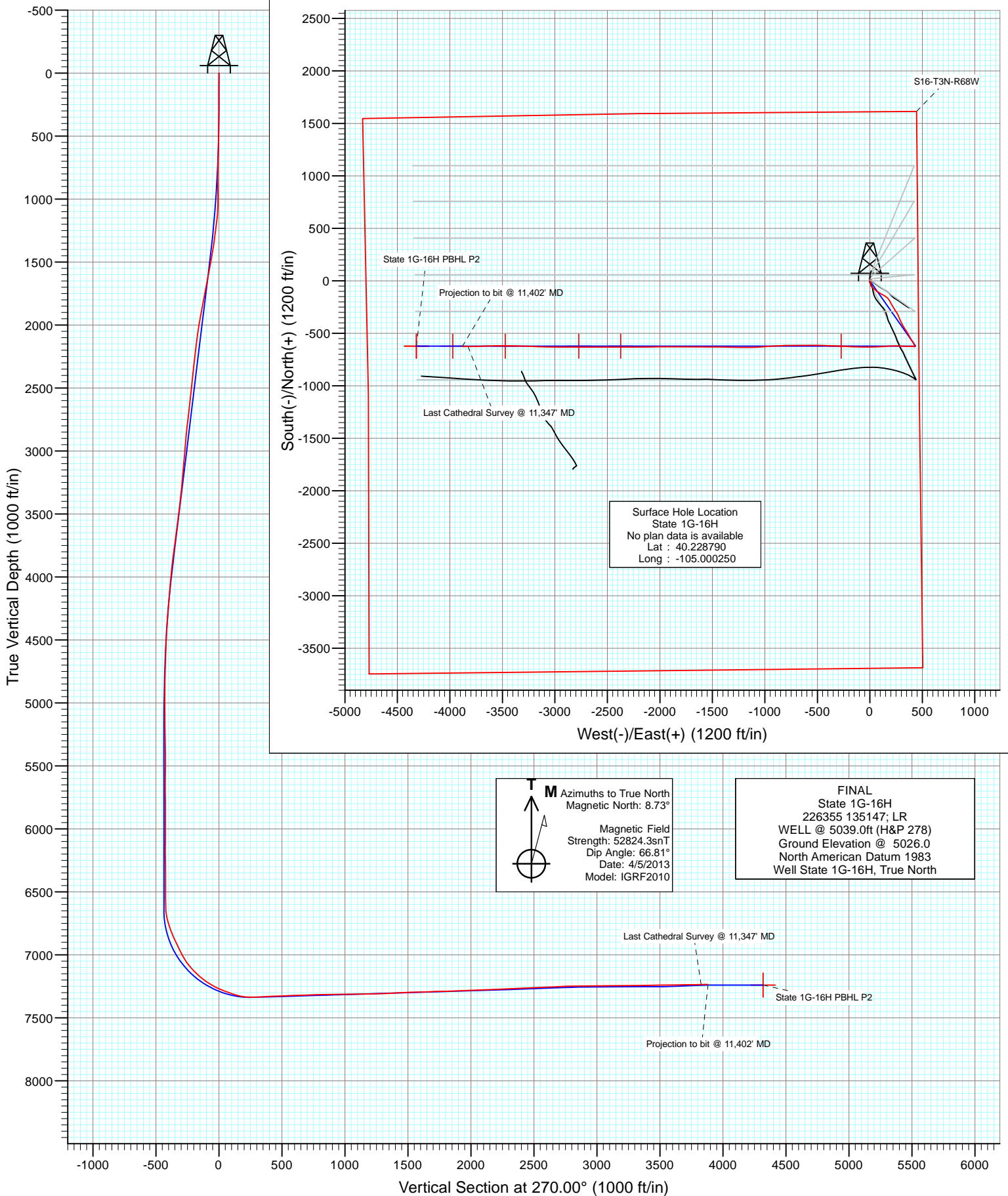




Project: DJ Wattenberg
Site: S16-T3N-R68W (State)
Well: State 1G-16H
Wellbore: Hz
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 1G-16H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5039.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	WELL @ 5039.0ft (H&P 278)
Well:	State 1G-16H	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		S16-T3N-R68W (State)			
Site Position:		Northing:	1,326,575.12 ft	Latitude:	40.228760
From:	Lat/Long	Easting:	3,139,542.66 ft	Longitude:	-105.000250
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.32 °

Well	State 1G-16H					
Well Position	+N/-S	0.0 ft	Northing:	1,326,586.04 ft	Latitude:	40.228790
	+E/-W	0.0 ft	Easting:	3,139,542.59 ft	Longitude:	-105.000250
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,026.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/5/2013	8.73	66.81	52,824

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	270.00

Survey Program	Date	4/23/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
123.0	11,402.0	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	
123.0	0.40	169.70	123.0	-0.4	0.1	-0.1	0.33	0.33	
215.0	0.70	183.40	215.0	-1.3	0.1	-0.1	0.35	0.33	
307.0	0.90	176.70	307.0	-2.6	0.1	-0.1	0.24	0.22	
399.0	2.11	163.90	399.0	-4.9	0.6	-0.6	1.36	1.32	
491.0	1.60	139.10	490.9	-7.5	1.9	-1.9	1.02	-0.55	
583.0	3.47	151.70	582.8	-11.0	4.1	-4.1	2.11	2.03	
675.0	3.12	150.90	674.7	-15.6	6.6	-6.6	0.38	-0.38	
767.0	2.72	172.80	766.5	-19.9	8.1	-8.1	1.28	-0.43	
781.0	2.70	172.70	780.5	-20.6	8.2	-8.2	0.15	-0.14	
895.0	3.50	181.40	894.4	-26.7	8.5	-8.5	0.81	0.70	
986.0	4.60	192.60	985.1	-33.1	7.6	-7.6	1.48	1.21	
1,078.0	7.50	160.40	1,076.6	-42.3	8.8	-8.8	4.74	3.15	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 1G-16H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5039.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	WELL @ 5039.0ft (H&P 278)
Well:	State 1G-16H	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
1,170.0	8.90	136.10	1,167.7	-53.1	15.8	-15.8	4.02	1.52	
1,262.0	10.60	131.50	1,258.4	-63.9	27.0	-27.0	2.03	1.85	
1,354.0	11.00	135.50	1,348.8	-75.7	39.5	-39.5	0.92	0.43	
1,446.0	12.80	130.60	1,438.8	-88.6	53.4	-53.4	2.24	1.96	
1,538.0	13.00	124.40	1,528.5	-101.1	69.7	-69.7	1.52	0.22	
1,630.0	12.00	120.50	1,618.3	-111.8	86.5	-86.5	1.42	-1.09	
1,722.0	12.50	118.40	1,708.2	-121.4	103.5	-103.5	0.73	0.54	
1,815.0	12.30	120.40	1,799.0	-131.2	120.9	-120.9	0.51	-0.22	
1,907.0	12.70	123.30	1,888.8	-141.7	137.8	-137.8	0.81	0.43	
1,999.0	12.20	126.40	1,978.7	-153.0	154.0	-154.0	0.91	-0.54	
2,092.0	11.30	134.20	2,069.7	-165.2	168.5	-168.5	1.96	-0.97	
2,184.0	11.30	143.90	2,160.0	-178.8	180.3	-180.3	2.06	0.00	
2,278.0	12.00	151.20	2,252.0	-194.8	190.4	-190.4	1.73	0.74	
2,373.0	12.50	151.20	2,344.9	-212.4	200.1	-200.1	0.53	0.53	
2,468.0	12.40	149.90	2,437.6	-230.3	210.2	-210.2	0.31	-0.11	
2,562.0	12.30	149.00	2,529.5	-247.6	220.4	-220.4	0.23	-0.11	
2,657.0	11.70	148.70	2,622.4	-264.5	230.6	-230.6	0.63	-0.63	
2,752.0	12.30	144.80	2,715.3	-281.0	241.4	-241.4	1.06	0.63	
2,846.0	11.70	147.70	2,807.2	-297.2	252.3	-252.3	0.90	-0.64	
2,941.0	11.00	151.70	2,900.4	-313.4	261.8	-261.8	1.11	-0.74	
3,036.0	11.30	157.40	2,993.6	-329.9	269.6	-269.6	1.20	0.32	
3,130.0	12.80	155.30	3,085.5	-347.9	277.5	-277.5	1.66	1.60	
3,225.0	11.90	157.00	3,178.3	-366.5	285.7	-285.7	1.02	-0.95	
3,319.0	13.00	155.50	3,270.1	-385.0	293.9	-293.9	1.22	1.17	
3,414.0	13.50	154.80	3,362.6	-404.8	303.1	-303.1	0.55	0.53	
3,509.0	14.00	149.70	3,454.9	-424.7	313.6	-313.6	1.38	0.53	
3,603.0	13.40	149.50	3,546.2	-443.9	324.9	-324.9	0.64	-0.64	
3,698.0	14.00	147.70	3,638.5	-463.1	336.6	-336.6	0.77	0.63	
3,792.0	13.70	147.30	3,729.8	-482.1	348.7	-348.7	0.34	-0.32	
3,887.0	14.00	150.20	3,822.0	-501.5	360.5	-360.5	0.80	0.32	
3,982.0	12.40	150.30	3,914.5	-520.4	371.2	-371.2	1.68	-1.68	
4,076.0	10.70	149.40	4,006.6	-536.7	380.7	-380.7	1.82	-1.81	
4,171.0	9.10	147.60	4,100.2	-550.6	389.2	-389.2	1.72	-1.68	
4,265.0	8.70	147.20	4,193.0	-562.8	397.0	-397.0	0.43	-0.43	
4,360.0	8.20	147.00	4,287.0	-574.6	404.6	-404.6	0.53	-0.53	
4,455.0	7.40	146.90	4,381.1	-585.4	411.6	-411.6	0.84	-0.84	
4,549.0	5.90	156.20	4,474.5	-594.9	416.9	-416.9	1.96	-1.60	
4,644.0	5.60	156.90	4,569.0	-603.6	420.7	-420.7	0.32	-0.32	
4,738.0	4.30	157.00	4,662.7	-611.1	423.9	-423.9	1.38	-1.38	
4,834.0	3.90	156.80	4,758.4	-617.4	426.5	-426.5	0.42	-0.42	
4,928.0	2.50	159.60	4,852.3	-622.2	428.5	-428.5	1.50	-1.49	
5,023.0	1.20	169.30	4,947.2	-625.2	429.4	-429.4	1.40	-1.37	
5,117.0	0.30	251.80	5,041.2	-626.2	429.4	-429.4	1.27	-0.96	
5,212.0	0.70	278.60	5,136.2	-626.2	428.6	-428.6	0.48	0.42	
5,306.0	0.70	270.40	5,230.2	-626.1	427.4	-427.4	0.11	0.00	
5,401.0	1.20	277.20	5,325.2	-626.0	425.9	-425.9	0.54	0.53	
5,496.0	0.20	320.00	5,420.2	-625.7	424.8	-424.8	1.12	-1.05	
5,590.0	0.20	146.60	5,514.2	-625.7	424.7	-424.7	0.42	0.00	
5,685.0	0.50	152.10	5,609.2	-626.2	425.0	-425.0	0.32	0.32	
5,780.0	0.40	222.00	5,704.2	-626.8	425.0	-425.0	0.55	-0.11	
5,874.0	0.50	10.20	5,798.2	-626.7	424.9	-424.9	0.92	0.11	
5,969.0	0.70	341.40	5,893.2	-625.7	424.7	-424.7	0.37	0.21	
6,064.0	0.70	316.90	5,988.2	-624.8	424.2	-424.2	0.31	0.00	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 1G-16H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5039.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	WELL @ 5039.0ft (H&P 278)
Well:	State 1G-16H	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
6,158.0	0.80	112.40	6,082.1	-624.6	424.4	-424.4	1.56	0.11	
6,253.0	0.30	176.80	6,177.1	-625.1	425.0	-425.0	0.76	-0.53	
6,347.0	0.40	270.80	6,271.1	-625.3	424.7	-424.7	0.55	0.11	
6,442.0	0.80	294.30	6,366.1	-625.1	423.8	-423.8	0.49	0.42	
6,537.0	0.40	118.60	6,461.1	-624.9	423.4	-423.4	1.26	-0.42	
6,631.0	0.10	291.40	6,555.1	-625.1	423.7	-423.7	0.53	-0.32	
6,726.0	4.10	271.00	6,650.1	-625.0	420.2	-420.2	4.22	4.21	
6,757.0	9.10	268.30	6,680.8	-625.0	416.6	-416.6	16.16	16.13	
6,789.0	12.70	269.10	6,712.3	-625.2	410.6	-410.6	11.26	11.25	
6,821.0	16.00	269.60	6,743.3	-625.2	402.6	-402.6	10.32	10.31	
6,852.0	18.90	269.90	6,772.8	-625.3	393.3	-393.3	9.36	9.35	
6,884.0	20.10	271.40	6,803.0	-625.2	382.7	-382.7	4.06	3.75	
6,915.0	21.30	272.40	6,832.0	-624.8	371.7	-371.7	4.04	3.87	
6,947.0	23.40	272.90	6,861.6	-624.2	359.6	-359.6	6.59	6.56	
6,978.0	25.20	273.30	6,889.8	-623.5	346.8	-346.8	5.83	5.81	
7,010.0	26.70	274.00	6,918.6	-622.6	332.8	-332.8	4.78	4.69	
7,041.0	27.20	274.20	6,946.2	-621.6	318.8	-318.8	1.64	1.61	
7,073.0	26.50	273.60	6,974.8	-620.7	304.4	-304.4	2.35	-2.19	
7,104.0	27.10	272.70	7,002.5	-619.9	290.5	-290.5	2.34	1.94	
7,136.0	30.80	269.70	7,030.5	-619.6	275.0	-275.0	12.42	11.56	
7,167.0	35.00	268.70	7,056.5	-619.8	258.1	-258.1	13.66	13.55	
7,199.0	37.50	270.00	7,082.3	-620.0	239.2	-239.2	8.17	7.81	
7,231.0	42.00	267.50	7,106.9	-620.5	218.8	-218.8	14.92	14.06	
7,262.0	44.40	267.70	7,129.5	-621.4	197.6	-197.6	7.75	7.74	
7,294.0	46.90	266.40	7,151.8	-622.6	174.7	-174.7	8.33	7.81	
7,325.0	49.00	266.30	7,172.6	-624.0	151.8	-151.8	6.78	6.77	
7,357.0	52.00	266.90	7,193.0	-625.5	127.1	-127.1	9.49	9.37	
7,388.0	55.80	266.90	7,211.2	-626.9	102.1	-102.1	12.26	12.26	
7,420.0	58.50	267.50	7,228.6	-628.2	75.3	-75.3	8.58	8.44	
7,451.0	61.10	268.70	7,244.2	-629.1	48.5	-48.5	9.03	8.39	
7,483.0	62.90	269.20	7,259.2	-629.6	20.2	-20.2	5.79	5.62	
7,514.0	65.80	269.30	7,272.6	-629.9	-7.7	7.7	9.36	9.35	
7,546.0	68.70	269.20	7,285.0	-630.3	-37.2	37.2	9.07	9.06	
7,578.0	70.00	270.50	7,296.3	-630.4	-67.1	67.1	5.56	4.06	
7,609.0	70.50	271.10	7,306.7	-630.0	-96.3	96.3	2.43	1.61	
7,641.0	72.10	271.90	7,317.0	-629.2	-126.6	126.6	5.53	5.00	
7,672.0	76.60	272.90	7,325.4	-627.9	-156.4	156.4	14.84	14.52	
7,704.0	81.10	272.90	7,331.6	-626.4	-187.8	187.8	14.06	14.06	
7,735.0	85.40	273.40	7,335.2	-624.7	-218.5	218.5	13.96	13.87	
7,763.0	89.80	273.60	7,336.4	-623.0	-246.4	246.4	15.73	15.71	
7,821.0	92.10	270.40	7,335.4	-620.9	-304.4	304.4	6.79	3.97	
7,853.0	92.60	272.20	7,334.1	-620.2	-336.3	336.3	5.83	1.56	
7,884.0	92.70	272.20	7,332.7	-619.0	-367.3	367.3	0.32	0.32	
7,916.0	92.70	272.50	7,331.2	-617.7	-399.2	399.2	0.94	0.00	
8,010.0	92.20	270.80	7,327.1	-615.0	-493.1	493.1	1.88	-0.53	
8,105.0	91.70	269.40	7,323.9	-614.8	-588.0	588.0	1.56	-0.53	
8,200.0	92.30	270.00	7,320.6	-615.3	-683.0	683.0	0.89	0.63	
8,294.0	91.80	269.40	7,317.2	-615.8	-776.9	776.9	0.83	-0.53	
8,389.0	91.40	267.40	7,314.6	-618.5	-871.8	871.8	2.15	-0.42	
8,483.0	90.30	265.10	7,313.2	-624.6	-965.6	965.6	2.71	-1.17	
8,578.0	89.70	267.00	7,313.2	-631.2	-1,060.4	1,060.4	2.10	-0.63	
8,672.0	91.50	269.10	7,312.2	-634.4	-1,154.3	1,154.3	2.94	1.91	
8,767.0	92.00	271.50	7,309.3	-633.9	-1,249.3	1,249.3	2.58	0.53	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 1G-16H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5039.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	WELL @ 5039.0ft (H&P 278)
Well:	State 1G-16H	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
8,861.0	92.40	271.30	7,305.7	-631.6	-1,343.2	1,343.2	0.48	0.43	
8,956.0	92.80	270.70	7,301.4	-629.9	-1,438.1	1,438.1	0.76	0.42	
9,051.0	91.40	270.60	7,297.9	-628.8	-1,533.0	1,533.0	1.48	-1.47	
9,145.0	92.00	270.30	7,295.1	-628.1	-1,626.9	1,626.9	0.71	0.64	
9,239.0	92.20	269.40	7,291.7	-628.4	-1,720.9	1,720.9	0.98	0.21	
9,333.0	91.00	269.80	7,289.0	-629.0	-1,814.8	1,814.8	1.35	-1.28	
9,428.0	92.20	270.50	7,286.4	-628.8	-1,909.8	1,909.8	1.46	1.26	
9,522.0	92.20	269.90	7,282.8	-628.4	-2,003.7	2,003.7	0.64	0.00	
9,617.0	92.60	269.10	7,278.8	-629.3	-2,098.6	2,098.6	0.94	0.42	
9,711.0	92.10	269.30	7,274.9	-630.6	-2,192.5	2,192.5	0.57	-0.53	
9,806.0	92.40	270.20	7,271.2	-631.0	-2,287.5	2,287.5	1.00	0.32	
9,901.0	92.70	270.20	7,267.0	-630.7	-2,382.4	2,382.4	0.32	0.32	
9,995.0	92.70	269.40	7,262.6	-631.0	-2,476.3	2,476.3	0.85	0.00	
10,090.0	92.30	270.00	7,258.4	-631.5	-2,571.2	2,571.2	0.76	-0.42	
10,184.0	93.00	270.40	7,254.1	-631.2	-2,665.1	2,665.1	0.86	0.74	
10,279.0	92.20	270.00	7,249.8	-630.8	-2,760.0	2,760.0	0.94	-0.84	
10,374.0	91.10	270.00	7,247.0	-630.8	-2,854.9	2,854.9	1.16	-1.16	
10,468.0	89.60	270.10	7,246.4	-630.7	-2,948.9	2,948.9	1.60	-1.60	
10,563.0	89.70	270.80	7,247.0	-630.0	-3,043.9	3,043.9	0.74	0.11	
10,657.0	90.40	272.00	7,246.9	-627.7	-3,137.9	3,137.9	1.48	0.74	
10,752.0	91.70	271.80	7,245.2	-624.5	-3,232.8	3,232.8	1.38	1.37	
10,847.0	90.60	272.20	7,243.3	-621.2	-3,327.7	3,327.7	1.23	-1.16	
10,941.0	91.00	271.60	7,242.0	-618.1	-3,421.7	3,421.7	0.77	0.43	
11,036.0	90.30	269.40	7,240.9	-617.3	-3,516.7	3,516.7	2.43	-0.74	
11,130.0	90.90	267.90	7,239.9	-619.5	-3,610.6	3,610.6	1.72	0.64	
11,225.0	91.00	267.80	7,238.3	-623.1	-3,705.6	3,705.6	0.15	0.11	
11,320.0	90.50	269.90	7,237.1	-625.0	-3,800.5	3,800.5	2.27	-0.53	
11,347.0	90.90	269.70	7,236.8	-625.1	-3,827.5	3,827.5	1.66	1.48	Last Cathedral Survey @ 11,347' MD
11,402.0	90.90	269.70	7,235.9	-625.4	-3,882.5	3,882.5	0.00	0.00	Projection to bit @ 11,402' MD

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 1G-16H
Project:	DJ Wattenberg	TVD Reference:	WELL @ 5039.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	WELL @ 5039.0ft (H&P 278)
Well:	State 1G-16H	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)		
State 1G-16H PBHL	0.00	0.00	7,257.4	-622.5	-4,319.6	1,325,939.16	3,135,226.62	40.227080	-105.015720
- actual wellpath misses target center by 437.6ft at 11402.0ft MD (7235.9 TVD, -625.4 N, -3882.5 E)									
- Point									
State 1G-16H 7800' MD	0.00	0.00	7,338.0	-622.4	-272.8	1,325,962.10	3,139,273.31	40.227081	-105.001227
- actual wellpath misses target center by 1.9ft at 7789.3ft MD (7336.2 TVD, -621.6 N, -272.7 E)									
- Point									
State 1G-16H 11000' MI	0.00	0.00	7,253.0	-622.5	-3,472.3	1,325,943.96	3,136,073.85	40.227080	-105.012686
- actual wellpath misses target center by 12.9ft at 10991.5ft MD (7241.3 TVD, -617.2 N, -3472.1 E)									
- Point									
State 1G-16H 11500' MI	0.00	0.00	7,240.0	-622.5	-3,972.2	1,325,941.13	3,135,573.93	40.227080	-105.014476
- actual wellpath misses target center by 89.9ft at 11402.0ft MD (7235.9 TVD, -625.4 N, -3882.5 E)									
- Point									
State 1G-16H 9900' MD	0.00	0.00	7,274.0	-622.5	-2,372.5	1,325,950.20	3,137,173.66	40.227081	-105.008747
- actual wellpath misses target center by 10.5ft at 9890.8ft MD (7267.5 TVD, -630.7 N, -2372.2 E)									
- Point									
State 1G-16H PBHL P2	0.00	0.00	7,240.0	-622.5	-4,319.6	1,325,939.16	3,135,226.62	40.227080	-105.015720
- actual wellpath misses target center by 437.1ft at 11402.0ft MD (7235.9 TVD, -625.4 N, -3882.5 E)									
- Point									
State 1G-16H 10300' MI	0.00	0.00	7,259.0	-622.5	-2,772.4	1,325,947.93	3,136,773.73	40.227081	-105.010179
- actual wellpath misses target center by 12.8ft at 10291.2ft MD (7249.3 TVD, -630.8 N, -2772.1 E)									
- Point									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	Comment	
11,347.0	7,236.8	-625.1	-3,827.5	Last Cathedral Survey @ 11,347' MD	
11,402.0	7,235.9	-625.4	-3,882.5	Projection to bit @ 11,402' MD	

Checked By: _____ Approved By: _____ Date: _____