



Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1D-8H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 4917.0ft (Ensign 135)
Site:	S8-T2N-R66W (lone)	MD Reference:	WELL @ 4917.0ft (Ensign 135)
Well:	lone 1D-8H	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		S8-T2N-R66W (lone)			
Site Position:		Northing:	1,297,444.41 ft	Latitude:	40.147740
From:	Lat/Long	Easting:	3,196,240.52 ft	Longitude:	-104.798020
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.45 °

Well	lone 1D-8H					
Well Position	+N/-S	0.0 ft	Northing:	1,301,630.33 ft	Latitude:	40.159220
	+E/-W	0.0 ft	Easting:	3,196,727.27 ft	Longitude:	-104.796160
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,904.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/30/2012	8.69	66.81	52,864

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	10/9/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
139.0	11,633.0	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	0.70	143.10	139.0	-0.7	0.5	0.7	0.50	0.50		
231.0	0.40	134.50	231.0	-1.4	1.1	1.4	0.34	-0.33		
323.0	0.70	317.30	323.0	-1.2	0.9	1.2	1.20	0.33		
415.0	1.70	307.00	415.0	0.1	-0.5	-0.1	1.11	1.09		
507.0	2.80	308.00	506.9	2.3	-3.4	-2.3	1.20	1.20		
599.0	3.90	310.40	598.7	5.7	-7.6	-5.7	1.21	1.20		
691.0	4.80	308.70	690.5	10.1	-12.9	-10.1	0.99	0.98		
783.0	5.30	308.50	782.1	15.2	-19.3	-15.2	0.54	0.54		
822.0	5.50	307.80	820.9	17.4	-22.2	-17.4	0.54	0.51		
918.0	5.80	304.00	916.5	23.0	-29.8	-23.0	0.50	0.31		
1,010.0	7.10	296.40	1,007.9	28.1	-38.8	-28.1	1.69	1.41		
1,102.0	7.30	298.80	1,099.2	33.4	-49.0	-33.4	0.39	0.22		

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1D-8H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 4917.0ft (Ensign 135)
Site:	S8-T2N-R66W (lone)	MD Reference:	WELL @ 4917.0ft (Ensign 135)
Well:	lone 1D-8H	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
1,194.0	8.40	300.00	1,190.3	39.6	-59.9	-39.6	1.21	1.20	
1,286.0	8.70	306.40	1,281.3	47.1	-71.3	-47.1	1.08	0.33	
1,378.0	9.30	300.60	1,372.2	55.0	-83.3	-55.0	1.18	0.65	
1,470.0	8.40	290.00	1,463.1	61.1	-96.1	-61.1	2.02	-0.98	
1,562.0	9.10	293.00	1,554.0	66.2	-109.1	-66.2	0.91	0.76	
1,654.0	7.90	290.50	1,645.0	71.3	-121.7	-71.3	1.36	-1.30	
1,746.0	7.20	297.00	1,736.2	76.1	-132.7	-76.1	1.20	-0.76	
1,837.0	6.90	294.80	1,826.5	81.0	-142.8	-81.0	0.44	-0.33	
1,929.0	8.10	299.60	1,917.7	86.5	-153.4	-86.5	1.47	1.30	
2,024.0	8.40	298.00	2,011.7	93.1	-165.4	-93.1	0.40	0.32	
2,119.0	9.00	296.40	2,105.6	99.7	-178.2	-99.7	0.68	0.63	
2,214.0	8.90	302.30	2,199.5	106.9	-191.0	-106.9	0.97	-0.11	
2,308.0	8.00	300.10	2,292.5	114.1	-202.8	-114.1	1.02	-0.96	
2,403.0	8.40	294.70	2,386.5	120.3	-214.9	-120.3	0.91	0.42	
2,498.0	8.60	292.80	2,480.4	125.9	-227.7	-125.9	0.36	0.21	
2,593.0	7.70	298.60	2,574.5	131.7	-239.9	-131.7	1.28	-0.95	
2,688.0	7.20	308.60	2,668.7	138.5	-250.1	-138.5	1.46	-0.53	
2,782.0	6.80	303.50	2,762.0	145.2	-259.3	-145.2	0.79	-0.43	
2,877.0	7.80	304.90	2,856.2	152.0	-269.3	-152.0	1.07	1.05	
2,972.0	8.70	304.10	2,950.2	159.7	-280.6	-159.7	0.96	0.95	
3,066.0	7.70	303.10	3,043.3	167.2	-291.7	-167.2	1.07	-1.06	
3,161.0	7.60	301.50	3,137.4	173.9	-302.4	-173.9	0.25	-0.11	
3,256.0	6.80	299.50	3,231.7	180.0	-312.7	-180.0	0.88	-0.84	
3,350.0	5.90	299.60	3,325.1	185.1	-321.7	-185.1	0.96	-0.96	
3,445.0	5.10	300.80	3,419.7	189.7	-329.6	-189.7	0.85	-0.84	
3,540.0	4.60	298.50	3,514.3	193.7	-336.6	-193.7	0.56	-0.53	
3,635.0	4.00	301.20	3,609.1	197.2	-342.7	-197.2	0.67	-0.63	
3,730.0	2.20	306.90	3,703.9	200.0	-347.0	-200.0	1.92	-1.89	
3,824.0	2.20	295.50	3,797.8	201.9	-350.1	-201.9	0.46	0.00	
3,919.0	1.30	273.20	3,892.8	202.7	-352.8	-202.7	1.17	-0.95	
4,014.0	0.40	298.60	3,987.8	202.9	-354.2	-202.9	1.00	-0.95	
4,109.0	0.20	358.70	4,082.8	203.3	-354.5	-203.3	0.37	-0.21	
4,204.0	0.80	161.30	4,177.8	202.8	-354.3	-202.8	1.04	0.63	
4,298.0	1.10	115.20	4,271.8	201.8	-353.2	-201.8	0.84	0.32	
4,393.0	1.00	90.70	4,366.8	201.4	-351.6	-201.4	0.48	-0.11	
4,487.0	0.50	107.00	4,460.8	201.3	-350.4	-201.3	0.57	-0.53	
4,582.0	0.30	331.80	4,555.8	201.4	-350.1	-201.4	0.78	-0.21	
4,677.0	0.90	325.60	4,650.7	202.2	-350.6	-202.2	0.63	0.63	
4,771.0	1.10	227.00	4,744.7	202.2	-351.7	-202.2	1.62	0.21	
4,866.0	1.80	217.90	4,839.7	200.4	-353.3	-200.4	0.77	0.74	
4,961.0	2.20	220.00	4,934.6	197.8	-355.4	-197.8	0.43	0.42	
5,055.0	1.90	226.70	5,028.6	195.4	-357.7	-195.4	0.41	-0.32	
5,150.0	1.20	258.60	5,123.6	194.1	-359.8	-194.1	1.14	-0.74	
5,245.0	0.50	337.20	5,218.5	194.3	-360.9	-194.3	1.27	-0.74	
5,340.0	0.90	1.10	5,313.5	195.4	-361.1	-195.4	0.51	0.42	
5,435.0	0.90	25.70	5,408.5	196.8	-360.7	-196.8	0.40	0.00	
5,530.0	1.10	6.90	5,503.5	198.4	-360.3	-198.4	0.40	0.21	
5,624.0	1.00	7.30	5,597.5	200.1	-360.1	-200.1	0.11	-0.11	
5,719.0	0.60	2.60	5,692.5	201.4	-360.0	-201.4	0.43	-0.42	
5,814.0	0.90	8.20	5,787.5	202.7	-359.8	-202.7	0.32	0.32	
5,909.0	0.90	65.20	5,882.5	203.7	-359.1	-203.7	0.90	0.00	
6,004.0	0.80	30.30	5,977.5	204.6	-358.1	-204.6	0.55	-0.11	
6,099.0	0.40	120.70	6,072.5	205.0	-357.4	-205.0	0.94	-0.42	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1D-8H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 4917.0ft (Ensign 135)
Site:	S8-T2N-R66W (lone)	MD Reference:	WELL @ 4917.0ft (Ensign 135)
Well:	lone 1D-8H	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
6,193.0	0.50	174.50	6,166.5	204.4	-357.1	-204.4	0.44	0.11	
6,288.0	0.60	171.90	6,261.5	203.5	-357.0	-203.5	0.11	0.11	
6,383.0	0.50	167.80	6,356.4	202.6	-356.8	-202.6	0.11	-0.11	
6,446.0	2.20	157.50	6,419.4	201.2	-356.3	-201.2	2.71	2.70	
6,478.0	5.20	168.90	6,451.4	199.2	-355.8	-199.2	9.61	9.37	
6,510.0	8.50	171.30	6,483.1	195.5	-355.2	-195.5	10.35	10.31	
6,541.0	11.00	172.10	6,513.7	190.3	-354.4	-190.3	8.08	8.06	
6,573.0	12.80	171.70	6,545.0	183.7	-353.5	-183.7	5.63	5.62	
6,604.0	14.70	172.70	6,575.1	176.4	-352.5	-176.4	6.18	6.13	
6,636.0	16.60	173.70	6,605.9	167.9	-351.5	-167.9	6.00	5.94	
6,668.0	18.90	174.90	6,636.4	158.2	-350.5	-158.2	7.28	7.19	
6,699.0	21.50	175.60	6,665.5	147.5	-349.6	-147.5	8.42	8.39	
6,731.0	24.20	176.20	6,695.0	135.1	-348.7	-135.1	8.47	8.44	
6,763.0	27.10	175.50	6,723.8	121.3	-347.7	-121.3	9.11	9.06	
6,794.0	29.30	176.30	6,751.1	106.7	-346.7	-106.7	7.20	7.10	
6,826.0	31.60	176.60	6,778.7	90.5	-345.7	-90.5	7.20	7.19	
6,858.0	33.40	178.10	6,805.7	73.3	-344.9	-73.3	6.16	5.62	
6,889.0	34.70	178.50	6,831.4	56.0	-344.4	-56.0	4.26	4.19	
6,921.0	36.40	179.90	6,857.4	37.4	-344.1	-37.4	5.89	5.31	
6,952.0	37.90	181.20	6,882.1	18.7	-344.3	-18.7	5.46	4.84	
6,984.0	39.80	182.60	6,907.0	-1.4	-345.0	1.4	6.54	5.94	
7,016.0	41.80	182.50	6,931.3	-22.3	-345.9	22.3	6.25	6.25	
7,047.0	43.90	182.60	6,954.0	-43.4	-346.9	43.4	6.78	6.77	
7,079.0	45.70	183.90	6,976.7	-65.9	-348.1	65.9	6.31	5.62	
7,111.0	47.20	183.30	6,998.7	-89.0	-349.6	89.0	4.88	4.69	
7,142.0	49.40	183.80	7,019.4	-112.1	-351.0	112.1	7.20	7.10	
7,174.0	51.80	183.80	7,039.7	-136.8	-352.7	136.8	7.50	7.50	
7,205.0	54.60	183.40	7,058.2	-161.5	-354.2	161.5	9.09	9.03	
7,237.0	57.00	183.80	7,076.2	-188.0	-355.9	188.0	7.57	7.50	
7,269.0	60.20	183.90	7,092.9	-215.2	-357.7	215.2	10.00	10.00	
7,300.0	62.40	183.40	7,107.8	-242.3	-359.4	242.3	7.24	7.10	
7,332.0	64.70	183.10	7,122.0	-270.9	-361.1	270.9	7.24	7.19	
7,364.0	66.70	181.90	7,135.2	-300.1	-362.3	300.1	7.12	6.25	
7,378.0	67.20	181.70	7,140.7	-313.0	-362.7	313.0	3.81	3.57	
7,419.0	69.80	182.30	7,155.7	-351.1	-364.1	351.1	6.49	6.34	
7,450.0	71.80	181.40	7,165.9	-380.3	-365.0	380.3	7.01	6.45	
7,482.0	75.40	181.50	7,174.9	-411.0	-365.8	411.0	11.25	11.25	
7,514.0	78.50	181.50	7,182.2	-442.2	-366.6	442.2	9.69	9.69	
7,545.0	82.40	181.80	7,187.3	-472.7	-367.5	472.7	12.62	12.58	
7,577.0	85.80	181.50	7,190.6	-504.5	-368.4	504.5	10.67	10.62	
7,608.0	88.70	181.40	7,192.1	-535.5	-369.2	535.5	9.36	9.35	
7,640.0	89.50	181.90	7,192.6	-567.5	-370.1	567.5	2.95	2.50	
7,687.0	90.50	181.70	7,192.6	-614.5	-371.6	614.5	2.17	2.13	
7,735.0	90.80	180.70	7,192.0	-662.4	-372.6	662.4	2.17	0.62	
7,782.0	90.80	179.70	7,191.4	-709.4	-372.8	709.4	2.13	0.00	
7,830.0	91.20	180.10	7,190.5	-757.4	-372.7	757.4	1.18	0.83	
7,877.0	91.10	179.10	7,189.6	-804.4	-372.3	804.4	2.14	-0.21	
7,924.0	91.30	178.40	7,188.6	-851.4	-371.3	851.4	1.55	0.43	
8,019.0	90.80	178.00	7,186.9	-946.3	-368.3	946.3	0.67	-0.53	
8,114.0	90.00	177.40	7,186.2	-1,041.3	-364.5	1,041.3	1.05	-0.84	
8,208.0	89.80	177.20	7,186.4	-1,135.1	-360.1	1,135.1	0.30	-0.21	
8,303.0	90.20	178.50	7,186.4	-1,230.1	-356.5	1,230.1	1.43	0.42	
8,398.0	90.00	178.10	7,186.2	-1,325.0	-353.7	1,325.0	0.47	-0.21	

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1D-8H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 4917.0ft (Ensign 135)
Site:	S8-T2N-R66W (lone)	MD Reference:	WELL @ 4917.0ft (Ensign 135)
Well:	lone 1D-8H	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
8,493.0	90.20	178.80	7,186.0	-1,420.0	-351.1	1,420.0	0.77	0.21	
8,588.0	90.80	180.30	7,185.2	-1,515.0	-350.4	1,515.0	1.70	0.63	
8,682.0	90.60	180.80	7,184.1	-1,609.0	-351.3	1,609.0	0.57	-0.21	
8,777.0	90.20	181.80	7,183.4	-1,704.0	-353.5	1,704.0	1.13	-0.42	
8,871.0	90.80	180.80	7,182.6	-1,797.9	-355.6	1,797.9	1.24	0.64	
8,966.0	90.30	180.80	7,181.7	-1,892.9	-356.9	1,892.9	0.53	-0.53	
9,061.0	89.70	181.00	7,181.7	-1,987.9	-358.4	1,987.9	0.67	-0.63	
9,155.0	89.90	180.30	7,182.0	-2,081.9	-359.5	2,081.9	0.77	0.21	
9,250.0	89.50	180.80	7,182.5	-2,176.9	-360.4	2,176.9	0.67	-0.42	
9,345.0	89.80	181.40	7,183.1	-2,271.9	-362.2	2,271.9	0.71	0.32	
9,440.0	89.80	181.40	7,183.4	-2,366.8	-364.5	2,366.8	0.00	0.00	
9,534.0	90.50	180.10	7,183.2	-2,460.8	-365.8	2,460.8	1.57	0.74	
9,629.0	90.10	179.90	7,182.7	-2,555.8	-365.8	2,555.8	0.47	-0.42	
9,724.0	89.80	179.60	7,182.8	-2,650.8	-365.3	2,650.8	0.45	-0.32	
9,819.0	90.50	178.60	7,182.5	-2,745.8	-363.9	2,745.8	1.28	0.74	
9,914.0	90.20	179.40	7,181.9	-2,840.8	-362.2	2,840.8	0.90	-0.32	
10,008.0	89.90	179.50	7,181.8	-2,934.8	-361.3	2,934.8	0.34	-0.32	
10,103.0	89.50	179.90	7,182.3	-3,029.8	-360.8	3,029.8	0.60	-0.42	
10,198.0	89.10	178.80	7,183.5	-3,124.8	-359.7	3,124.8	1.23	-0.42	
10,293.0	89.40	178.70	7,184.7	-3,219.7	-357.7	3,219.7	0.33	0.32	
10,388.0	89.20	178.80	7,185.9	-3,314.7	-355.6	3,314.7	0.24	-0.21	
10,483.0	89.90	178.70	7,186.7	-3,409.7	-353.5	3,409.7	0.74	0.74	
10,578.0	90.50	178.50	7,186.3	-3,504.7	-351.2	3,504.7	0.67	0.63	
10,672.0	90.40	178.60	7,185.6	-3,598.6	-348.8	3,598.6	0.15	-0.11	
10,767.0	90.20	179.10	7,185.1	-3,693.6	-346.9	3,693.6	0.57	-0.21	
10,862.0	89.60	178.90	7,185.2	-3,788.6	-345.2	3,788.6	0.67	-0.63	
10,957.0	89.60	179.10	7,185.9	-3,883.5	-343.6	3,883.5	0.21	0.00	
11,052.0	89.00	179.80	7,187.1	-3,978.5	-342.7	3,978.5	0.97	-0.63	
11,147.0	88.70	180.20	7,189.0	-4,073.5	-342.7	4,073.5	0.53	-0.32	
11,242.0	89.30	181.00	7,190.6	-4,168.5	-343.7	4,168.5	1.05	0.63	
11,337.0	90.10	181.70	7,191.1	-4,263.5	-345.9	4,263.5	1.12	0.84	
11,432.0	90.80	182.00	7,190.4	-4,358.4	-349.0	4,358.4	0.80	0.74	
11,526.0	90.10	181.60	7,189.7	-4,452.4	-351.9	4,452.4	0.86	-0.74	
11,584.0	90.60	182.00	7,189.3	-4,510.3	-353.7	4,510.3	1.10	0.86	Last Cathedral Survey @ 11,584' MD
11,633.0	90.60	182.00	7,188.8	-4,559.3	-355.5	4,559.3	0.00	0.00	Projection to Bit @ 11,633' MD

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1D-8H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 4917.0ft (Ensign 135)
Site:	S8-T2N-R66W (lone)	MD Reference:	WELL @ 4917.0ft (Ensign 135)
Well:	lone 1D-8H	North Reference:	True
Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
lone 1D-8H PBHL	0.00	0.00	7,192.0	-4,589.9	-357.8	1,297,037.73	3,196,405.88	40.146620	-104.797440
- actual wellpath misses target center by 30.9ft at 11633.0ft MD (7188.8 TVD, -4559.3 N, -355.5 E)									
- Point									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	Comment	
11,584.0	7,189.3	-4,510.3	-353.7	Last Cathedral Survey @ 11,584' MD	
11,633.0	7,188.8	-4,559.3	-355.5	Projection to Bit @ 11,633' MD	

Checked By: _____ Approved By: _____ Date: _____