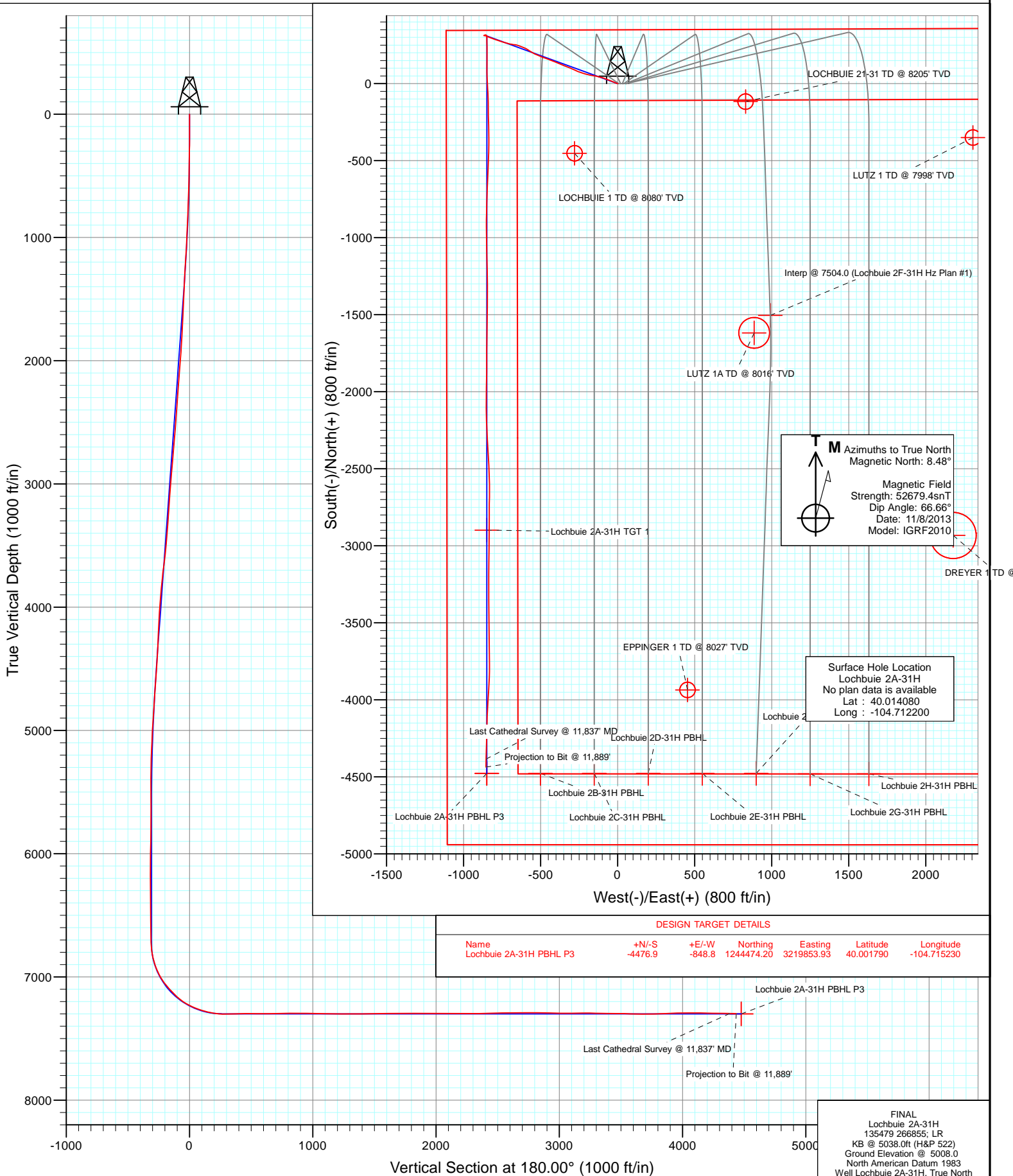


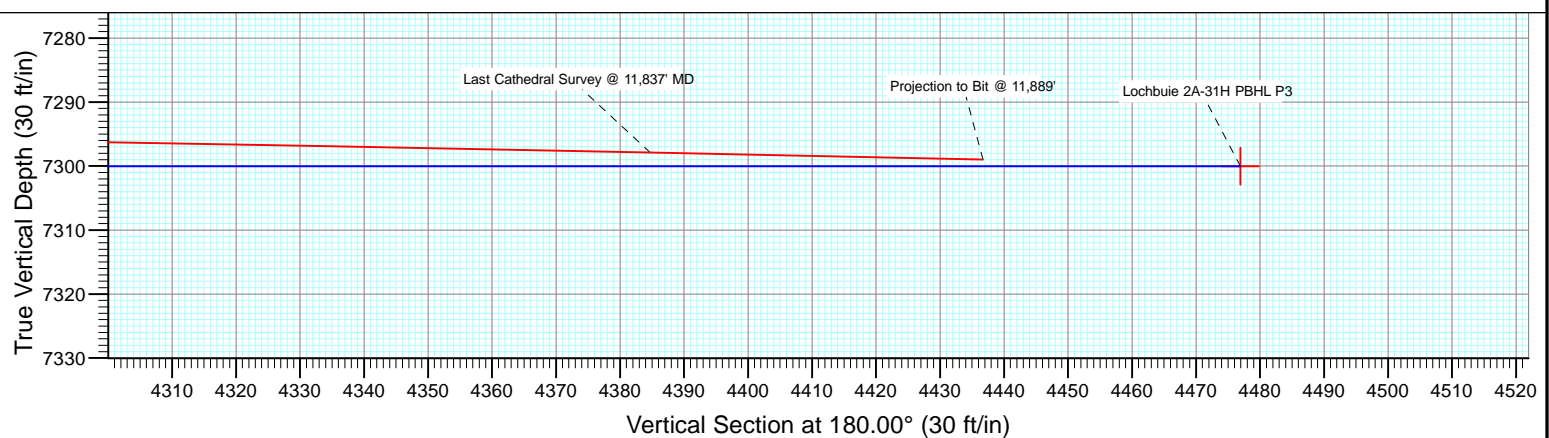
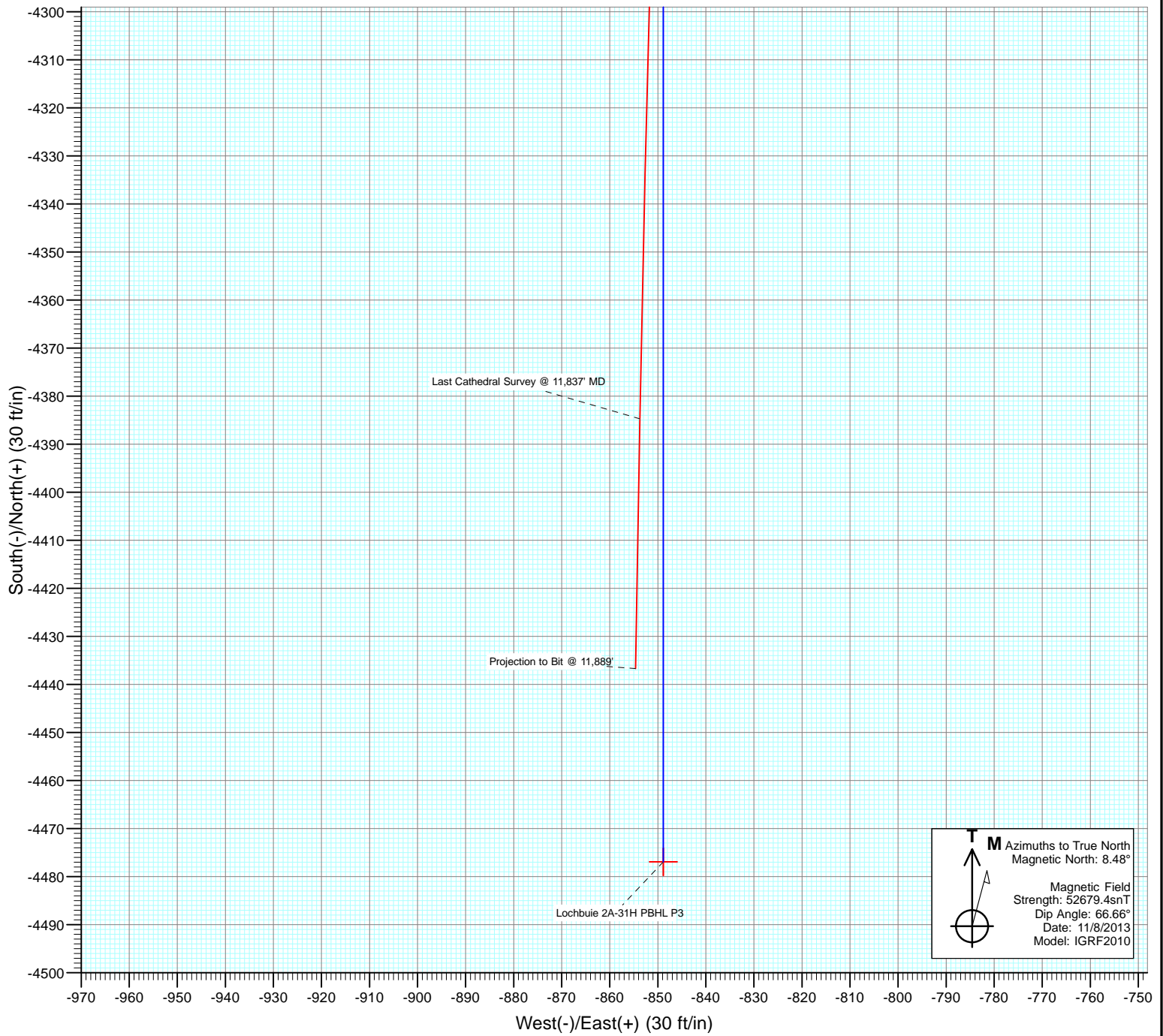


Project: DJ Wattenberg
Site: S31-T1N-R65W (Lochbuie)
Well: Lochbuie 2A-31H
Wellbore: Hz
Design: FINAL





Project: DJ Wattenberg
Site: S31-T1N-R65W (Lochbuie)
Well: Lochbuie 2A-31H
Wellbore: Hz
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lochbuie 2A-31H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5038.0ft (H&P 522)
Site:	S31-T1N-R65W (Lochbuie)	MD Reference:	KB @ 5038.0ft (H&P 522)
Well:	Lochbuie 2A-31H	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	S31-T1N-R65W (Lochbuie)				
Site Position:		Northing:	1,248,958.49 ft	Latitude:	40.014080
From:	Lat/Long	Easting:	3,220,662.97 ft	Longitude:	-104.712200
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.51 °

Well	Lochbuie 2A-31H					
Well Position	+N/-S	0.0 ft	Northing:	1,248,958.48 ft	Latitude:	40.014080
	+E/-W	0.0 ft	Easting:	3,220,662.97 ft	Longitude:	-104.712200
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,008.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/8/2013	8.48	66.66	52,679

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	11/24/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
164.0	11,889.0	Survey #1 (Hz)	Geolink 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		
164.0	0.30	123.50	164.0	-0.2	0.4	0.2	0.18	0.18		
256.0	0.80	286.30	256.0	-0.2	-0.1	0.2	1.18	0.54		
348.0	1.80	292.30	348.0	0.5	-2.0	-0.5	1.10	1.09		
440.0	3.10	287.30	439.9	1.8	-5.7	-1.8	1.43	1.41		
532.0	3.70	292.10	531.7	3.7	-10.8	-3.7	0.72	0.65		
624.0	4.60	294.10	623.5	6.3	-17.0	-6.3	0.99	0.98		
715.0	5.30	293.20	714.1	9.5	-24.2	-9.5	0.77	0.77		
807.0	5.30	291.70	805.7	12.7	-32.0	-12.7	0.15	0.00		
899.0	5.70	292.30	897.3	16.0	-40.2	-16.0	0.44	0.43		
991.0	7.10	294.50	988.7	20.1	-49.6	-20.1	1.54	1.52		
1,083.0	8.00	292.00	1,080.0	24.9	-60.7	-24.9	1.04	0.98		
1,175.0	9.60	290.40	1,170.9	29.9	-73.8	-29.9	1.76	1.74		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lochbuie 2A-31H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5038.0ft (H&P 522)
Site:	S31-T1N-R65W (Lochbuie)	MD Reference:	KB @ 5038.0ft (H&P 522)
Well:	Lochbuie 2A-31H	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
1,267.0	11.30	286.80	1,261.3	35.2	-89.6	-35.2	1.98	1.85	
1,358.0	11.70	285.60	1,350.5	40.3	-107.1	-40.3	0.51	0.44	
1,447.0	11.90	282.60	1,437.6	44.7	-124.7	-44.7	0.72	0.22	
1,546.0	11.60	282.30	1,534.6	49.0	-144.4	-49.0	0.31	-0.30	
1,640.0	12.40	279.70	1,626.5	52.7	-163.6	-52.7	1.03	0.85	
1,735.0	12.60	280.90	1,719.2	56.4	-183.8	-56.4	0.35	0.21	
1,829.0	12.90	286.60	1,810.9	61.4	-203.9	-61.4	1.38	0.32	
1,924.0	13.70	286.70	1,903.4	67.6	-224.9	-67.6	0.84	0.84	
2,019.0	11.80	289.60	1,996.0	74.1	-244.8	-74.1	2.11	-2.00	
2,113.0	11.20	294.10	2,088.2	81.1	-262.2	-81.1	1.15	-0.64	
2,208.0	10.50	293.20	2,181.5	88.2	-278.6	-88.2	0.76	-0.74	
2,302.0	9.90	293.20	2,274.0	94.8	-293.9	-94.8	0.64	-0.64	
2,397.0	10.90	294.00	2,367.4	101.7	-309.6	-101.7	1.06	1.05	
2,492.0	11.70	291.00	2,460.6	108.8	-326.8	-108.8	1.04	0.84	
2,586.0	11.80	290.20	2,552.6	115.5	-344.7	-115.5	0.20	0.11	
2,681.0	12.30	291.60	2,645.5	122.6	-363.2	-122.6	0.61	0.53	
2,776.0	12.40	294.10	2,738.3	130.5	-381.9	-130.5	0.57	0.11	
2,870.0	12.80	292.70	2,830.0	138.6	-400.8	-138.6	0.54	0.43	
2,965.0	11.80	291.40	2,922.9	146.2	-419.5	-146.2	1.09	-1.05	
3,059.0	11.90	291.10	3,014.9	153.2	-437.5	-153.2	0.12	0.11	
3,154.0	11.60	291.80	3,107.9	160.3	-455.5	-160.3	0.35	-0.32	
3,249.0	12.00	288.90	3,200.9	167.0	-473.7	-167.0	0.75	0.42	
3,343.0	11.00	290.50	3,293.0	173.4	-491.4	-173.4	1.12	-1.06	
3,438.0	11.40	292.50	3,386.2	180.1	-508.5	-180.1	0.59	0.42	
3,532.0	12.20	292.60	3,478.2	187.5	-526.3	-187.5	0.85	0.85	
3,627.0	13.60	299.90	3,570.8	196.9	-545.2	-196.9	2.26	1.47	
3,721.0	13.30	299.90	3,662.2	207.8	-564.2	-207.8	0.32	-0.32	
3,816.0	11.50	304.40	3,755.0	218.6	-581.5	-218.6	2.15	-1.89	
3,911.0	10.90	297.10	3,848.2	228.1	-597.3	-228.1	1.62	-0.63	
4,005.0	11.30	292.10	3,940.4	235.6	-613.7	-235.6	1.11	0.43	
4,100.0	10.80	290.10	4,033.7	242.1	-630.7	-242.1	0.66	-0.53	
4,194.0	10.90	289.90	4,126.0	248.2	-647.3	-248.2	0.11	0.11	
4,289.0	12.70	275.80	4,219.0	252.3	-666.2	-252.3	3.56	1.89	
4,384.0	14.00	280.10	4,311.4	255.4	-687.9	-255.4	1.72	1.37	
4,478.0	14.70	283.00	4,402.5	260.0	-710.7	-260.0	1.07	0.74	
4,573.0	14.50	288.00	4,494.4	266.4	-733.8	-266.4	1.34	-0.21	
4,668.0	13.20	286.50	4,586.7	273.2	-755.5	-273.2	1.42	-1.37	
4,762.0	10.90	289.60	4,678.6	279.2	-774.1	-279.2	2.54	-2.45	
4,857.0	11.10	291.50	4,771.8	285.6	-791.1	-285.6	0.44	0.21	
4,951.0	11.20	288.80	4,864.1	291.8	-808.2	-291.8	0.57	0.11	
5,046.0	9.30	290.60	4,957.5	297.5	-824.1	-297.5	2.03	-2.00	
5,141.0	7.90	288.90	5,051.5	302.3	-837.5	-302.3	1.50	-1.47	
5,235.0	6.10	290.80	5,144.8	306.2	-848.2	-306.2	1.93	-1.91	
5,330.0	4.90	298.80	5,239.3	309.9	-856.5	-309.9	1.50	-1.26	
5,424.0	3.30	289.00	5,333.1	312.8	-862.6	-312.8	1.85	-1.70	
5,519.0	1.80	258.10	5,428.0	313.3	-866.6	-313.3	2.09	-1.58	
5,614.0	0.80	187.60	5,523.0	312.4	-868.2	-312.4	1.80	-1.05	
5,708.0	1.10	107.40	5,617.0	311.5	-867.4	-311.5	1.32	0.32	
5,803.0	0.90	61.50	5,712.0	311.5	-865.9	-311.5	0.84	-0.21	
5,898.0	1.50	69.70	5,806.9	312.3	-864.1	-312.3	0.66	0.63	
5,992.0	1.40	32.90	5,900.9	313.7	-862.3	-313.7	0.98	-0.11	
6,087.0	1.00	54.60	5,995.9	315.2	-861.0	-315.2	0.63	-0.42	
6,182.0	1.40	54.40	6,090.9	316.3	-859.4	-316.3	0.42	0.42	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lochbuie 2A-31H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5038.0ft (H&P 522)
Site:	S31-T1N-R65W (Lochbuie)	MD Reference:	KB @ 5038.0ft (H&P 522)
Well:	Lochbuie 2A-31H	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
6,276.0	1.00	156.80	6,184.9	316.2	-858.1	-316.2	2.01	-0.43	
6,371.0	1.10	100.90	6,279.8	315.3	-856.9	-315.3	1.04	0.11	
6,465.0	1.60	88.20	6,373.8	315.2	-854.7	-315.2	0.62	0.53	
6,560.0	1.10	99.50	6,468.8	315.1	-852.5	-315.1	0.59	-0.53	
6,655.0	1.20	161.80	6,563.8	314.0	-851.2	-314.0	1.26	0.11	
6,749.0	1.00	150.60	6,657.8	312.3	-850.5	-312.3	0.31	-0.21	
6,780.0	0.60	149.60	6,688.8	312.0	-850.3	-312.0	1.29	-1.29	
6,812.0	1.90	155.70	6,720.7	311.3	-850.0	-311.3	4.08	4.06	
6,843.0	4.70	164.40	6,751.7	309.6	-849.5	-309.6	9.15	9.03	
6,875.0	7.80	179.60	6,783.5	306.2	-849.1	-306.2	10.90	9.69	
6,906.0	9.90	184.00	6,814.1	301.4	-849.3	-301.4	7.11	6.77	
6,938.0	12.40	181.80	6,845.5	295.3	-849.6	-295.3	7.92	7.81	
6,969.0	15.60	179.00	6,875.6	287.8	-849.6	-287.8	10.55	10.32	
7,001.0	18.80	176.90	6,906.2	278.3	-849.2	-278.3	10.18	10.00	
7,032.0	22.40	177.60	6,935.2	267.4	-848.7	-267.4	11.64	11.61	
7,064.0	25.50	178.70	6,964.4	254.4	-848.3	-254.4	9.79	9.69	
7,095.0	28.50	178.50	6,992.0	240.4	-848.0	-240.4	9.68	9.68	
7,127.0	32.40	178.30	7,019.6	224.2	-847.5	-224.2	12.19	12.19	
7,158.0	35.80	179.60	7,045.3	206.8	-847.2	-206.8	11.22	10.97	
7,190.0	39.80	180.60	7,070.6	187.2	-847.2	-187.2	12.65	12.50	
7,221.0	41.60	181.40	7,094.1	167.0	-847.6	-167.0	6.05	5.81	
7,253.0	43.70	180.50	7,117.6	145.3	-848.0	-145.3	6.83	6.56	
7,284.0	44.50	180.20	7,139.9	123.7	-848.1	-123.7	2.67	2.58	
7,316.0	47.50	180.30	7,162.1	100.7	-848.2	-100.7	9.38	9.37	
7,348.0	51.40	179.70	7,182.9	76.4	-848.2	-76.4	12.27	12.19	
7,379.0	55.90	178.10	7,201.3	51.4	-847.7	-51.4	15.10	14.52	
7,411.0	59.30	177.20	7,218.4	24.4	-846.6	-24.4	10.89	10.62	
7,442.0	63.40	176.40	7,233.3	-2.7	-845.1	2.7	13.42	13.23	
7,474.0	66.40	176.60	7,246.8	-31.6	-843.3	31.6	9.39	9.37	
7,505.0	69.70	177.20	7,258.4	-60.3	-841.7	60.3	10.80	10.65	
7,537.0	72.00	178.20	7,268.9	-90.5	-840.5	90.5	7.77	7.19	
7,568.0	73.80	179.20	7,278.0	-120.2	-839.9	120.2	6.57	5.81	
7,600.0	76.40	179.40	7,286.3	-151.1	-839.5	151.1	8.15	8.12	
7,631.0	79.30	179.70	7,292.8	-181.4	-839.2	181.4	9.40	9.35	
7,646.0	80.70	179.60	7,295.4	-196.2	-839.2	196.2	9.36	9.33	
7,719.0	88.80	177.80	7,302.1	-268.8	-837.5	268.8	11.36	11.10	
7,814.0	93.00	179.90	7,300.6	-363.7	-835.6	363.7	4.94	4.42	
7,908.0	89.70	182.30	7,298.4	-457.6	-837.4	457.6	4.34	-3.51	
8,003.0	89.20	182.10	7,299.3	-552.6	-841.0	552.6	0.57	-0.53	
8,097.0	91.00	182.40	7,299.1	-646.5	-844.7	646.5	1.94	1.91	
8,192.0	91.20	181.80	7,297.3	-741.4	-848.2	741.4	0.67	0.21	
8,286.0	89.80	181.10	7,296.5	-835.4	-850.6	835.4	1.67	-1.49	
8,381.0	90.00	180.00	7,296.6	-930.4	-851.5	930.4	1.18	0.21	
8,475.0	89.00	179.30	7,297.4	-1,024.4	-850.9	1,024.4	1.30	-1.06	
8,570.0	88.30	178.70	7,299.7	-1,119.3	-849.3	1,119.3	0.97	-0.74	
8,664.0	89.80	178.20	7,301.2	-1,213.3	-846.7	1,213.3	1.68	1.60	
8,759.0	90.50	179.50	7,301.0	-1,308.3	-844.8	1,308.3	1.55	0.74	
8,853.0	90.70	181.00	7,300.0	-1,402.2	-845.2	1,402.2	1.61	0.21	
8,948.0	90.00	180.80	7,299.4	-1,497.2	-846.7	1,497.2	0.77	-0.74	
9,043.0	90.00	181.00	7,299.4	-1,592.2	-848.2	1,592.2	0.21	0.00	
9,137.0	91.70	180.10	7,298.0	-1,686.2	-849.1	1,686.2	2.05	1.81	
9,232.0	90.80	180.40	7,296.0	-1,781.2	-849.5	1,781.2	1.00	-0.95	
9,326.0	89.50	180.50	7,295.7	-1,875.2	-850.3	1,875.2	1.39	-1.38	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lochbuie 2A-31H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5038.0ft (H&P 522)
Site:	S31-T1N-R65W (Lochbuie)	MD Reference:	KB @ 5038.0ft (H&P 522)
Well:	Lochbuie 2A-31H	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
9,421.0	89.50	180.70	7,296.5	-1,970.2	-851.3	1,970.2	0.21	0.00	
9,516.0	89.60	180.50	7,297.3	-2,065.2	-852.3	2,065.2	0.24	0.11	
9,610.0	89.40	179.40	7,298.1	-2,159.1	-852.2	2,159.1	1.19	-0.21	
9,705.0	89.50	176.70	7,299.0	-2,254.1	-848.9	2,254.1	2.84	0.11	
9,799.0	91.30	176.10	7,298.4	-2,347.9	-843.0	2,347.9	2.02	1.91	
9,894.0	91.60	177.10	7,296.0	-2,442.7	-837.4	2,442.7	1.10	0.32	
9,989.0	90.90	178.60	7,293.9	-2,537.6	-833.9	2,537.6	1.74	-0.74	
10,083.0	90.50	180.10	7,292.7	-2,631.6	-832.8	2,631.6	1.65	-0.43	
10,178.0	90.80	180.00	7,291.7	-2,726.6	-832.9	2,726.6	0.33	0.32	
10,272.0	88.80	180.60	7,292.0	-2,820.6	-833.4	2,820.6	2.22	-2.13	
10,367.0	89.20	180.60	7,293.6	-2,915.5	-834.4	2,915.5	0.42	0.42	
10,461.0	89.10	180.00	7,295.0	-3,009.5	-834.8	3,009.5	0.65	-0.11	
10,556.0	90.90	180.60	7,295.0	-3,104.5	-835.3	3,104.5	2.00	1.89	
10,650.0	90.20	180.10	7,294.1	-3,198.5	-835.9	3,198.5	0.92	-0.74	
10,745.0	88.70	180.40	7,295.1	-3,293.5	-836.3	3,293.5	1.61	-1.58	
10,840.0	88.80	179.50	7,297.1	-3,388.5	-836.3	3,388.5	0.95	0.11	
10,934.0	89.70	179.30	7,298.4	-3,482.5	-835.3	3,482.5	0.98	0.96	
11,029.0	88.10	178.80	7,300.2	-3,577.4	-833.7	3,577.4	1.76	-1.68	
11,124.0	89.70	179.30	7,302.0	-3,672.4	-832.1	3,672.4	1.76	1.68	
11,218.0	90.40	179.90	7,301.9	-3,766.4	-831.5	3,766.4	0.98	0.74	
11,313.0	93.40	182.20	7,298.8	-3,861.3	-833.2	3,861.3	3.98	3.16	
11,408.0	91.50	184.10	7,294.7	-3,956.1	-838.4	3,956.1	2.83	-2.00	
11,502.0	90.20	182.60	7,293.3	-4,049.9	-843.9	4,049.9	2.11	-1.38	
11,597.0	89.20	181.80	7,293.8	-4,144.8	-847.6	4,144.8	1.35	-1.05	
11,691.0	89.10	181.50	7,295.2	-4,238.8	-850.3	4,238.8	0.34	-0.11	
11,786.0	88.90	181.40	7,296.9	-4,333.7	-852.7	4,333.7	0.24	-0.21	
11,837.0	88.80	181.00	7,297.9	-4,384.7	-853.7	4,384.7	0.81	-0.20	Last Cathedral Survey @ 11,837' MD Projection to Bit @ 11,889'
11,889.0	88.80	181.00	7,299.0	-4,436.7	-854.6	4,436.7	0.00	0.00	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lochbuie 2A-31H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5038.0ft (H&P 522)
Site:	S31-T1N-R65W (Lochbuie)	MD Reference:	KB @ 5038.0ft (H&P 522)
Well:	Lochbuie 2A-31H	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									
Lochbuie 2A-31H PBHL	0.00	0.00	7,300.0	-4,476.9	-848.8	1,244,474.20	3,219,853.93	40.001790	-104.715230
- actual wellpath misses target center by 40.6ft at 11889.0ft MD (7299.0 TVD, -4436.7 N, -854.6 E)									
- Point									
Lochbuie 2A-31H PBHL	0.00	0.00	7,284.0	-4,476.9	-848.8	1,244,474.20	3,219,853.93	40.001790	-104.715230
- actual wellpath misses target center by 43.3ft at 11889.0ft MD (7299.0 TVD, -4436.7 N, -854.6 E)									
- Point									
Lochbuie 2A-31H TGT 1	0.00	0.00	7,300.0	-2,898.0	-848.8	1,246,053.04	3,219,839.91	40.006124	-104.715230
- actual wellpath misses target center by 16.1ft at 10349.7ft MD (7293.4 TVD, -2898.3 N, -834.2 E)									
- Point									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
11,837.0	7,297.9	-4,384.7	-853.7	Last Cathedral Survey @ 11,837' MD
11,889.0	7,299.0	-4,436.7	-854.6	Projection to Bit @ 11,889'

Checked By: _____ Approved By: _____ Date: _____