



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1F-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Well:	lone 1F-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 1F-2H			
Well Position	+N/-S	0.0 ft	Northing:	1,306,940.51 ft
	+E/-W	0.0 ft	Easting:	3,212,460.09 ft
Position Uncertainty	0.0 ft		Wellhead Elevation:	ft
			Ground Level:	5,078.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/1/2012	8.63	66.82	52,859

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	180.00

Survey Program	Date	2/23/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
138.0	1,005.0	Survey #1 (HZ)	MWD	Geolink MWD
1,102.0	12,060.0	Survey #2 (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	
138.0	0.20	16.60	138.0	0.2	0.1	-0.2	0.14	0.14	
169.0	0.50	70.10	169.0	0.3	0.2	-0.3	1.33	0.97	
260.0	1.30	66.30	260.0	0.9	1.5	-0.9	0.88	0.88	
352.0	2.70	68.40	351.9	2.1	4.5	-2.1	1.52	1.52	
445.0	3.90	67.80	444.8	4.1	9.5	-4.1	1.29	1.29	
537.0	5.10	70.10	536.5	6.7	16.2	-6.7	1.32	1.30	
629.0	5.80	73.20	628.1	9.4	24.5	-9.4	0.83	0.76	
721.0	6.60	70.90	719.5	12.5	33.9	-12.5	0.91	0.87	
815.0	7.50	72.60	812.8	16.1	44.9	-16.1	0.98	0.96	
907.0	7.50	71.90	904.0	19.7	56.3	-19.7	0.10	0.00	
1,005.0	7.80	70.70	1,001.2	23.9	68.7	-23.9	0.35	0.31	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1F-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Well:	lone 1F-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
1,102.0	7.20	70.10	1,097.3	28.2	80.6	-28.2	0.62	-0.62	
1,194.0	8.30	70.00	1,188.5	32.4	92.3	-32.4	1.20	1.20	
1,286.0	10.20	72.10	1,279.3	37.2	106.3	-37.2	2.10	2.07	
1,378.0	10.60	72.80	1,369.8	42.2	122.1	-42.2	0.46	0.43	
1,470.0	12.20	71.20	1,460.0	47.8	139.4	-47.8	1.77	1.74	
1,562.0	13.80	70.70	1,549.6	54.6	159.0	-54.6	1.74	1.74	
1,654.0	14.20	70.10	1,638.9	62.1	179.9	-62.1	0.46	0.43	
1,746.0	14.40	69.00	1,728.0	70.0	201.2	-70.0	0.37	0.22	
1,838.0	12.90	65.70	1,817.4	78.3	221.3	-78.3	1.84	-1.63	
1,930.0	10.70	62.00	1,907.5	86.6	238.2	-86.6	2.53	-2.39	
2,024.0	11.90	59.80	1,999.6	95.5	254.2	-95.5	1.36	1.28	
2,088.0	12.10	66.00	2,062.2	101.6	266.1	-101.6	2.04	0.31	
2,151.0	12.70	70.50	2,123.8	106.6	278.6	-106.6	1.80	0.95	
2,214.0	14.00	70.00	2,185.1	111.5	292.3	-111.5	2.07	2.06	
2,309.0	15.80	66.00	2,276.9	120.7	314.9	-120.7	2.18	1.89	
2,404.0	15.90	66.90	2,368.3	131.0	338.7	-131.0	0.28	0.11	
2,467.0	15.00	70.40	2,429.0	137.2	354.3	-137.2	2.06	-1.43	
2,530.0	15.10	76.10	2,489.8	141.9	370.0	-141.9	2.35	0.16	
2,593.0	14.70	75.10	2,550.7	145.9	385.7	-145.9	0.75	-0.63	
2,688.0	12.80	72.10	2,643.0	152.2	407.3	-152.2	2.14	-2.00	
2,782.0	14.50	66.80	2,734.3	160.1	428.1	-160.1	2.24	1.81	
2,877.0	14.20	67.60	2,826.4	169.2	449.8	-169.2	0.38	-0.32	
2,972.0	14.60	74.40	2,918.4	176.9	472.1	-176.9	1.83	0.42	
3,067.0	15.70	75.90	3,010.1	183.2	496.1	-183.2	1.23	1.16	
3,161.0	15.60	75.80	3,100.6	189.4	520.7	-189.4	0.11	-0.11	
3,256.0	14.90	75.10	3,192.3	195.7	544.9	-195.7	0.76	-0.74	
3,351.0	13.40	65.80	3,284.4	203.3	566.7	-203.3	2.86	-1.58	
3,446.0	13.70	67.30	3,376.7	212.2	587.1	-212.2	0.49	0.32	
3,541.0	14.40	67.70	3,468.9	221.0	608.4	-221.0	0.74	0.74	
3,636.0	14.10	70.10	3,561.0	229.4	630.2	-229.4	0.70	-0.32	
3,730.0	13.70	66.00	3,652.2	237.9	651.2	-237.9	1.13	-0.43	
3,825.0	13.50	69.30	3,744.6	246.4	671.8	-246.4	0.84	-0.21	
3,920.0	13.10	65.60	3,837.0	254.7	692.0	-254.7	0.99	-0.42	
4,014.0	13.80	68.50	3,928.4	263.2	712.1	-263.2	1.03	0.74	
4,109.0	15.10	68.50	4,020.4	271.9	734.2	-271.9	1.37	1.37	
4,204.0	13.80	71.40	4,112.4	280.1	756.5	-280.1	1.57	-1.37	
4,299.0	16.20	72.90	4,204.2	287.6	779.9	-287.6	2.56	2.53	
4,393.0	16.50	70.90	4,294.4	295.8	805.0	-295.8	0.68	0.32	
4,488.0	14.20	70.00	4,386.0	304.2	828.7	-304.2	2.43	-2.42	
4,583.0	14.30	67.50	4,478.1	312.7	850.5	-312.7	0.66	0.11	
4,677.0	15.70	71.50	4,568.9	321.2	873.3	-321.2	1.85	1.49	
4,772.0	13.60	70.20	4,660.8	329.0	896.0	-329.0	2.24	-2.21	
4,867.0	14.10	76.00	4,753.0	335.6	917.7	-335.6	1.55	0.53	
4,961.0	15.30	75.10	4,843.9	341.6	940.8	-341.6	1.30	1.28	
5,056.0	14.20	74.60	4,935.8	347.9	964.2	-347.9	1.17	-1.16	
5,151.0	11.80	74.10	5,028.4	353.6	984.7	-353.6	2.53	-2.53	
5,245.0	12.00	74.40	5,120.3	358.9	1,003.4	-358.9	0.22	0.21	
5,340.0	11.40	70.40	5,213.4	364.7	1,021.8	-364.7	1.06	-0.63	
5,435.0	11.10	70.70	5,306.5	370.9	1,039.2	-370.9	0.32	-0.32	
5,530.0	10.60	68.40	5,399.8	377.1	1,056.0	-377.1	0.70	-0.53	
5,625.0	8.00	67.70	5,493.6	382.8	1,070.2	-382.8	2.74	-2.74	
5,719.0	8.70	67.10	5,586.6	388.1	1,082.8	-388.1	0.75	0.74	
5,814.0	7.70	66.20	5,680.6	393.5	1,095.3	-393.5	1.06	-1.05	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1F-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Well:	lone 1F-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
5,909.0	6.60	63.40	5,774.9	398.5	1,106.0	-398.5	1.21	-1.16	
6,004.0	6.00	59.90	5,869.3	403.4	1,115.2	-403.4	0.75	-0.63	
6,099.0	5.10	64.40	5,963.9	407.7	1,123.3	-407.7	1.05	-0.95	
6,194.0	2.80	54.60	6,058.6	410.9	1,129.0	-410.9	2.51	-2.42	
6,288.0	2.50	66.20	6,152.5	413.0	1,132.7	-413.0	0.65	-0.32	
6,383.0	2.60	103.60	6,247.4	413.4	1,136.7	-413.4	1.72	0.11	
6,478.0	2.50	80.90	6,342.3	413.2	1,140.8	-413.2	1.06	-0.11	
6,573.0	2.80	62.10	6,437.2	414.6	1,144.9	-414.6	0.96	0.32	
6,667.0	3.00	68.40	6,531.1	416.6	1,149.3	-416.6	0.40	0.21	
6,762.0	1.60	69.30	6,626.1	418.0	1,152.8	-418.0	1.47	-1.47	
6,857.0	2.20	92.50	6,721.0	418.4	1,155.9	-418.4	1.01	0.63	
6,952.0	1.30	133.30	6,816.0	417.5	1,158.5	-417.5	1.56	-0.95	
6,983.0	1.50	129.60	6,846.9	417.0	1,159.0	-417.0	0.71	0.65	
7,015.0	3.60	145.90	6,878.9	415.9	1,159.9	-415.9	6.88	6.56	
7,046.0	7.00	161.50	6,909.8	413.3	1,161.1	-413.3	11.81	10.97	
7,078.0	10.90	168.00	6,941.4	408.5	1,162.3	-408.5	12.57	12.19	
7,110.0	14.80	164.90	6,972.6	401.6	1,164.0	-401.6	12.37	12.19	
7,141.0	18.80	162.70	7,002.2	393.0	1,166.5	-393.0	13.06	12.90	
7,173.0	23.20	161.70	7,032.1	382.1	1,170.0	-382.1	13.80	13.75	
7,204.0	27.60	161.90	7,060.1	369.5	1,174.2	-369.5	14.20	14.19	
7,236.0	32.20	163.40	7,087.8	354.3	1,178.9	-354.3	14.56	14.37	
7,268.0	36.20	165.00	7,114.3	337.0	1,183.8	-337.0	12.81	12.50	
7,299.0	38.80	166.50	7,138.9	318.7	1,188.5	-318.7	8.89	8.39	
7,331.0	41.40	168.70	7,163.4	298.5	1,192.9	-298.5	9.25	8.12	
7,362.0	44.80	171.80	7,186.0	277.7	1,196.4	-277.7	12.92	10.97	
7,394.0	48.20	174.10	7,208.0	254.6	1,199.3	-254.6	11.83	10.62	
7,426.0	52.10	176.10	7,228.5	230.2	1,201.4	-230.2	13.10	12.19	
7,457.0	56.50	177.40	7,246.6	205.0	1,202.8	-205.0	14.60	14.19	
7,489.0	60.20	178.10	7,263.4	177.8	1,203.8	-177.8	11.71	11.56	
7,521.0	62.90	179.20	7,278.7	149.7	1,204.5	-149.7	8.96	8.44	
7,552.0	65.50	180.10	7,292.2	121.8	1,204.7	-121.8	8.78	8.39	
7,583.0	68.50	180.80	7,304.3	93.3	1,204.5	-93.3	9.90	9.68	
7,615.0	71.30	180.50	7,315.3	63.2	1,204.1	-63.2	8.79	8.75	
7,647.0	73.80	180.30	7,324.9	32.7	1,203.9	-32.7	7.84	7.81	
7,678.0	76.50	180.70	7,332.8	2.7	1,203.6	-2.7	8.80	8.71	
7,710.0	79.30	180.90	7,339.5	-28.6	1,203.2	28.6	8.77	8.75	
7,728.0	81.60	180.80	7,342.5	-46.3	1,202.9	46.3	12.79	12.78	
7,799.0	86.40	179.80	7,349.9	-116.9	1,202.6	116.9	6.90	6.76	
7,862.0	88.80	179.90	7,352.6	-179.8	1,202.7	179.8	3.81	3.81	
7,926.0	90.00	178.80	7,353.2	-243.8	1,203.5	243.8	2.54	1.87	
7,989.0	89.10	179.00	7,353.7	-306.8	1,204.7	306.8	1.46	-1.43	
8,052.0	88.10	181.00	7,355.3	-369.8	1,204.7	369.8	3.55	-1.59	
8,115.0	88.70	182.80	7,357.0	-432.7	1,202.6	432.7	3.01	0.95	
8,179.0	89.90	184.40	7,357.8	-496.6	1,198.6	496.6	3.12	1.87	
8,242.0	89.20	183.60	7,358.3	-559.4	1,194.2	559.4	1.69	-1.11	
8,305.0	90.50	182.60	7,358.5	-622.3	1,190.8	622.3	2.60	2.06	
8,400.0	88.40	183.10	7,359.4	-717.2	1,186.0	717.2	2.27	-2.21	
8,495.0	88.00	184.10	7,362.4	-812.0	1,180.1	812.0	1.13	-0.42	
8,589.0	90.00	183.00	7,364.0	-905.8	1,174.3	905.8	2.43	2.13	
8,684.0	89.60	181.90	7,364.3	-1,000.7	1,170.2	1,000.7	1.23	-0.42	
8,778.0	88.10	182.20	7,366.2	-1,094.6	1,166.8	1,094.6	1.63	-1.60	
8,873.0	92.20	184.30	7,366.0	-1,189.4	1,161.5	1,189.4	4.85	4.32	
8,936.0	91.40	183.00	7,364.0	-1,252.3	1,157.4	1,252.3	2.42	-1.27	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1F-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Well:	lone 1F-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
8,999.0	91.50	181.50	7,362.4	-1,315.2	1,155.0	1,315.2	2.39	0.16	
9,062.0	91.00	180.90	7,361.0	-1,378.2	1,153.7	1,378.2	1.24	-0.79	
9,157.0	89.10	179.00	7,360.9	-1,473.1	1,153.7	1,473.1	2.83	-2.00	
9,251.0	89.50	177.40	7,362.1	-1,567.1	1,156.7	1,567.1	1.75	0.43	
9,346.0	91.00	176.80	7,361.7	-1,662.0	1,161.5	1,662.0	1.70	1.58	
9,409.0	90.20	177.20	7,361.0	-1,724.9	1,164.8	1,724.9	1.42	-1.27	
9,473.0	88.90	178.90	7,361.5	-1,788.8	1,167.0	1,788.8	3.34	-2.03	
9,536.0	88.40	179.00	7,363.0	-1,851.8	1,168.1	1,851.8	0.81	-0.79	
9,630.0	88.20	180.40	7,365.8	-1,945.8	1,168.6	1,945.8	1.50	-0.21	
9,725.0	89.30	180.60	7,367.9	-2,040.7	1,167.8	2,040.7	1.18	1.16	
9,820.0	90.50	180.50	7,368.0	-2,135.7	1,166.9	2,135.7	1.27	1.26	
9,915.0	91.60	181.90	7,366.3	-2,230.7	1,164.9	2,230.7	1.87	1.16	
10,010.0	89.60	181.50	7,365.3	-2,325.6	1,162.1	2,325.6	2.15	-2.11	
10,104.0	89.10	180.40	7,366.4	-2,419.6	1,160.5	2,419.6	1.29	-0.53	
10,199.0	89.10	179.90	7,367.8	-2,514.6	1,160.3	2,514.6	0.53	0.00	
10,293.0	89.60	180.40	7,368.9	-2,608.6	1,160.0	2,608.6	0.75	0.53	
10,388.0	89.80	181.10	7,369.4	-2,703.6	1,158.8	2,703.6	0.77	0.21	
10,483.0	89.60	180.50	7,369.9	-2,798.6	1,157.4	2,798.6	0.67	-0.21	
10,577.0	89.50	181.10	7,370.6	-2,892.6	1,156.1	2,892.6	0.65	-0.11	
10,672.0	90.00	182.20	7,371.1	-2,987.5	1,153.4	2,987.5	1.27	0.53	
10,767.0	90.90	180.30	7,370.3	-3,082.5	1,151.3	3,082.5	2.21	0.95	
10,862.0	90.90	179.10	7,368.8	-3,177.5	1,151.8	3,177.5	1.26	0.00	
10,957.0	89.00	179.00	7,368.9	-3,272.5	1,153.4	3,272.5	2.00	-2.00	
11,052.0	88.70	179.90	7,370.8	-3,367.4	1,154.3	3,367.4	1.00	-0.32	
11,146.0	91.10	181.10	7,371.0	-3,461.4	1,153.5	3,461.4	2.85	2.55	
11,241.0	90.40	180.60	7,369.7	-3,556.4	1,152.1	3,556.4	0.91	-0.74	
11,336.0	90.20	180.10	7,369.2	-3,651.4	1,151.5	3,651.4	0.57	-0.21	
11,430.0	90.60	180.20	7,368.6	-3,745.4	1,151.3	3,745.4	0.44	0.43	
11,525.0	89.60	178.90	7,368.4	-3,840.4	1,152.0	3,840.4	1.73	-1.05	
11,620.0	87.50	179.70	7,370.8	-3,935.4	1,153.2	3,935.4	2.37	-2.21	
11,715.0	87.80	180.50	7,374.7	-4,030.3	1,153.0	4,030.3	0.90	0.32	
11,810.0	91.20	181.40	7,375.5	-4,125.2	1,151.4	4,125.2	3.70	3.58	
11,905.0	92.40	180.40	7,372.6	-4,220.2	1,149.9	4,220.2	1.64	1.26	
12,000.0	93.10	181.00	7,368.0	-4,315.1	1,148.8	4,315.1	0.97	0.74	
12,011.0	93.20	180.20	7,367.4	-4,326.0	1,148.7	4,326.0	7.32	0.91	Last Cathedral Survey @ 12,011' MD
12,060.0	93.20	180.20	7,364.7	-4,375.0	1,148.5	4,375.0	0.00	0.00	Projection to Bit @ 12,060' MD - lone 1F-2H PBT

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1F-2H
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Site:	S2-T2N-R66W (lone.)	MD Reference:	KB=13' @ 5091.0ft (Ensign 135)
Well:	lone 1F-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 1F-2H LP P6	0.00	0.00	7,267.9	-594.5	1,209.1	1,306,356.42	3,213,674.25	40.171808	-104.735383
- actual wellpath misses target center by 92.2ft at 8276.0ft MD (7358.6 TVD, -593.3 N, 1192.2 E)									
- Point									
lone 1F-2H PBHL (460' I	0.00	0.00	7,317.0	-4,389.6	1,151.5	1,302,560.98	3,213,649.19	40.161390	-104.735590
- actual wellpath misses target center by 49.9ft at 12060.0ft MD (7364.7 TVD, -4375.0 N, 1148.5 E)									
- Point									
lone 1F-2H PBHL P6	0.00	0.00	7,267.7	-4,232.8	1,209.1	1,302,718.26	3,213,705.44	40.161820	-104.735384
- actual wellpath misses target center by 119.9ft at 11921.9ft MD (7371.8 TVD, -4237.0 N, 1149.8 E)									
- Point									
lone 1F-2H PBHL P3 (460' I	0.00	0.00	7,290.0	-4,389.6	1,151.5	1,302,560.98	3,213,649.19	40.161390	-104.735590
- actual wellpath misses target center by 76.1ft at 12060.0ft MD (7364.7 TVD, -4375.0 N, 1148.5 E)									
- Point									
lone 1F-2H PBHL P10	0.00	0.00	7,363.0	-4,389.6	1,151.5	1,302,560.98	3,213,649.19	40.161390	-104.735590
- actual wellpath misses target center by 15.0ft at 12060.0ft MD (7364.7 TVD, -4375.0 N, 1148.5 E)									
- Point									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	Comment	
12,011.0	7,367.4	-4,326.0	1,148.7	Last Cathedral Survey @ 12,011' MD	
12,060.0	7,364.7	-4,375.0	1,148.5	Projection to Bit @ 12,060' MD	

Checked By: _____ Approved By: _____ Date: _____