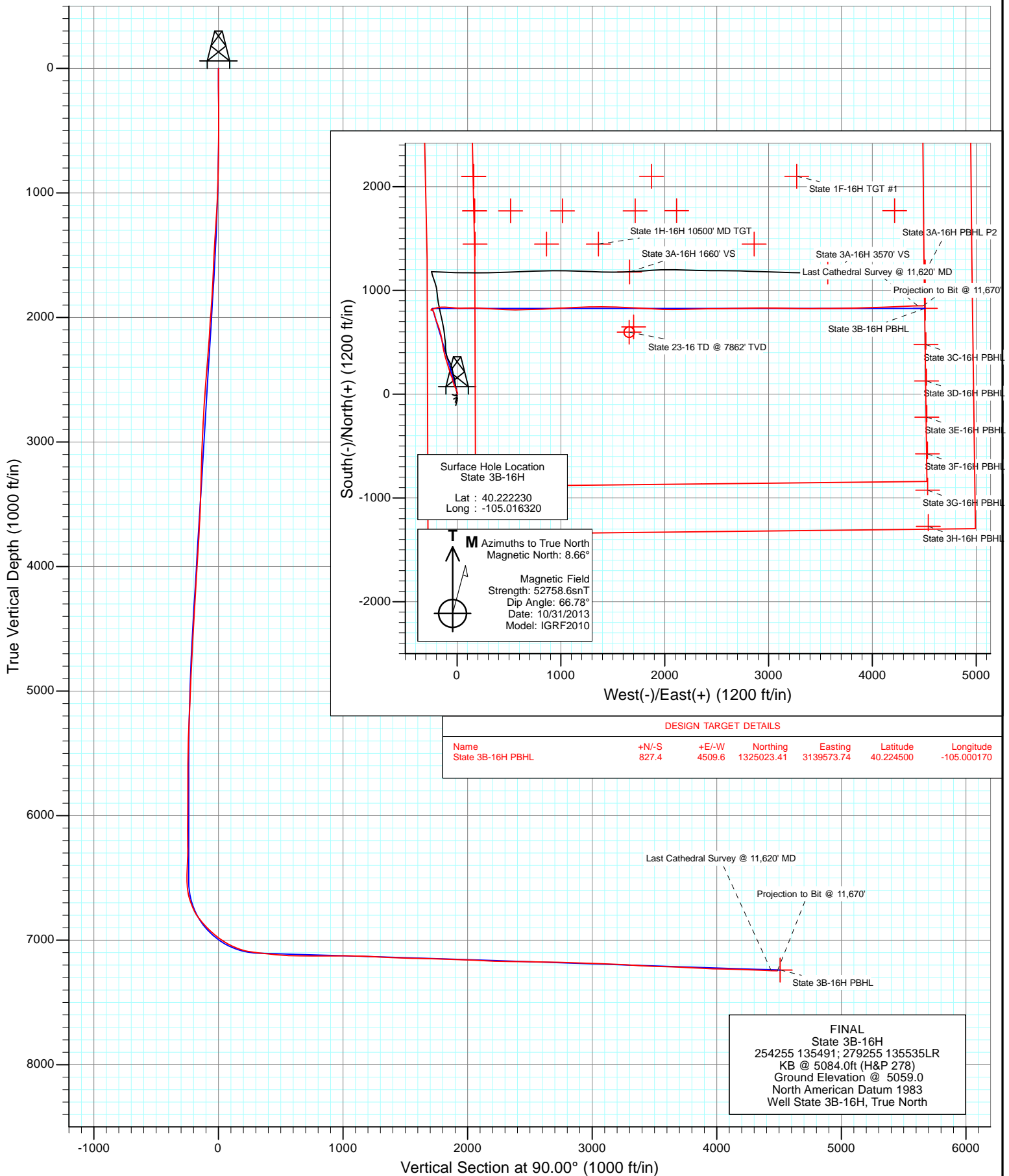


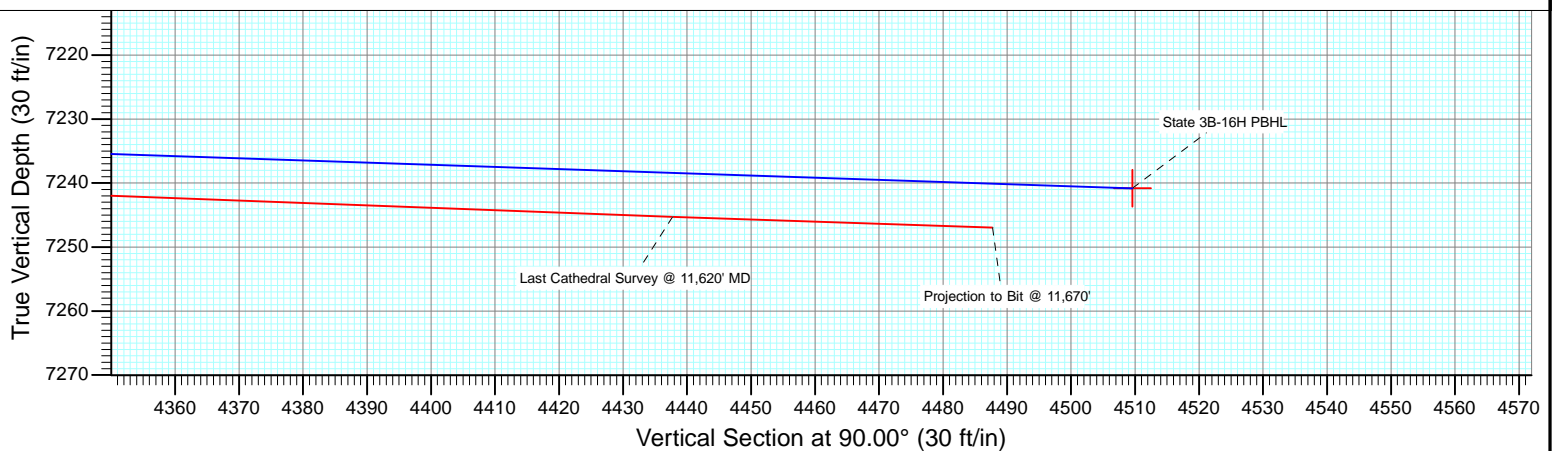
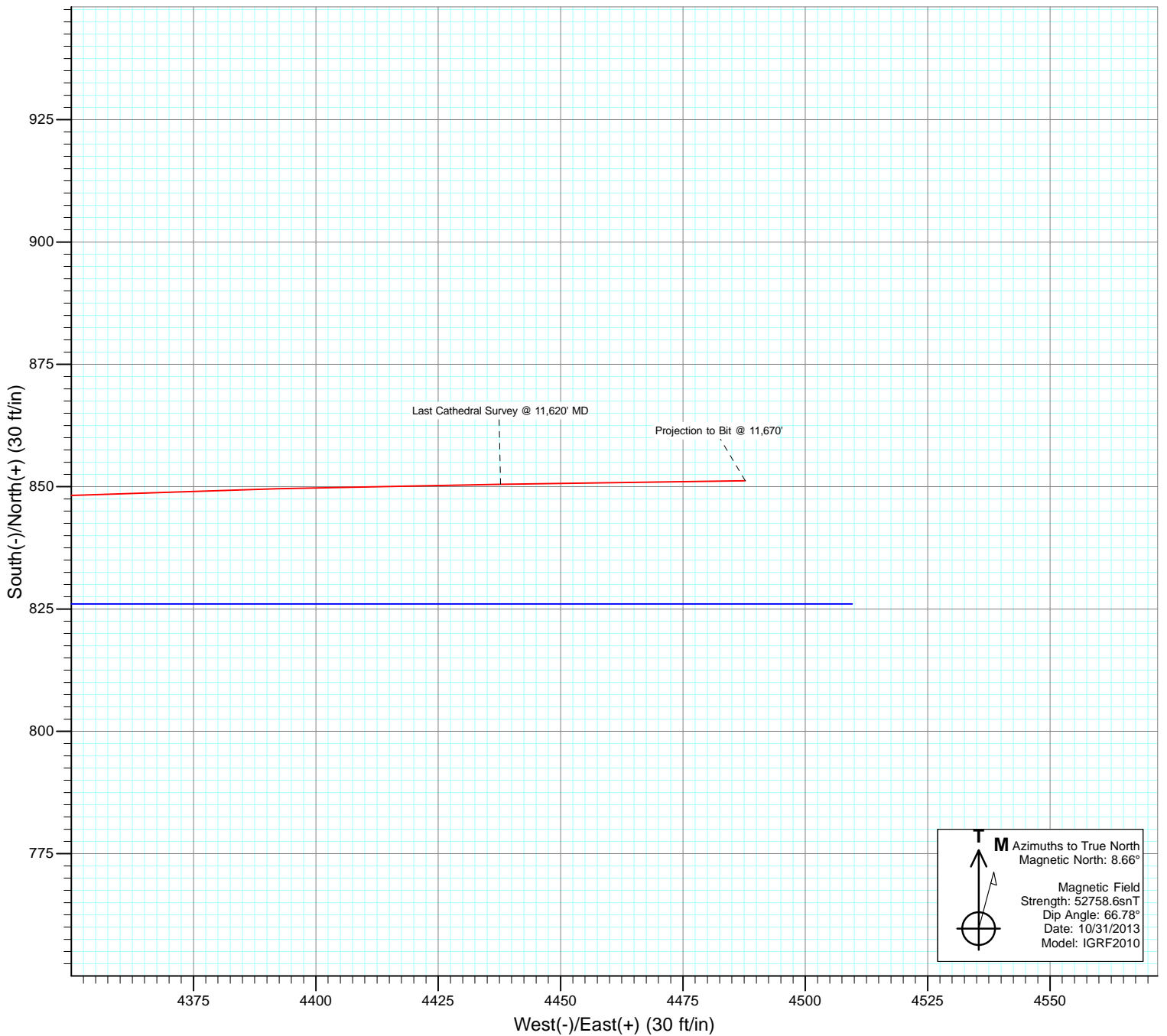


Project: DJ Wattenberg
Site: S16-T3N-R68W (State)
Well: State 3B-16H
Wellbore: Hz
Design: FINAL





Project: DJ Wattenberg
Site: S16-T3N-R68W (State)
Well: State 3B-16H
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 3B-16H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5084.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	KB @ 5084.0ft (H&P 278)
Well:	State 3B-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 3B-16H					
Well Position	+N/-S	0.0 ft	Northing:	1,324,171.47 ft	Latitude:	40.222230
	+E/-W	0.0 ft	Easting:	3,135,068.73 ft	Longitude:	-105.016320
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,059.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/31/2013	8.66	66.78	52,759

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	90.00	

Survey Program	Date	11/14/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
144.0	11,670.0	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		
144.0	0.60	57.40	144.0	0.4	0.6	0.6	0.42	0.42		
235.0	0.70	50.10	235.0	1.0	1.5	1.5	0.14	0.11		
327.0	0.70	41.80	327.0	1.8	2.3	2.3	0.11	0.00		
419.0	1.10	6.20	419.0	3.1	2.7	2.7	0.73	0.43		
511.0	2.00	351.50	510.9	5.6	2.6	2.6	1.06	0.98		
603.0	2.80	345.70	602.9	9.3	1.8	1.8	0.91	0.87		
695.0	3.40	346.60	694.7	14.2	0.6	0.6	0.65	0.65		
787.0	4.20	346.60	786.5	20.1	-0.8	-0.8	0.87	0.87		
842.0	4.90	346.50	841.3	24.3	-1.8	-1.8	1.27	1.27		
918.0	5.20	342.60	917.1	30.8	-3.6	-3.6	0.60	0.39		
1,010.0	6.50	339.40	1,008.6	39.6	-6.7	-6.7	1.46	1.41		
1,102.0	7.90	339.30	1,099.8	50.4	-10.7	-10.7	1.52	1.52		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 3B-16H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5084.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	KB @ 5084.0ft (H&P 278)
Well:	State 3B-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
1,194.0	7.10	328.90	1,191.1	61.2	-15.9	-15.9	1.71	-0.87	
1,286.0	7.80	330.40	1,282.3	71.5	-21.9	-21.9	0.79	0.76	
1,378.0	8.70	341.70	1,373.3	83.5	-27.2	-27.2	2.01	0.98	
1,469.0	9.40	339.90	1,463.2	97.0	-31.9	-31.9	0.83	0.77	
1,561.0	8.90	342.00	1,554.0	110.9	-36.7	-36.7	0.65	-0.54	
1,653.0	9.80	342.80	1,644.8	125.1	-41.2	-41.2	0.99	0.98	
1,745.0	11.50	348.70	1,735.2	141.6	-45.3	-45.3	2.19	1.85	
1,837.0	11.80	343.40	1,825.3	159.6	-49.8	-49.8	1.21	0.33	
1,929.0	10.50	334.20	1,915.6	176.2	-56.2	-56.2	2.39	-1.41	
2,024.0	11.80	341.20	2,008.8	193.2	-63.0	-63.0	1.97	1.37	
2,119.0	14.00	343.80	2,101.4	213.4	-69.4	-69.4	2.39	2.32	
2,214.0	14.10	346.10	2,193.6	235.7	-75.4	-75.4	0.60	0.11	
2,309.0	14.00	342.10	2,285.7	257.8	-81.7	-81.7	1.03	-0.11	
2,403.0	13.80	342.10	2,377.0	279.3	-88.6	-88.6	0.21	-0.21	
2,498.0	14.20	338.80	2,469.2	301.0	-96.3	-96.3	0.94	0.42	
2,593.0	13.50	340.40	2,561.4	322.3	-104.3	-104.3	0.84	-0.74	
2,688.0	14.50	346.40	2,653.6	344.3	-110.8	-110.8	1.85	1.05	
2,783.0	13.80	347.70	2,745.7	366.9	-116.0	-116.0	0.81	-0.74	
2,878.0	11.80	343.30	2,838.3	387.3	-121.2	-121.2	2.34	-2.11	
2,973.0	11.90	349.10	2,931.3	406.2	-125.8	-125.8	1.26	0.11	
3,068.0	10.70	345.50	3,024.5	424.4	-129.9	-129.9	1.46	-1.26	
3,163.0	11.20	351.20	3,117.7	442.0	-133.5	-133.5	1.25	0.53	
3,257.0	9.90	345.30	3,210.1	458.9	-137.0	-137.0	1.80	-1.38	
3,352.0	9.90	353.80	3,303.7	474.9	-139.9	-139.9	1.54	0.00	
3,447.0	10.50	353.50	3,397.2	491.6	-141.8	-141.8	0.63	0.63	
3,543.0	11.30	353.70	3,491.5	509.6	-143.8	-143.8	0.83	0.83	
3,638.0	12.60	346.00	3,584.4	528.9	-147.3	-147.3	2.16	1.37	
3,733.0	14.60	349.10	3,676.8	550.8	-152.1	-152.1	2.24	2.11	
3,828.0	14.80	347.60	3,768.7	574.4	-157.0	-157.0	0.45	0.21	
3,923.0	12.70	345.70	3,860.9	596.3	-162.2	-162.2	2.26	-2.21	
4,019.0	11.10	341.50	3,954.9	615.3	-167.7	-167.7	1.89	-1.67	
4,113.0	9.60	338.40	4,047.3	631.2	-173.4	-173.4	1.70	-1.60	
4,209.0	11.30	341.40	4,141.8	647.6	-179.4	-179.4	1.86	1.77	
4,304.0	10.90	340.40	4,235.0	664.8	-185.4	-185.4	0.47	-0.42	
4,399.0	9.00	339.00	4,328.5	680.2	-191.1	-191.1	2.02	-2.00	
4,494.0	9.50	341.70	4,422.3	694.6	-196.2	-196.2	0.70	0.53	
4,589.0	9.20	340.00	4,516.0	709.2	-201.2	-201.2	0.43	-0.32	
4,684.0	10.50	342.50	4,609.6	724.6	-206.4	-206.4	1.44	1.37	
4,779.0	11.40	347.60	4,702.9	742.0	-211.1	-211.1	1.39	0.95	
4,874.0	9.40	344.90	4,796.3	758.7	-215.1	-215.1	2.17	-2.11	
4,969.0	7.80	341.60	4,890.3	772.3	-219.2	-219.2	1.76	-1.68	
5,064.0	6.90	337.70	4,984.5	783.7	-223.4	-223.4	1.08	-0.95	
5,158.0	5.80	334.90	5,077.9	793.2	-227.5	-227.5	1.22	-1.17	
5,254.0	5.00	327.40	5,173.5	801.1	-231.8	-231.8	1.11	-0.83	
5,349.0	4.00	324.50	5,268.2	807.3	-236.0	-236.0	1.08	-1.05	
5,444.0	2.90	311.10	5,363.0	811.6	-239.7	-239.7	1.43	-1.16	
5,538.0	2.40	334.50	5,456.9	814.9	-242.3	-242.3	1.26	-0.53	
5,633.0	2.00	306.10	5,551.9	817.7	-244.5	-244.5	1.21	-0.42	
5,728.0	1.60	27.50	5,646.8	819.9	-245.3	-245.3	2.49	-0.42	
5,823.0	0.90	18.80	5,741.8	821.7	-244.4	-244.4	0.76	-0.74	
5,917.0	0.60	315.40	5,835.8	822.8	-244.5	-244.5	0.88	-0.32	
6,012.0	0.60	251.90	5,930.8	823.0	-245.3	-245.3	0.66	0.00	
6,107.0	0.80	234.20	6,025.8	822.4	-246.4	-246.4	0.31	0.21	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 3B-16H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5084.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	KB @ 5084.0ft (H&P 278)
Well:	State 3B-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
6,201.0	2.50	169.10	6,119.8	820.0	-246.5	-246.5	2.43	1.81	
6,296.0	2.80	170.20	6,214.6	815.7	-245.7	-245.7	0.32	0.32	
6,391.0	1.50	249.30	6,309.6	813.0	-246.5	-246.5	3.07	-1.37	
6,486.0	1.90	236.00	6,404.6	811.7	-249.0	-249.0	0.59	0.42	
6,548.0	2.20	330.00	6,466.5	812.1	-250.4	-250.4	4.85	0.48	
6,579.0	2.30	226.30	6,497.5	812.2	-251.2	-251.2	11.42	0.32	
6,611.0	1.10	179.00	6,529.5	811.5	-251.6	-251.6	5.47	-3.75	
6,642.0	3.60	76.70	6,560.5	811.4	-250.7	-250.7	12.84	8.06	
6,674.0	7.80	64.40	6,592.3	812.6	-247.7	-247.7	13.59	13.12	
6,705.0	12.60	62.30	6,622.8	815.0	-242.8	-242.8	15.53	15.48	
6,737.0	17.40	65.10	6,653.7	818.7	-235.4	-235.4	15.17	15.00	
6,768.0	20.00	66.60	6,683.1	822.7	-226.3	-226.3	8.53	8.39	
6,800.0	21.70	70.40	6,713.0	826.9	-215.7	-215.7	6.79	5.31	
6,831.0	23.90	74.80	6,741.6	830.5	-204.3	-204.3	8.97	7.10	
6,863.0	27.90	78.20	6,770.3	833.7	-190.7	-190.7	13.33	12.50	
6,894.0	33.00	82.80	6,797.1	836.3	-175.2	-175.2	18.08	16.45	
6,926.0	36.90	87.50	6,823.3	837.8	-156.9	-156.9	14.80	12.19	
6,958.0	40.00	90.00	6,848.4	838.2	-137.0	-137.0	10.84	9.69	
6,989.0	41.70	90.80	6,871.8	838.0	-116.8	-116.8	5.74	5.48	
7,021.0	43.40	92.20	6,895.4	837.5	-95.1	-95.1	6.08	5.31	
7,053.0	45.80	95.20	6,918.2	836.0	-72.7	-72.7	9.98	7.50	
7,084.0	48.20	96.90	6,939.3	833.6	-50.2	-50.2	8.72	7.74	
7,116.0	50.90	95.40	6,960.1	831.0	-26.0	-26.0	9.16	8.44	
7,147.0	52.80	92.50	6,979.2	829.3	-1.7	-1.7	9.57	6.13	
7,179.0	55.60	90.60	6,997.9	828.6	24.3	24.3	9.99	8.75	
7,210.0	58.20	89.50	7,014.9	828.6	50.2	50.2	8.90	8.39	
7,242.0	60.70	88.80	7,031.1	829.0	77.8	77.8	8.04	7.81	
7,273.0	63.80	88.60	7,045.6	829.7	105.2	105.2	10.02	10.00	
7,305.0	67.20	89.30	7,058.8	830.2	134.3	134.3	10.81	10.62	
7,337.0	70.20	90.80	7,070.4	830.2	164.1	164.1	10.34	9.37	
7,368.0	73.80	92.00	7,080.0	829.4	193.6	193.6	12.18	11.61	
7,400.0	77.30	92.70	7,088.0	828.2	224.6	224.6	11.14	10.94	
7,431.0	80.70	93.00	7,093.9	826.6	255.0	255.0	11.01	10.97	
7,463.0	83.60	92.90	7,098.3	825.0	286.6	286.6	9.07	9.06	
7,550.0	83.90	94.00	7,107.8	819.8	372.9	372.9	1.30	0.34	
7,645.0	83.90	92.10	7,117.9	814.8	467.3	467.3	1.99	0.00	
7,739.0	88.40	89.90	7,124.2	813.2	561.0	561.0	5.33	4.79	
7,834.0	89.10	88.50	7,126.2	814.5	656.0	656.0	1.65	0.74	
7,929.0	89.90	88.50	7,127.1	817.0	750.9	750.9	0.84	0.84	
8,024.0	89.70	87.60	7,127.4	820.2	845.9	845.9	0.97	-0.21	
8,118.0	90.00	85.70	7,127.6	825.7	939.7	939.7	2.05	0.32	
8,213.0	90.50	87.80	7,127.2	831.1	1,034.6	1,034.6	2.27	0.53	
8,308.0	88.20	87.10	7,128.3	835.3	1,129.4	1,129.4	2.53	-2.42	
8,403.0	87.40	87.80	7,132.0	839.5	1,224.3	1,224.3	1.12	-0.84	
8,497.0	86.80	89.50	7,136.7	841.7	1,318.1	1,318.1	1.92	-0.64	
8,592.0	88.00	90.30	7,141.0	841.9	1,413.0	1,413.0	1.52	1.26	
8,687.0	87.60	90.90	7,144.7	840.9	1,508.0	1,508.0	0.76	-0.42	
8,782.0	89.10	93.60	7,147.4	837.2	1,602.8	1,602.8	3.25	1.58	
8,876.0	87.80	92.70	7,150.0	832.0	1,696.6	1,696.6	1.68	-1.38	
8,971.0	88.70	93.50	7,152.9	826.9	1,791.5	1,791.5	1.27	0.95	
9,066.0	88.90	92.60	7,154.8	821.8	1,886.3	1,886.3	0.97	0.21	
9,160.0	87.20	92.60	7,158.0	817.6	1,980.2	1,980.2	1.81	-1.81	
9,255.0	86.80	89.70	7,163.0	815.7	2,075.0	2,075.0	3.08	-0.42	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State 3B-16H
Project:	DJ Wattenberg	TVD Reference:	KB @ 5084.0ft (H&P 278)
Site:	S16-T3N-R68W (State)	MD Reference:	KB @ 5084.0ft (H&P 278)
Well:	State 3B-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
9,350.0	87.50	88.80	7,167.7	816.9	2,169.9	2,169.9	1.20	0.74	
9,444.0	89.10	87.90	7,170.5	819.6	2,263.8	2,263.8	1.95	1.70	
9,539.0	88.90	89.30	7,172.2	821.9	2,358.7	2,358.7	1.49	-0.21	
9,634.0	89.40	89.50	7,173.6	822.9	2,453.7	2,453.7	0.57	0.53	
9,729.0	89.00	88.90	7,174.9	824.3	2,548.7	2,548.7	0.76	-0.42	
9,823.0	88.80	89.30	7,176.7	825.7	2,642.7	2,642.7	0.48	-0.21	
9,918.0	88.50	88.70	7,179.0	827.4	2,737.6	2,737.6	0.71	-0.32	
10,013.0	88.40	89.20	7,181.5	829.1	2,832.6	2,832.6	0.54	-0.11	
10,108.0	87.60	89.40	7,184.8	830.3	2,927.5	2,927.5	0.87	-0.84	
10,203.0	88.10	90.60	7,188.4	830.3	3,022.4	3,022.4	1.37	0.53	
10,298.0	88.30	92.20	7,191.4	828.0	3,117.4	3,117.4	1.70	0.21	
10,392.0	87.10	90.30	7,195.2	825.9	3,211.3	3,211.3	2.39	-1.28	
10,487.0	86.00	90.40	7,200.9	825.3	3,306.1	3,306.1	1.16	-1.16	
10,582.0	87.30	89.80	7,206.4	825.2	3,400.9	3,400.9	1.51	1.37	
10,676.0	87.90	89.30	7,210.4	825.9	3,494.8	3,494.8	0.83	0.64	
10,771.0	88.50	90.20	7,213.4	826.3	3,589.8	3,589.8	1.14	0.63	
10,866.0	87.40	89.30	7,216.8	826.7	3,684.7	3,684.7	1.50	-1.16	
10,961.0	87.40	88.80	7,221.1	828.3	3,779.6	3,779.6	0.53	0.00	
11,056.0	86.80	87.90	7,225.9	831.0	3,874.4	3,874.4	1.14	-0.63	
11,150.0	87.90	88.40	7,230.2	834.1	3,968.3	3,968.3	1.29	1.17	
11,245.0	89.00	88.60	7,232.8	836.6	4,063.2	4,063.2	1.18	1.16	
11,340.0	88.40	87.30	7,234.9	840.0	4,158.1	4,158.1	1.51	-0.63	
11,435.0	87.80	87.50	7,238.1	844.3	4,253.0	4,253.0	0.67	-0.63	
11,529.0	87.60	87.80	7,241.9	848.1	4,346.8	4,346.8	0.38	-0.21	
11,620.0	88.10	89.20	7,245.3	850.5	4,437.7	4,437.7	1.63	0.55	Last Cathedral Survey @ 11,620' MD
11,670.0	88.10	89.20	7,246.9	851.2	4,487.7	4,487.7	0.00	0.00	Projection to Bit @ 11,670'

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
State 3B-16H PBHL	0.00	0.00	7,240.8	827.4	4,509.6	1,325,023.41	3,139,573.74	40.224500	-105.000170
- actual wellpath misses target center by 32.9ft at 11670.0ft MD (7246.9 TVD, 851.2 N, 4487.7 E)									
- Point									

Design Annotations

	Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
			+N/-S (ft)	+E/-W (ft)	
	11,620.0	7,245.3	850.5	4,437.7	Last Cathedral Survey @ 11,620' MD Projection to Bit @ 11,670'
	11,670.0	7,246.9	851.2	4,487.7	

Checked By: _____ Approved By: _____ Date: _____