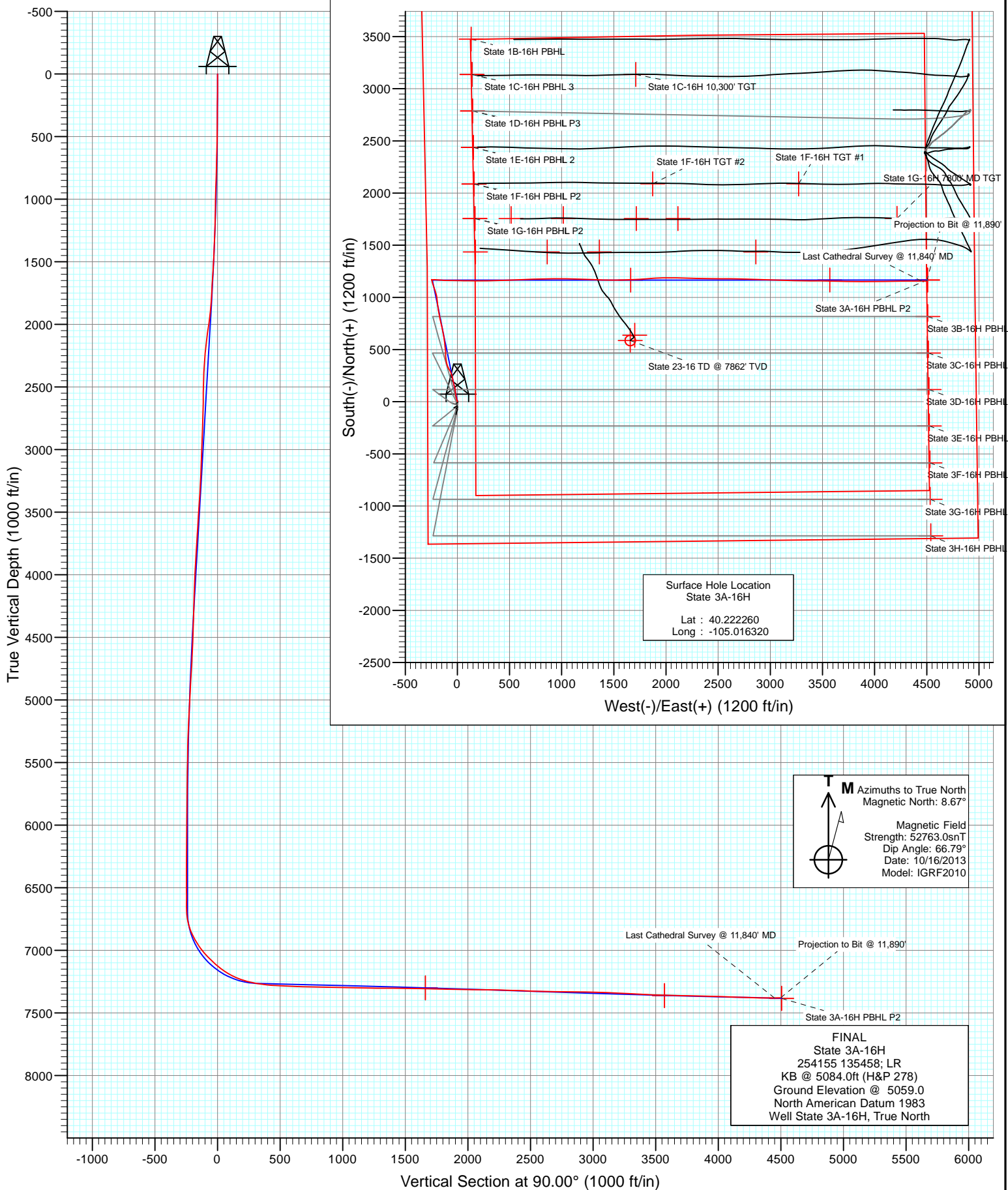


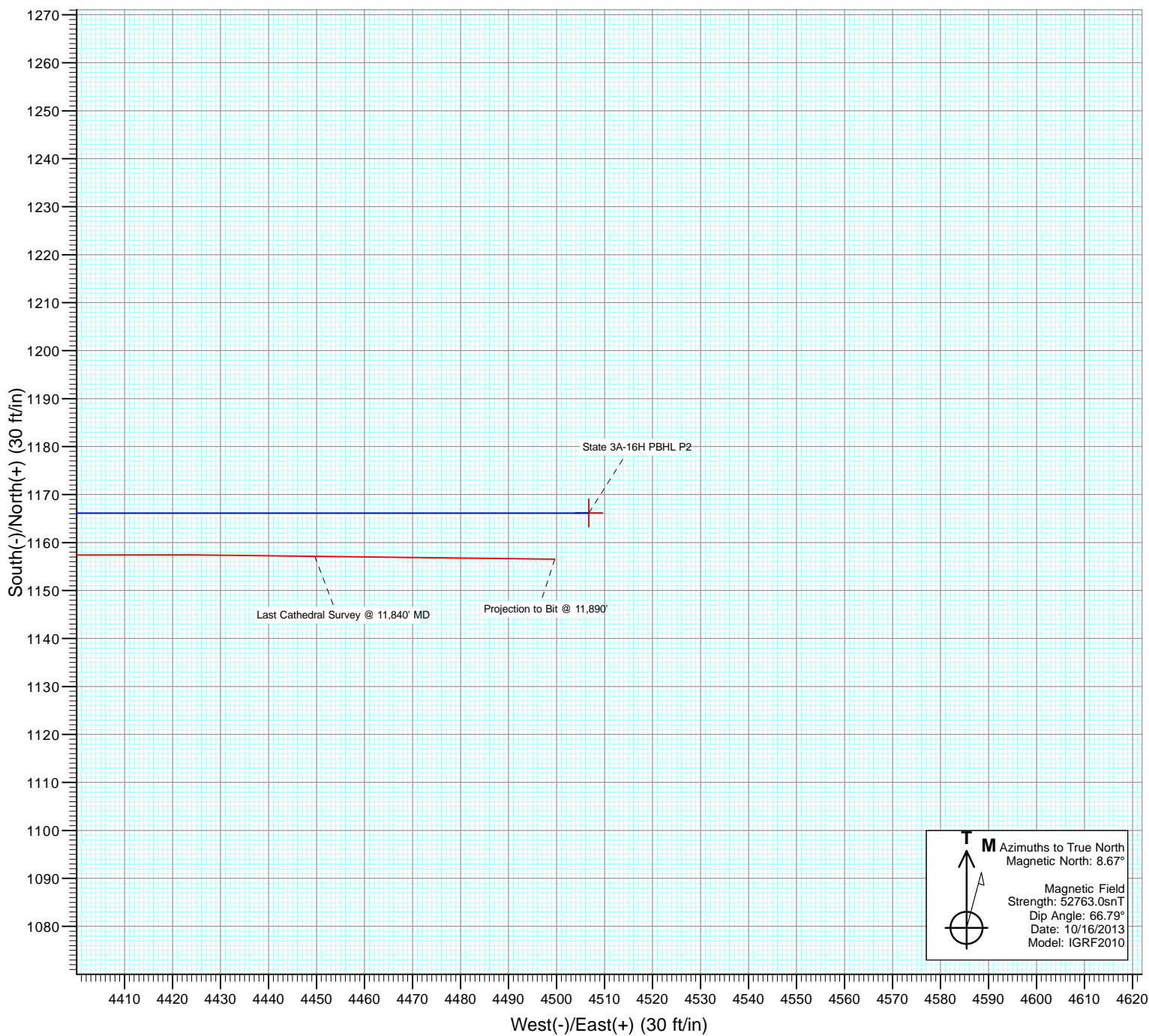


Project: DJ Wattenberg
 Site: S16-T3N-R68W (State)
 Well: State 3A-16H
 Wellbore: Hz
 Design: FINAL



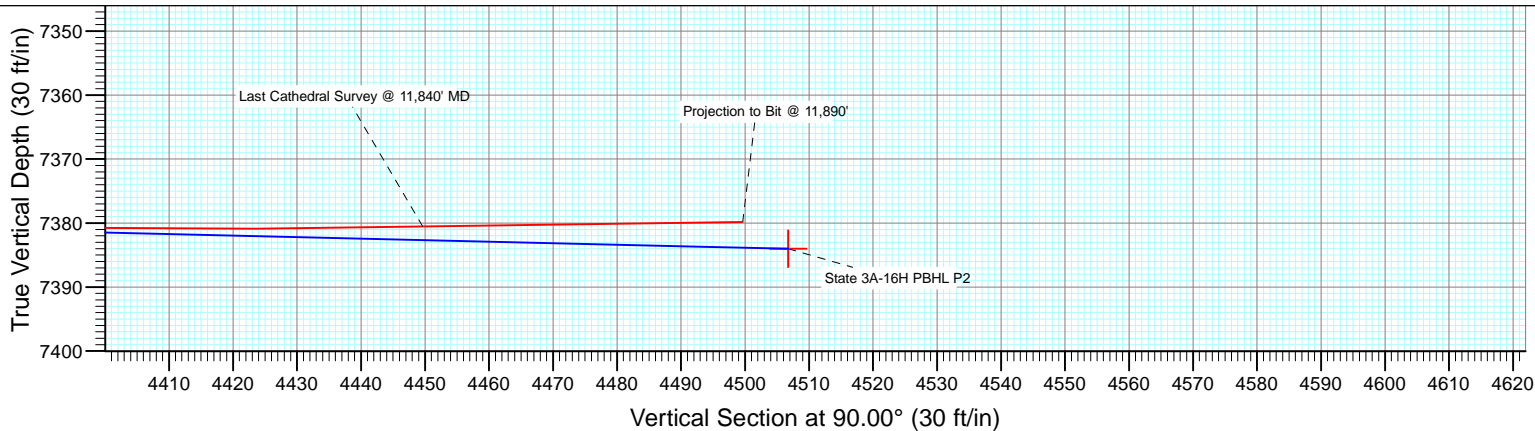


Project: DJ Wattenberg
Site: S16-T3N-R68W (State)
Well: State 3A-16H
Wellbore: Hz
Design: FINAL



M Azimuths to True North
Magnetic North: 8.67°

Magnetic Field
Strength: 52763.0snT
Dip Angle: 66.79°
Date: 10/16/2013
Model: IGRF2010



Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well State 3A-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 3A-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 3A-16H				
Well Position	+N/-S 0.0 ft	Northing: 1,324,182.39 ft	Latitude: 40.222260	
	+E/-W 0.0 ft	Easting: 3,135,068.67 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	10/16/2013	8.67	66.79	52,763

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	90.00

Survey Program		Date 11/5/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
144.0	11,890.0	Survey #1 (Hz)	Geolink MWD	Geolink MWD	

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	3.30	144.0	0.8	0.0	0.0	0.42	0.42	
235.0	0.50	331.80	235.0	1.6	-0.1	-0.1	0.34	-0.11	
327.0	1.32	346.80	327.0	3.0	-0.5	-0.5	0.92	0.89	
419.0	2.20	343.00	418.9	5.7	-1.3	-1.3	0.96	0.96	
511.0	2.80	339.00	510.8	9.5	-2.6	-2.6	0.68	0.65	
603.0	4.10	342.30	602.7	14.7	-4.4	-4.4	1.43	1.41	
695.0	5.50	344.40	694.4	22.1	-6.6	-6.6	1.53	1.52	
787.0	6.90	347.30	785.8	31.7	-9.0	-9.0	1.56	1.52	
842.0	8.20	347.60	840.3	38.8	-10.6	-10.6	2.36	2.36	
916.0	9.10	347.00	913.5	49.6	-13.0	-13.0	1.22	1.22	
1,008.0	9.10	355.90	1,004.3	64.0	-15.2	-15.2	1.53	0.00	
1,100.0	10.00	352.70	1,095.1	79.2	-16.7	-16.7	1.14	0.98	

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well State 3A-16H
Project: DJ Wattenberg	TD Reference: KB @ 5084.0ft (H&P 278)
Site: S16-T3N-R68W (State)	MVD Reference: KB @ 5084.0ft (H&P 278)
Well: State 3A-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
1,197.0	10.50	351.30	1,190.5	96.2	-19.1	-19.1	0.58	0.52	
1,284.0	11.60	351.90	1,275.9	112.7	-21.6	-21.6	1.27	1.26	
1,376.0	12.70	350.40	1,365.8	131.9	-24.6	-24.6	1.24	1.20	
1,468.0	12.40	341.70	1,455.7	151.2	-29.3	-29.3	2.08	-0.33	
1,560.0	13.40	347.40	1,545.3	171.0	-34.8	-34.8	1.76	1.09	
1,652.0	13.90	346.60	1,634.7	192.2	-39.7	-39.7	0.58	0.54	
1,744.0	15.80	348.30	1,723.7	215.2	-44.8	-44.8	2.12	2.07	
1,835.0	15.80	348.10	1,811.2	239.4	-49.8	-49.8	0.06	0.00	
1,927.0	16.10	339.90	1,899.7	263.7	-56.8	-56.8	2.47	0.33	
2,022.0	17.00	334.00	1,990.8	288.5	-67.4	-67.4	2.01	0.95	
2,116.0	16.70	330.30	2,080.7	312.6	-80.1	-80.1	1.18	-0.32	
2,211.0	17.80	336.20	2,171.5	337.8	-92.8	-92.8	2.17	1.16	
2,306.0	16.80	346.90	2,262.2	364.4	-101.7	-101.7	3.51	-1.05	
2,401.0	17.30	352.00	2,353.0	391.8	-106.8	-106.8	1.66	0.53	
2,496.0	17.10	351.80	2,443.8	419.6	-110.8	-110.8	0.22	-0.21	
2,590.0	16.80	0.00	2,533.7	446.9	-112.7	-112.7	2.56	-0.32	
2,685.0	17.00	357.30	2,624.6	474.5	-113.4	-113.4	0.85	0.21	
2,780.0	17.00	354.20	2,715.4	502.1	-115.4	-115.4	0.95	0.00	
2,875.0	17.10	352.70	2,806.3	529.8	-118.6	-118.6	0.47	0.11	
2,969.0	15.80	352.80	2,896.4	556.2	-122.0	-122.0	1.38	-1.38	
3,064.0	15.30	353.30	2,987.9	581.5	-125.1	-125.1	0.54	-0.53	
3,159.0	14.70	354.10	3,079.7	605.9	-127.8	-127.8	0.67	-0.63	
3,253.0	15.80	351.00	3,170.4	630.4	-131.0	-131.0	1.46	1.17	
3,348.0	15.30	348.20	3,261.9	655.5	-135.6	-135.6	0.95	-0.53	
3,443.0	15.50	346.90	3,353.5	680.1	-141.0	-141.0	0.42	0.21	
3,537.0	16.20	347.70	3,443.9	705.2	-146.7	-146.7	0.78	0.74	
3,632.0	15.20	347.90	3,535.4	730.3	-152.1	-152.1	1.05	-1.05	
3,727.0	15.70	345.80	3,627.0	754.9	-157.9	-157.9	0.79	0.53	
3,822.0	16.80	348.30	3,718.2	780.8	-163.8	-163.8	1.37	1.16	
3,917.0	16.60	349.10	3,809.2	807.6	-169.1	-169.1	0.32	-0.21	
4,011.0	16.00	349.10	3,899.4	833.5	-174.1	-174.1	0.64	-0.64	
4,106.0	14.90	347.00	3,990.9	858.3	-179.4	-179.4	1.30	-1.16	
4,201.0	15.10	354.10	4,082.7	882.5	-183.4	-183.4	1.94	0.21	
4,295.0	15.40	353.00	4,173.4	907.1	-186.2	-186.2	0.44	0.32	
4,390.0	15.00	353.10	4,265.1	931.8	-189.2	-189.2	0.42	-0.42	
4,485.0	14.20	353.40	4,357.0	955.6	-192.0	-192.0	0.85	-0.84	
4,580.0	13.80	353.40	4,449.2	978.4	-194.6	-194.6	0.42	-0.42	
4,674.0	13.30	351.80	4,540.6	1,000.2	-197.5	-197.5	0.66	-0.53	
4,769.0	13.50	347.00	4,633.0	1,021.8	-201.5	-201.5	1.19	0.21	
4,863.0	11.30	344.40	4,724.8	1,041.4	-206.5	-206.5	2.41	-2.34	
4,958.0	10.30	343.30	4,818.1	1,058.5	-211.4	-211.4	1.07	-1.05	
5,053.0	9.50	340.50	4,911.7	1,074.0	-216.5	-216.5	0.98	-0.84	
5,148.0	9.20	339.70	5,005.4	1,088.5	-221.7	-221.7	0.34	-0.32	
5,243.0	7.90	341.40	5,099.4	1,101.9	-226.4	-226.4	1.39	-1.37	
5,338.0	7.20	341.50	5,193.5	1,113.7	-230.4	-230.4	0.74	-0.74	
5,433.0	6.50	337.40	5,287.9	1,124.3	-234.4	-234.4	0.90	-0.74	
5,527.0	4.30	346.30	5,381.4	1,132.6	-237.2	-237.2	2.50	-2.34	
5,622.0	3.80	348.00	5,476.2	1,139.2	-238.7	-238.7	0.54	-0.53	
5,717.0	3.30	342.60	5,571.0	1,144.9	-240.2	-240.2	0.63	-0.53	
5,811.0	3.20	341.50	5,664.9	1,149.9	-241.9	-241.9	0.13	-0.11	
5,906.0	2.70	354.90	5,759.7	1,154.7	-242.9	-242.9	0.89	-0.53	
6,001.0	2.60	343.30	5,854.6	1,159.0	-243.7	-243.7	0.57	-0.11	
6,096.0	2.20	346.70	5,949.6	1,162.8	-244.7	-244.7	0.45	-0.42	

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well State 3A-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 3A-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
6,190.0	2.00	348.10	6,043.5	1,166.2	-245.5	-245.5	0.22	-0.21	
6,285.0	1.80	344.60	6,138.4	1,169.2	-246.2	-246.2	0.24	-0.21	
6,380.0	0.40	253.90	6,233.4	1,170.6	-247.0	-247.0	1.95	-1.47	
6,475.0	0.70	201.00	6,328.4	1,169.9	-247.5	-247.5	0.59	0.32	
6,570.0	0.90	199.50	6,423.4	1,168.7	-247.9	-247.9	0.21	0.21	
6,664.0	0.70	49.80	6,517.4	1,168.4	-247.7	-247.7	1.64	-0.21	
6,759.0	0.40	63.70	6,612.4	1,168.9	-247.0	-247.0	0.34	-0.32	
6,791.0	0.50	72.10	6,644.4	1,169.0	-246.8	-246.8	0.37	0.31	
6,822.0	0.60	75.10	6,675.4	1,169.1	-246.5	-246.5	0.34	0.32	
6,854.0	2.70	83.10	6,707.4	1,169.2	-245.6	-245.6	6.59	6.56	
6,885.0	8.10	88.60	6,738.2	1,169.3	-242.7	-242.7	17.48	17.42	
6,917.0	13.20	89.70	6,769.7	1,169.4	-236.8	-236.8	15.95	15.94	
6,949.0	16.30	89.10	6,800.6	1,169.5	-228.6	-228.6	9.70	9.69	
6,980.0	19.90	89.70	6,830.1	1,169.6	-219.0	-219.0	11.63	11.61	
7,012.0	23.60	92.80	6,859.8	1,169.3	-207.1	-207.1	12.10	11.56	
7,043.0	26.50	95.00	6,887.9	1,168.4	-194.0	-194.0	9.82	9.35	
7,075.0	29.20	95.30	6,916.2	1,167.1	-179.2	-179.2	8.45	8.44	
7,107.0	32.10	94.80	6,943.7	1,165.6	-162.9	-162.9	9.10	9.06	
7,138.0	34.90	93.30	6,969.6	1,164.4	-145.8	-145.8	9.42	9.03	
7,170.0	38.00	92.00	6,995.3	1,163.6	-126.9	-126.9	9.98	9.69	
7,201.0	41.20	91.20	7,019.2	1,163.0	-107.1	-107.1	10.45	10.32	
7,233.0	43.20	91.00	7,042.9	1,162.6	-85.6	-85.6	6.26	6.25	
7,265.0	44.90	90.70	7,065.9	1,162.3	-63.4	-63.4	5.35	5.31	
7,296.0	46.30	91.20	7,087.6	1,161.9	-41.2	-41.2	4.66	4.52	
7,328.0	48.80	91.50	7,109.2	1,161.4	-17.6	-17.6	7.84	7.81	
7,359.0	51.30	91.70	7,129.1	1,160.7	6.1	6.1	8.08	8.06	
7,391.0	53.10	90.80	7,148.7	1,160.1	31.4	31.4	6.05	5.62	
7,423.0	55.00	90.60	7,167.5	1,159.8	57.3	57.3	5.96	5.94	
7,454.0	57.60	90.70	7,184.7	1,159.5	83.1	83.1	8.39	8.39	
7,486.0	61.90	90.70	7,200.8	1,159.2	110.7	110.7	13.44	13.44	
7,517.0	65.50	91.00	7,214.5	1,158.8	138.5	138.5	11.65	11.61	
7,549.0	69.40	90.40	7,226.8	1,158.4	168.1	168.1	12.31	12.19	
7,581.0	72.10	90.00	7,237.3	1,158.3	198.3	198.3	8.52	8.44	
7,612.0	74.80	89.70	7,246.2	1,158.4	228.0	228.0	8.76	8.71	
7,644.0	76.80	89.50	7,254.0	1,158.6	259.0	259.0	6.28	6.25	
7,674.0	79.00	89.40	7,260.3	1,158.9	288.3	288.3	7.34	7.33	
7,739.0	83.10	88.60	7,270.4	1,160.0	352.5	352.5	6.42	6.31	
7,771.0	82.30	88.20	7,274.5	1,160.9	384.2	384.2	2.79	-2.50	
7,802.0	83.80	87.90	7,278.2	1,162.0	415.0	415.0	4.93	4.84	
7,834.0	87.10	87.70	7,280.8	1,163.2	446.9	446.9	10.33	10.31	
7,929.0	87.50	87.00	7,285.2	1,167.6	541.7	541.7	0.85	0.42	
8,024.0	87.40	87.60	7,289.5	1,172.0	636.5	636.5	0.64	-0.11	
8,118.0	88.60	88.80	7,292.7	1,175.0	730.4	730.4	1.80	1.28	
8,213.0	89.70	89.60	7,294.2	1,176.3	825.3	825.3	1.43	1.16	
8,308.0	88.70	89.30	7,295.5	1,177.2	920.3	920.3	1.10	-1.05	
8,402.0	88.40	90.10	7,297.9	1,177.7	1,014.3	1,014.3	0.91	-0.32	
8,497.0	88.90	91.70	7,300.1	1,176.2	1,109.2	1,109.2	1.76	0.53	
8,592.0	88.50	91.60	7,302.3	1,173.5	1,204.2	1,204.2	0.43	-0.42	
8,687.0	90.30	92.50	7,303.2	1,170.1	1,299.1	1,299.1	2.12	1.89	
8,782.0	90.00	91.30	7,303.0	1,166.9	1,394.1	1,394.1	1.30	-0.32	
8,876.0	89.10	90.60	7,303.7	1,165.4	1,488.0	1,488.0	1.21	-0.96	
8,971.0	88.20	88.20	7,306.0	1,166.4	1,583.0	1,583.0	2.70	-0.95	
9,066.0	88.90	87.80	7,308.4	1,169.7	1,677.9	1,677.9	0.85	0.74	

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well State 3A-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 3A-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
9,160.0	89.20	85.30	7,309.9	1,175.3	1,771.7	1,771.7	2.68	0.32	
9,255.0	88.80	86.40	7,311.6	1,182.2	1,866.5	1,866.5	1.23	-0.42	
9,350.0	89.20	88.60	7,313.3	1,186.4	1,961.3	1,961.3	2.35	0.42	
9,444.0	89.10	89.50	7,314.7	1,187.9	2,055.3	2,055.3	0.96	-0.11	
9,539.0	89.40	91.90	7,315.9	1,186.8	2,150.3	2,150.3	2.55	0.32	
9,634.0	88.60	92.40	7,317.6	1,183.2	2,245.2	2,245.2	0.99	-0.84	
9,729.0	88.30	90.70	7,320.1	1,180.6	2,340.1	2,340.1	1.82	-0.32	
9,823.0	87.60	90.50	7,323.5	1,179.6	2,434.1	2,434.1	0.77	-0.74	
9,918.0	87.80	90.10	7,327.3	1,179.1	2,529.0	2,529.0	0.47	0.21	
10,013.0	89.10	90.30	7,329.9	1,178.8	2,624.0	2,624.0	1.38	1.37	
10,108.0	89.50	92.20	7,331.0	1,176.7	2,718.9	2,718.9	2.04	0.42	
10,203.0	89.50	91.50	7,331.9	1,173.7	2,813.9	2,813.9	0.74	0.00	
10,298.0	89.10	92.10	7,333.0	1,170.7	2,908.8	2,908.8	0.76	-0.42	
10,392.0	88.00	92.10	7,335.4	1,167.2	3,002.7	3,002.7	1.17	-1.17	
10,487.0	87.70	91.50	7,339.0	1,164.3	3,097.6	3,097.6	0.71	-0.32	
10,582.0	87.60	91.50	7,342.9	1,161.8	3,192.5	3,192.5	0.11	-0.11	
10,676.0	87.40	91.20	7,347.0	1,159.6	3,286.4	3,286.4	0.38	-0.21	
10,771.0	87.70	90.30	7,351.0	1,158.3	3,381.3	3,381.3	1.00	0.32	
10,866.0	87.30	89.80	7,355.2	1,158.2	3,476.2	3,476.2	0.67	-0.42	
10,961.0	87.80	91.00	7,359.2	1,157.6	3,571.1	3,571.1	1.37	0.53	
11,055.0	89.20	92.40	7,361.7	1,154.8	3,665.0	3,665.0	2.11	1.49	
11,150.0	88.60	91.10	7,363.5	1,151.9	3,760.0	3,760.0	1.51	-0.63	
11,245.0	88.40	89.30	7,366.0	1,151.6	3,854.9	3,854.9	1.91	-0.21	
11,340.0	88.40	89.80	7,368.6	1,152.3	3,949.9	3,949.9	0.53	0.00	
11,435.0	88.50	90.00	7,371.2	1,152.5	4,044.8	4,044.8	0.24	0.11	
11,529.0	87.60	88.60	7,374.4	1,153.6	4,138.8	4,138.8	1.77	-0.96	
11,624.0	88.20	88.80	7,377.9	1,155.8	4,233.7	4,233.7	0.67	0.63	
11,719.0	88.70	89.30	7,380.5	1,157.3	4,328.6	4,328.6	0.74	0.53	
11,814.0	90.80	90.60	7,380.9	1,157.4	4,423.6	4,423.6	2.60	2.21	
11,840.0	90.80	90.70	7,380.5	1,157.1	4,449.6	4,449.6	0.38	0.00	Last Cathedral Survey @ 11,840' MD
11,890.0	90.80	90.70	7,379.8	1,156.5	4,499.6	4,499.6	0.00	0.00	Projection to Bit @ 11,890'

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well State 3A-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 3A-16H	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									
State 3A-16H 3570' VS - actual wellpath misses target center by 8.9ft at 10960.0ft MD (7359.2 TVD, 1157.6 N, 3570.1 E) - Point	0.00	0.00	7,362.0	1,166.1	3,570.0	1,325,367.92	3,138,632.28	40.225460	-105.003535
State 3A-16H 1660' VS - actual wellpath misses target center by 8.6ft at 9047.8ft MD (7308.0 TVD, 1169.0 N, 1659.7 E) - Point	0.00	0.00	7,300.0	1,165.9	1,660.0	1,325,357.34	3,136,722.31	40.225460	-105.010375
State 3A-16H PBHL - actual wellpath misses target center by 27.0ft at 11890.0ft MD (7379.8 TVD, 1156.5 N, 4499.6 E) - Point	0.00	0.00	7,404.0	1,166.2	4,506.7	1,325,373.11	3,139,568.98	40.225460	-105.000180
State 3A-16H PBHL P2 - actual wellpath misses target center by 12.7ft at 11890.0ft MD (7379.8 TVD, 1156.5 N, 4499.6 E) - Point	0.00	0.00	7,384.0	1,166.2	4,506.7	1,325,373.11	3,139,568.98	40.225460	-105.000180

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)		
11,840.0	7,380.5	1,157.1	4,449.6	Last Cathedral Survey @ 11,840' MD	
11,890.0	7,379.8	1,156.5	4,499.6	Projection to Bit @ 11,890'	

Checked By: _____	Approved By: _____	Date: _____
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