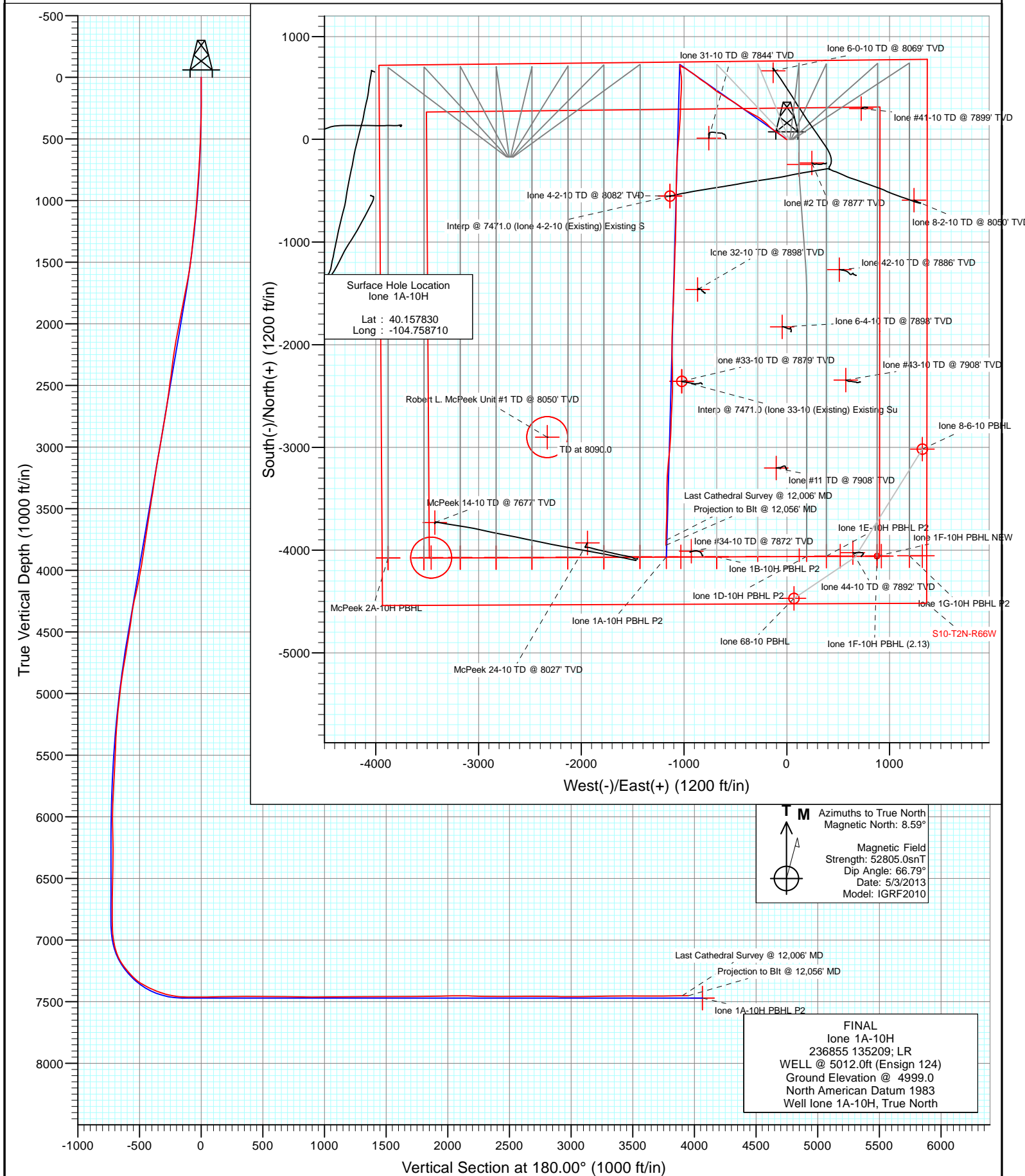




Project: DJ Wattenberg
Site: S10-T2N-R66W (lone)
Well: lone 1A-10H
Wellbore: Hz
Design: FINAL





Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1A-10H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5012.0ft (Ensign 124)
Site:	S10-T2N-R66W (lone)	MD Reference:	WELL @ 5012.0ft (Ensign 124)
Well:	lone 1A-10H	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		S10-T2N-R66W (lone)			
Site Position:		Northing:	1,297,164.02 ft	Latitude:	40.146710
From:	Lat/Long	Easting:	3,207,875.24 ft	Longitude:	-104.756410
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.48 °

Well	lone 1A-10H					
Well Position	+N/-S	0.0 ft	Northing:	1,301,209.31 ft	Latitude:	40.157830
	+E/-W	0.0 ft	Easting:	3,207,198.43 ft	Longitude:	-104.758710
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,999.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/3/2013	8.59	66.79	52,805

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	5/21/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
141.0	12,056.0	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	
141.0	0.80	215.70	141.0	-0.8	-0.6	0.8	0.57	0.57	
234.0	1.40	274.20	234.0	-1.2	-2.1	1.2	1.29	0.65	
327.0	2.30	296.60	326.9	-0.3	-4.9	0.3	1.22	0.97	
420.0	2.90	310.70	419.8	2.0	-8.3	-2.0	0.94	0.65	
513.0	3.80	309.40	512.7	5.5	-12.5	-5.5	0.97	0.97	
606.0	4.40	307.20	605.4	9.6	-17.7	-9.6	0.67	0.65	
699.0	5.40	307.30	698.1	14.5	-24.1	-14.5	1.08	1.08	
792.0	6.00	307.60	790.6	20.1	-31.4	-20.1	0.65	0.65	
885.0	6.80	309.60	883.1	26.5	-39.5	-26.5	0.89	0.86	
972.0	6.40	308.70	969.5	32.9	-47.2	-32.9	0.47	-0.46	
1,020.0	6.20	309.00	1,017.2	36.2	-51.3	-36.2	0.42	-0.42	
1,113.0	8.80	306.80	1,109.4	43.6	-60.9	-43.6	2.81	2.80	



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1A-10H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5012.0ft (Ensign 124)
Site:	S10-T2N-R66W (lone)	MD Reference:	WELL @ 5012.0ft (Ensign 124)
Well:	lone 1A-10H	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
1,206.0	11.00	307.00	1,201.0	53.2	-73.7	-53.2	2.37	2.37	
1,299.0	10.70	301.20	1,292.3	63.0	-88.2	-63.0	1.22	-0.32	
1,392.0	10.50	299.10	1,383.8	71.6	-103.0	-71.6	0.47	-0.22	
1,485.0	12.90	308.00	1,474.8	82.1	-118.6	-82.1	3.22	2.58	
1,578.0	13.10	308.00	1,565.4	95.0	-135.1	-95.0	0.22	0.22	
1,671.0	16.10	313.60	1,655.4	110.4	-152.7	-110.4	3.56	3.23	
1,764.0	16.40	313.50	1,744.7	128.3	-171.6	-128.3	0.32	0.32	
1,857.0	15.80	311.70	1,834.1	145.8	-190.5	-145.8	0.84	-0.65	
1,950.0	16.00	310.60	1,923.5	162.5	-209.7	-162.5	0.39	0.22	
2,045.0	17.80	310.00	2,014.4	180.4	-230.8	-180.4	1.90	1.89	
2,140.0	16.30	308.90	2,105.2	198.1	-252.3	-198.1	1.61	-1.58	
2,235.0	15.50	303.50	2,196.6	213.5	-273.3	-213.5	1.77	-0.84	
2,330.0	15.60	299.10	2,288.1	226.7	-295.0	-226.7	1.25	0.11	
2,425.0	15.80	296.10	2,379.6	238.6	-317.8	-238.6	0.88	0.21	
2,520.0	17.00	299.40	2,470.7	251.1	-341.5	-251.1	1.60	1.26	
2,615.0	16.30	299.10	2,561.7	264.4	-365.2	-264.4	0.74	-0.74	
2,710.0	15.40	298.20	2,653.1	276.9	-388.0	-276.9	0.98	-0.95	
2,805.0	15.90	301.80	2,744.6	289.7	-410.2	-289.7	1.15	0.53	
2,900.0	16.60	306.30	2,835.8	304.6	-432.2	-304.6	1.52	0.74	
2,995.0	18.20	305.00	2,926.5	321.1	-455.3	-321.1	1.73	1.68	
3,090.0	17.40	304.30	3,016.9	337.6	-479.2	-337.6	0.87	-0.84	
3,185.0	16.10	303.50	3,107.9	352.9	-501.9	-352.9	1.39	-1.37	
3,280.0	16.60	301.50	3,199.0	367.3	-524.4	-367.3	0.79	0.53	
3,375.0	16.40	299.90	3,290.1	381.0	-547.6	-381.0	0.52	-0.21	
3,470.0	16.90	301.70	3,381.1	395.0	-571.0	-395.0	0.76	0.53	
3,565.0	15.60	306.40	3,472.3	409.8	-593.0	-409.8	1.95	-1.37	
3,660.0	14.50	301.90	3,564.1	423.7	-613.4	-423.7	1.69	-1.16	
3,755.0	14.60	304.80	3,656.0	436.8	-633.3	-436.8	0.77	0.11	
3,850.0	16.70	302.10	3,747.5	450.9	-654.7	-450.9	2.34	2.21	
3,945.0	15.60	301.40	3,838.8	464.8	-677.2	-464.8	1.18	-1.16	
4,040.0	14.40	308.30	3,930.5	478.8	-697.4	-478.8	2.26	-1.26	
4,136.0	15.60	308.80	4,023.3	494.3	-716.8	-494.3	1.26	1.25	
4,230.0	20.90	307.90	4,112.5	512.5	-739.9	-512.5	5.65	5.64	
4,325.0	19.80	307.20	4,201.6	532.6	-766.1	-532.6	1.19	-1.16	
4,420.0	18.20	305.00	4,291.4	550.9	-791.1	-550.9	1.84	-1.68	
4,516.0	14.20	299.80	4,383.6	565.3	-813.6	-565.3	4.43	-4.17	
4,611.0	13.80	306.80	4,475.7	577.9	-832.8	-577.9	1.83	-0.42	
4,706.0	14.40	310.40	4,567.9	592.3	-850.8	-592.3	1.12	0.63	
4,801.0	15.00	307.60	4,659.8	607.5	-869.6	-607.5	0.98	0.63	
4,896.0	16.00	307.30	4,751.3	622.9	-889.7	-622.9	1.06	1.05	
4,991.0	14.70	306.00	4,842.9	638.0	-909.9	-638.0	1.42	-1.37	
5,086.0	12.00	302.80	4,935.4	650.4	-927.9	-650.4	2.95	-2.84	
5,181.0	12.20	306.10	5,028.2	661.7	-944.4	-661.7	0.76	0.21	
5,276.0	9.10	302.40	5,121.6	671.6	-958.8	-671.6	3.34	-3.26	
5,371.0	9.10	306.00	5,215.4	680.0	-971.2	-680.0	0.60	0.00	
5,466.0	7.20	300.80	5,309.4	687.5	-982.4	-687.5	2.14	-2.00	
5,561.0	5.60	295.70	5,403.9	692.6	-991.7	-692.6	1.79	-1.68	
5,656.0	6.70	290.50	5,498.3	696.5	-1,001.1	-696.5	1.30	1.16	
5,751.0	7.10	292.00	5,592.6	700.7	-1,011.7	-700.7	0.46	0.42	
5,846.0	5.10	303.80	5,687.1	705.2	-1,020.7	-705.2	2.47	-2.11	
5,941.0	4.20	325.70	5,781.8	710.4	-1,026.1	-710.4	2.08	-0.95	
6,036.0	2.20	342.40	5,876.6	715.0	-1,028.7	-715.0	2.30	-2.11	
6,131.0	1.30	313.40	5,971.6	717.5	-1,030.0	-717.5	1.30	-0.95	



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1A-10H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5012.0ft (Ensign 124)
Site:	S10-T2N-R66W (lone)	MD Reference:	WELL @ 5012.0ft (Ensign 124)
Well:	lone 1A-10H	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
6,226.0	1.60	241.00	6,066.6	717.6	-1,031.9	-717.6	1.82	0.32	
6,321.0	1.40	187.70	6,161.5	715.8	-1,033.3	-715.8	1.43	-0.21	
6,416.0	1.10	76.60	6,256.5	714.9	-1,032.5	-714.9	2.18	-0.32	
6,511.0	0.80	31.90	6,351.5	715.7	-1,031.3	-715.7	0.81	-0.32	
6,606.0	1.20	98.30	6,446.5	716.1	-1,029.9	-716.1	1.21	0.42	
6,701.0	1.80	317.10	6,541.5	717.0	-1,030.0	-717.0	2.99	0.63	
6,796.0	2.20	302.60	6,636.4	719.1	-1,032.5	-719.1	0.68	0.42	
6,891.0	2.00	295.00	6,731.4	720.8	-1,035.6	-720.8	0.36	-0.21	
6,987.0	1.20	214.20	6,827.3	720.7	-1,037.7	-720.7	2.25	-0.83	
7,018.0	0.90	218.90	6,858.3	720.2	-1,038.0	-720.2	1.01	-0.97	
7,050.0	1.30	183.60	6,890.3	719.7	-1,038.2	-719.7	2.40	1.25	
7,081.0	2.90	171.70	6,921.3	718.5	-1,038.1	-718.5	5.32	5.16	
7,113.0	5.30	175.70	6,953.2	716.2	-1,037.8	-716.2	7.55	7.50	
7,145.0	7.80	179.80	6,985.0	712.6	-1,037.7	-712.6	7.94	7.81	
7,176.0	10.50	180.10	7,015.6	707.7	-1,037.7	-707.7	8.71	8.71	
7,208.0	12.30	176.90	7,047.0	701.4	-1,037.5	-701.4	5.96	5.62	
7,240.0	15.60	173.50	7,078.0	693.7	-1,036.9	-693.7	10.62	10.31	
7,271.0	19.70	173.50	7,107.6	684.3	-1,035.8	-684.3	13.23	13.23	
7,303.0	24.30	173.30	7,137.2	672.4	-1,034.4	-672.4	14.38	14.37	
7,335.0	29.20	173.40	7,165.8	658.1	-1,032.8	-658.1	15.31	15.31	
7,366.0	34.10	173.30	7,192.2	642.0	-1,030.9	-642.0	15.81	15.81	
7,398.0	37.10	173.60	7,218.2	623.5	-1,028.8	-623.5	9.39	9.37	
7,429.0	39.60	175.00	7,242.5	604.3	-1,026.9	-604.3	8.54	8.06	
7,461.0	41.50	176.90	7,266.8	583.6	-1,025.4	-583.6	7.08	5.94	
7,493.0	43.70	178.80	7,290.4	561.9	-1,024.6	-561.9	7.96	6.87	
7,524.0	46.50	180.60	7,312.2	540.0	-1,024.5	-540.0	9.92	9.03	
7,556.0	51.90	182.00	7,333.1	515.8	-1,025.0	-515.8	17.20	16.87	
7,588.0	57.80	183.10	7,351.6	489.7	-1,026.2	-489.7	18.65	18.44	
7,620.0	61.70	183.50	7,367.7	462.1	-1,027.8	-462.1	12.24	12.19	
7,651.0	63.30	183.20	7,382.0	434.6	-1,029.4	-434.6	5.23	5.16	
7,683.0	65.00	183.00	7,395.9	405.9	-1,031.0	-405.9	5.34	5.31	
7,714.0	67.10	182.10	7,408.5	377.6	-1,032.2	-377.6	7.28	6.77	
7,746.0	69.50	181.70	7,420.4	347.8	-1,033.2	-347.8	7.59	7.50	
7,778.0	72.50	182.00	7,430.8	317.6	-1,034.2	-317.6	9.42	9.37	
7,809.0	74.70	182.00	7,439.5	287.9	-1,035.2	-287.9	7.10	7.10	
7,841.0	77.30	181.90	7,447.3	256.9	-1,036.3	-256.9	8.13	8.12	
7,873.0	79.30	182.00	7,453.8	225.5	-1,037.4	-225.5	6.26	6.25	
7,904.0	82.10	182.30	7,458.8	195.0	-1,038.5	-195.0	9.08	9.03	
7,922.0	84.60	182.80	7,460.8	177.1	-1,039.3	-177.1	14.16	13.89	
7,984.0	89.90	184.80	7,463.8	115.4	-1,043.4	-115.4	9.14	8.55	
8,047.0	90.10	185.30	7,463.8	52.6	-1,048.9	-52.6	0.85	0.32	
8,142.0	90.80	184.30	7,463.1	-42.1	-1,056.9	42.1	1.28	0.74	
8,237.0	91.40	184.50	7,461.3	-136.8	-1,064.2	136.8	0.67	0.63	
8,332.0	90.50	181.60	7,459.7	-231.6	-1,069.2	231.6	3.20	-0.95	
8,427.0	90.50	181.70	7,458.8	-326.6	-1,072.0	326.6	0.11	0.00	
8,522.0	91.00	182.00	7,457.6	-421.5	-1,075.0	421.5	0.61	0.53	
8,617.0	89.00	180.40	7,457.6	-516.5	-1,077.0	516.5	2.70	-2.11	
8,712.0	89.10	180.40	7,459.2	-611.5	-1,077.7	611.5	0.11	0.11	
8,808.0	89.00	180.50	7,460.8	-707.4	-1,078.4	707.4	0.15	-0.10	
8,903.0	89.10	181.10	7,462.3	-802.4	-1,079.8	802.4	0.64	0.11	
8,998.0	89.80	181.10	7,463.3	-897.4	-1,081.6	897.4	0.74	0.74	
9,093.0	90.90	182.70	7,462.7	-992.3	-1,084.7	992.3	2.04	1.16	
9,188.0	90.60	182.50	7,461.4	-1,087.2	-1,089.1	1,087.2	0.38	-0.32	



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1A-10H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5012.0ft (Ensign 124)
Site:	S10-T2N-R66W (lone)	MD Reference:	WELL @ 5012.0ft (Ensign 124)
Well:	lone 1A-10H	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
9,283.0	90.40	181.00	7,460.6	-1,182.2	-1,092.0	1,182.2	1.59	-0.21	
9,378.0	90.50	180.80	7,459.9	-1,277.2	-1,093.4	1,277.2	0.24	0.11	
9,473.0	90.10	182.10	7,459.4	-1,372.1	-1,095.9	1,372.1	1.43	-0.42	
9,568.0	89.70	182.30	7,459.5	-1,467.1	-1,099.5	1,467.1	0.47	-0.42	
9,663.0	90.30	182.50	7,459.5	-1,562.0	-1,103.5	1,562.0	0.67	0.63	
9,758.0	90.50	182.10	7,458.9	-1,656.9	-1,107.3	1,656.9	0.47	0.21	
9,852.0	90.50	182.00	7,458.0	-1,750.8	-1,110.7	1,750.8	0.11	0.00	
9,948.0	91.00	181.70	7,456.8	-1,846.8	-1,113.8	1,846.8	0.61	0.52	
10,043.0	90.90	181.60	7,455.2	-1,941.7	-1,116.5	1,941.7	0.15	-0.11	
10,138.0	90.60	179.20	7,454.0	-2,036.7	-1,117.1	2,036.7	2.55	-0.32	
10,233.0	89.80	178.50	7,453.6	-2,131.7	-1,115.2	2,131.7	1.12	-0.84	
10,328.0	87.80	179.30	7,455.6	-2,226.6	-1,113.4	2,226.6	2.27	-2.11	
10,423.0	89.10	179.50	7,458.2	-2,321.6	-1,112.4	2,321.6	1.38	1.37	
10,518.0	90.70	180.90	7,458.4	-2,416.6	-1,112.8	2,416.6	2.24	1.68	
10,613.0	90.40	181.70	7,457.4	-2,511.6	-1,114.9	2,511.6	0.90	-0.32	
10,708.0	89.80	183.50	7,457.3	-2,606.5	-1,119.2	2,606.5	2.00	-0.63	
10,804.0	90.10	182.60	7,457.4	-2,702.3	-1,124.3	2,702.3	0.99	0.31	
10,898.0	90.10	181.30	7,457.2	-2,796.3	-1,127.5	2,796.3	1.38	0.00	
10,993.0	88.40	182.30	7,458.4	-2,891.2	-1,130.5	2,891.2	2.08	-1.79	
11,089.0	89.80	185.30	7,460.0	-2,987.0	-1,136.9	2,987.0	3.45	1.46	
11,183.0	90.80	186.00	7,459.5	-3,080.5	-1,146.1	3,080.5	1.30	1.06	
11,279.0	91.40	184.80	7,457.6	-3,176.1	-1,155.2	3,176.1	1.40	0.62	
11,374.0	90.80	183.30	7,455.8	-3,270.8	-1,161.9	3,270.8	1.70	-0.63	
11,469.0	90.50	181.90	7,454.7	-3,365.7	-1,166.2	3,365.7	1.51	-0.32	
11,563.0	89.50	179.10	7,454.7	-3,459.7	-1,167.0	3,459.7	3.16	-1.06	
11,658.0	90.20	180.20	7,455.0	-3,554.7	-1,166.4	3,554.7	1.37	0.74	
11,753.0	90.30	181.30	7,454.6	-3,649.7	-1,167.7	3,649.7	1.16	0.11	
11,848.0	90.00	182.50	7,454.3	-3,744.6	-1,170.8	3,744.6	1.30	-0.32	
11,943.0	90.80	181.60	7,453.6	-3,839.6	-1,174.2	3,839.6	1.27	0.84	
12,006.0	90.40	181.10	7,453.0	-3,902.5	-1,175.7	3,902.5	1.02	-0.63	Last Cathedral Survey @ 12,006' MD
12,056.0	90.40	181.10	7,452.6	-3,952.5	-1,176.6	3,952.5	0.00	0.00	Projection to Blt @ 12,056' MD - lone 1A-10H PE



Cathedral Energy Services
Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well lone 1A-10H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5012.0ft (Ensign 124)
Site:	S10-T2N-R66W (lone)	MD Reference:	WELL @ 5012.0ft (Ensign 124)
Well:	lone 1A-10H	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 1A-10H PBHL	0.00	0.00	7,471.0	-4,065.3	-1,031.5	1,297,135.48	3,206,200.90	40.146670	-104.762400
- actual wellpath misses target center by 184.7ft at 12056.0ft MD (7452.6 TVD, -3952.5 N, -1176.6 E)									
- Point									
lone 1A-10H PBHL P2	0.00	0.00	7,471.0	-4,065.3	-1,171.5	1,297,134.36	3,206,060.95	40.146670	-104.762901
- actual wellpath misses target center by 114.4ft at 12056.0ft MD (7452.6 TVD, -3952.5 N, -1176.6 E)									
- Point									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
12,006.0	7,453.0	-3,902.5	-1,175.7	Last Cathedral Survey @ 12,006' MD
12,056.0	7,452.6	-3,952.5	-1,176.6	Projection to Blt @ 12,056' MD

Checked By: _____ Approved By: _____ Date: _____