16	0.16	
11,152.0	90.80	181.90	7,494.7	-3,571.3	106.7	3,571.3	2.16	2.06	
11,216.0	91.60	181.30	7,493.3	-3,635.2	104.9	3,635.2	1.56	1.25	
11,279.0	89.80	180.60	7,492.5	-3,698.2	103.8	3,698.2	3.07	-2.86	
11,342.0	89.70	179.90	7,492.8	-3,761.2	103.6	3,761.2	1.12	-0.16	
11,406.0	90.10	179.80	7,492.9	-3,825.2	103.7	3,825.2	0.64	0.62	
11,469.0	90.60	179.70	7,492.5	-3,888.2	104.0	3,888.2	0.81	0.79	
11,564.0	91.10	179.70	7,491.1	-3,983.2	104.5	3,983.2	0.53	0.53	
11,660.0	91.30	179.70	7,489.1	-4,079.2	105.0	4,079.2	0.21	0.21	
11,755.0	91.80	180.00	7,486.6	-4,174.1	105.3	4,174.1	0.61	0.53	
11,803.0	91.70	179.70	7,485.1	-4,222.1	105.4	4,222.1	0.66	-0.21	Last Cathedral Survey @ 11,803' MD
11,853.0	91.70	179.70	7,483.6	-4,272.1	105.6	4,272.1	0.00	0.00	Projection to Bit @ 11,853' MD

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 2D-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5059.0ft (Ensign 124)
Well:	lone 2D-2H	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
lone 2D-2H PBHL (460'	0.00	0.00	7,517.0	-4,309.4	44.7	1,302,489.83	3,210,013.48	40.161280	-104.748600
- actual wellpath misses target center by 78.9ft at 11853.0ft MD (7483.6 TVD, -4272.1 N, 105.6 E)									
- Point									
lone 2D-2H PBHL P3 (460'	0.00	0.00	7,517.0	-4,308.9	81.2	1,302,490.66	3,210,049.99	40.161281	-104.748469
- actual wellpath misses target center by 55.4ft at 11853.0ft MD (7483.6 TVD, -4272.1 N, 105.6 E)									
- Point									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
11,803.0	7,485.1	-4,222.1	105.4	Last Cathedral Survey @ 11,803' MD	
11,853.0	7,483.6	-4,272.1	105.6	Projection to Bit @ 11,853' MD	

Checked By: _____ Approved By: _____ Date: _____