

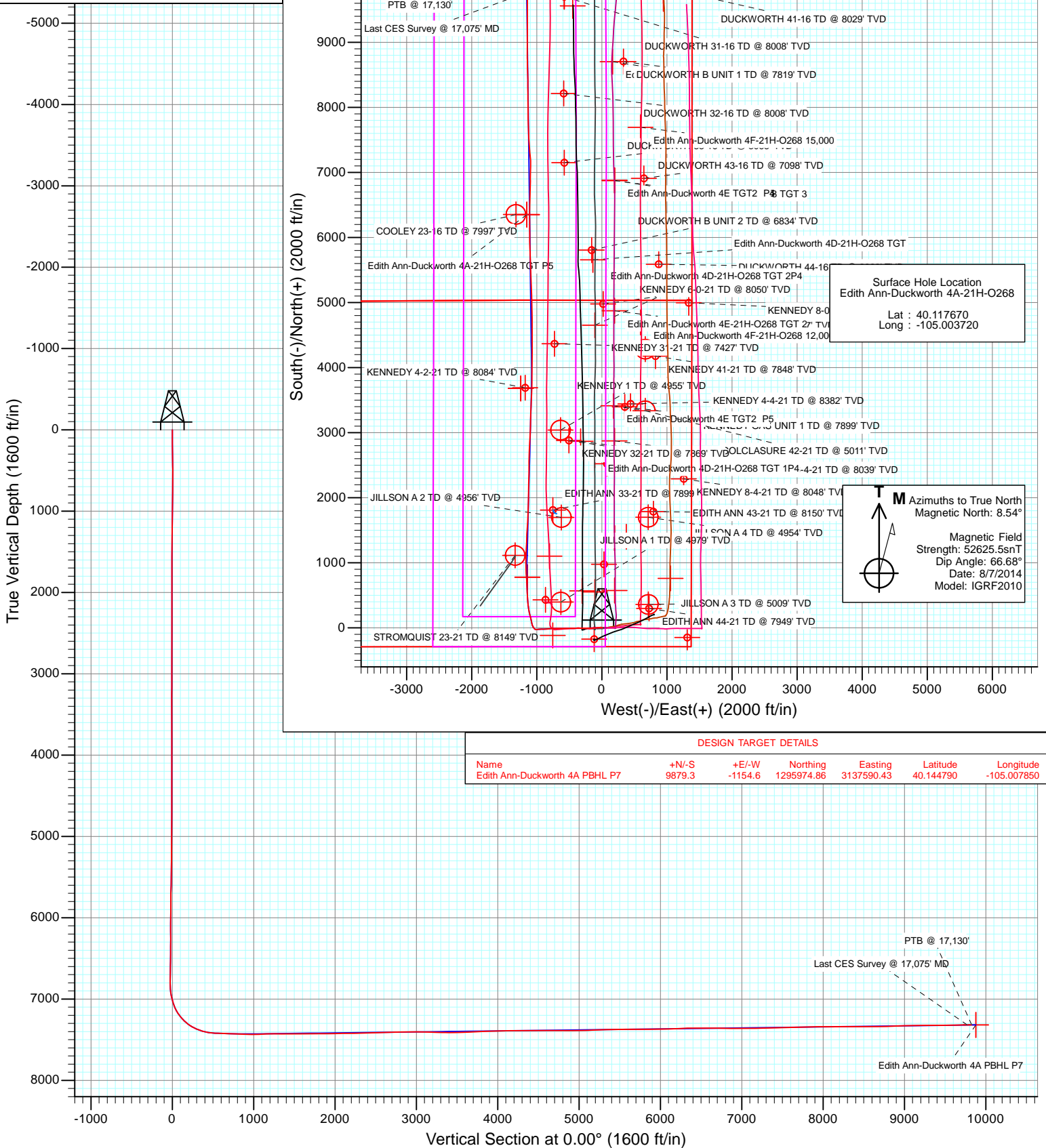


Project: DJ Wattenberg  
Site: S21-T2N-R68W (Edith Ann-Duckworth)  
Well: Edith Ann-Duckworth 4A-21H-O268  
Vellbore: Hz  
Design: SURVEYS



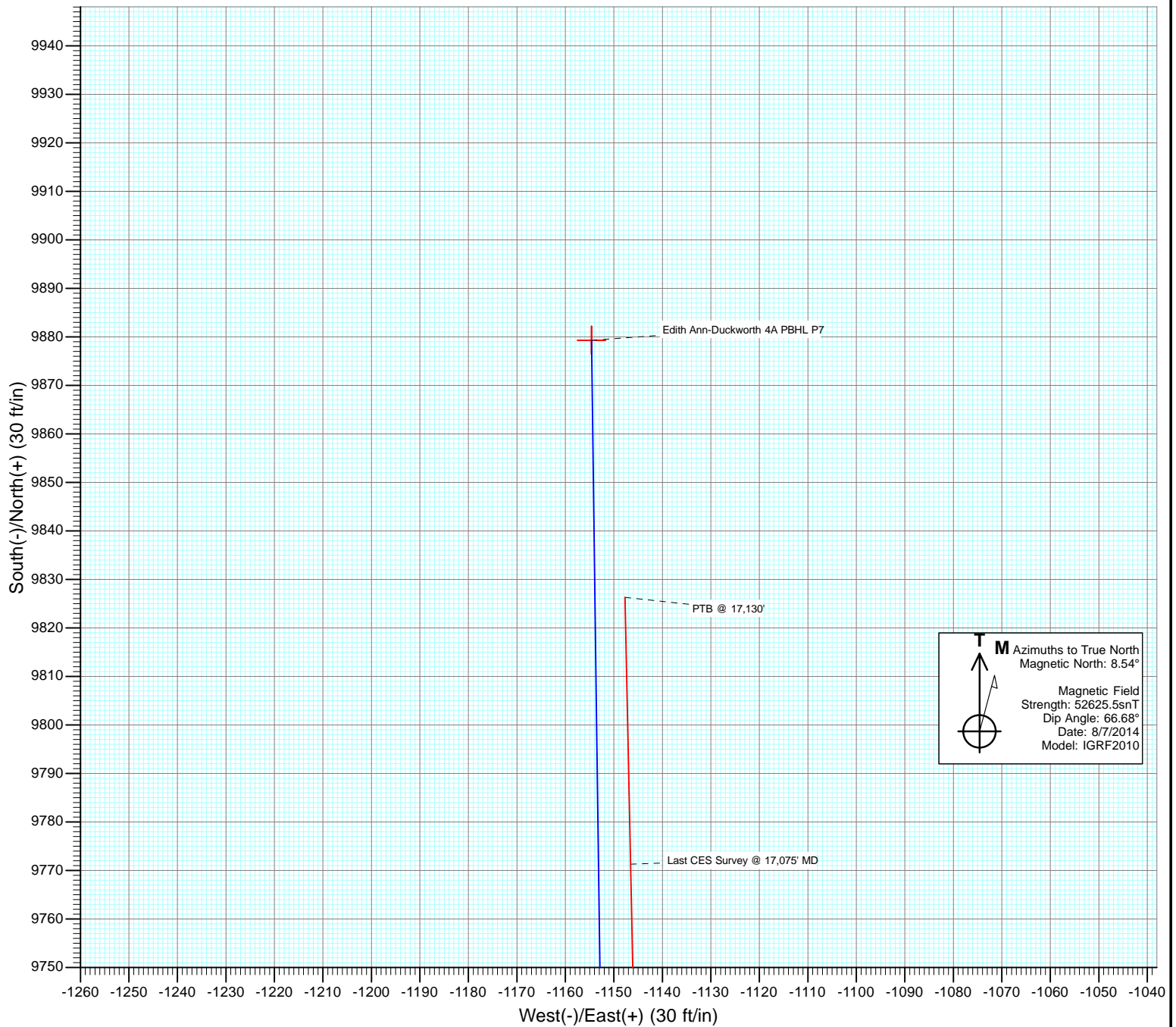
#### SURVEYS

Edith Ann-Duckworth 4A-21H-O268  
305055 145083; 322355 145254LR  
KB @ 4953.5ft (Patterson 272)  
Ground Elevation @ 4925.0  
North American Datum 1983  
Well Edith Ann-Duckworth 4A-21H-O268, True North



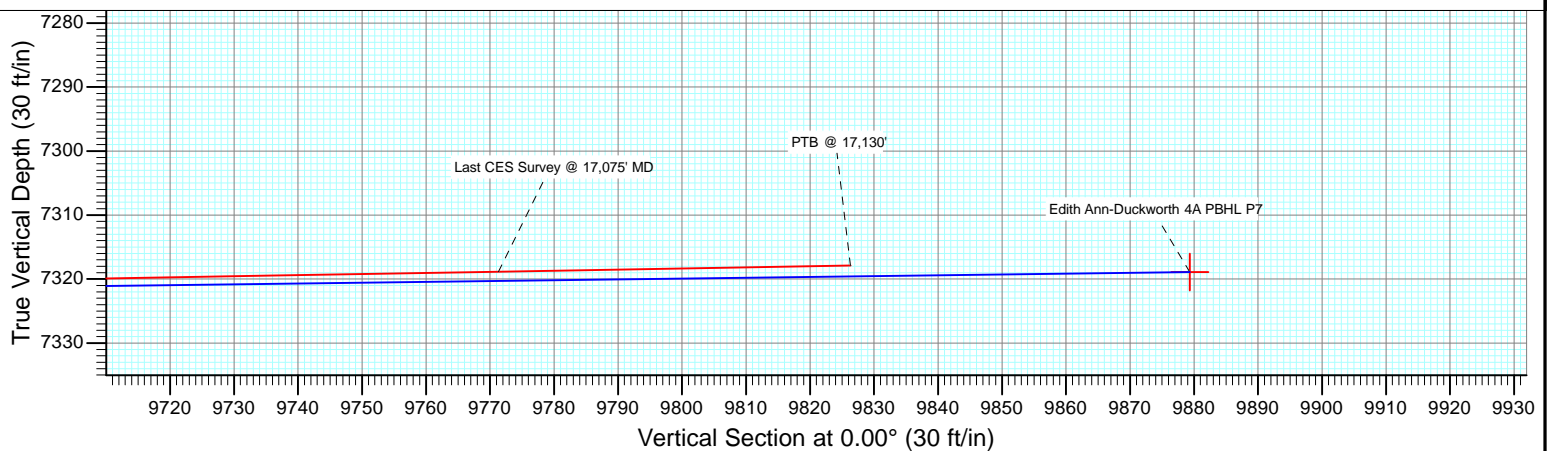


Project: DJ Wattenberg  
Site: S21-T2N-R68W (Edith Ann-Duckworth)  
Well: Edith Ann-Duckworth 4A-21H-O268  
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**T M** Azimuths to True North  
Magnetic North: 8.54°

Magnetic Field  
Strength: 52625.5snT  
Dip Angle: 66.68°  
Date: 8/7/2014  
Model: IGRF2010



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

<b>Project</b>	DJ Wattenberg		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		S21-T2N-R68W (Edith Ann-Duckworth)			
Site Position:		Northing:	1,290,455.50 ft	Latitude:	40.129630
From:	Lat/Long	Easting:	3,138,171.93 ft	Longitude:	-105.005880
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.32 °

Well	Edith Ann-Duckworth 4A-21H-O268					
Well Position	+N/-S	0.0 ft	Northing:	1,286,102.16 ft	Latitude:	40.117670
	+E/-W	0.0 ft	Easting:	3,138,800.28 ft	Longitude:	-105.003720
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,925.0 ft

<b>Wellbore</b>	Hz				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	8/7/2014	8.54	66.68	52,625

<b>Design</b>	SURVEYS				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	0.00	

<b>Survey Program</b>	<b>Date</b>	8/25/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
164.0	17,130.0	Survey #1 (Hz)	Geolink MWD	Geolink MWD	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
164.0	0.70	329.40	164.0	0.9	-0.5	0.9	0.43	0.43		
257.0	1.50	320.00	257.0	2.3	-1.6	2.3	0.88	0.86		
349.0	2.40	308.60	348.9	4.4	-3.9	4.4	1.06	0.98		
441.0	3.30	285.00	440.8	6.3	-7.9	6.3	1.59	0.98		
533.0	4.40	274.70	532.6	7.3	-14.0	7.3	1.41	1.20		
625.0	5.40	262.10	624.3	7.0	-21.8	7.0	1.59	1.09		
717.0	5.80	261.60	715.8	5.7	-30.7	5.7	0.44	0.43		
809.0	6.70	263.70	807.3	4.4	-40.6	4.4	1.01	0.98		
858.0	7.00	264.40	855.9	3.8	-46.4	3.8	0.64	0.61		
920.0	7.20	263.00	917.5	3.0	-54.1	3.0	0.43	0.32		
1,013.0	8.70	264.70	1,009.6	1.6	-66.8	1.6	1.63	1.61		
1,106.0	9.00	266.50	1,101.5	0.5	-81.1	0.5	0.44	0.32		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	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
1,200.0	9.20	266.90	1,194.3	-0.3	-95.9	-0.3	0.22	0.21	
1,294.0	9.30	266.20	1,287.0	-1.2	-111.0	-1.2	0.16	0.11	
1,387.0	9.10	266.90	1,378.9	-2.1	-125.9	-2.1	0.25	-0.22	
1,481.0	9.00	267.20	1,471.7	-2.9	-140.6	-2.9	0.12	-0.11	
1,576.0	8.80	267.70	1,565.5	-3.6	-155.3	-3.6	0.23	-0.21	
1,671.0	8.60	269.60	1,659.4	-3.9	-169.7	-3.9	0.37	-0.21	
1,766.0	8.40	268.70	1,753.4	-4.1	-183.7	-4.1	0.25	-0.21	
1,861.0	9.60	272.40	1,847.2	-3.9	-198.6	-3.9	1.40	1.26	
1,956.0	9.50	271.50	1,940.9	-3.4	-214.3	-3.4	0.19	-0.11	
2,052.0	9.80	270.90	2,035.6	-3.1	-230.4	-3.1	0.33	0.31	
2,147.0	9.90	267.90	2,129.2	-3.2	-246.7	-3.2	0.55	0.11	
2,242.0	9.90	268.30	2,222.7	-3.8	-263.0	-3.8	0.07	0.00	
2,337.0	9.80	267.80	2,316.3	-4.3	-279.2	-4.3	0.14	-0.11	
2,432.0	9.50	268.90	2,410.0	-4.8	-295.1	-4.8	0.37	-0.32	
2,528.0	9.50	269.10	2,504.7	-5.1	-311.0	-5.1	0.03	0.00	
2,622.0	9.30	269.10	2,597.4	-5.3	-326.3	-5.3	0.21	-0.21	
2,718.0	9.10	269.50	2,692.2	-5.5	-341.7	-5.5	0.22	-0.21	
2,813.0	8.80	269.30	2,786.0	-5.6	-356.5	-5.6	0.32	-0.32	
2,908.0	8.60	268.70	2,879.9	-5.9	-370.8	-5.9	0.23	-0.21	
3,003.0	8.40	269.50	2,973.9	-6.1	-384.9	-6.1	0.24	-0.21	
3,099.0	8.00	270.50	3,068.9	-6.1	-398.6	-6.1	0.44	-0.42	
3,194.0	7.50	270.20	3,163.0	-6.0	-411.4	-6.0	0.53	-0.53	
3,289.0	8.20	264.60	3,257.2	-6.7	-424.3	-6.7	1.09	0.74	
3,384.0	7.30	267.80	3,351.3	-7.5	-437.1	-7.5	1.05	-0.95	
3,479.0	8.40	274.50	3,445.4	-7.2	-450.0	-7.2	1.50	1.16	
3,575.0	9.30	271.90	3,540.2	-6.4	-464.8	-6.4	1.03	0.94	
3,670.0	9.80	269.50	3,633.9	-6.2	-480.5	-6.2	0.67	0.53	
3,765.0	9.30	269.50	3,727.6	-6.4	-496.3	-6.4	0.53	-0.53	
3,860.0	10.30	271.00	3,821.2	-6.3	-512.5	-6.3	1.09	1.05	
3,956.0	9.80	272.20	3,915.8	-5.8	-529.2	-5.8	0.56	-0.52	
4,051.0	9.10	271.90	4,009.5	-5.3	-544.8	-5.3	0.74	-0.74	
4,146.0	8.90	272.10	4,103.3	-4.7	-559.7	-4.7	0.21	-0.21	
4,241.0	9.10	265.00	4,197.1	-5.1	-574.5	-5.1	1.19	0.21	
4,336.0	9.70	266.60	4,290.9	-6.3	-590.0	-6.3	0.69	0.63	
4,432.0	8.40	265.50	4,385.7	-7.3	-605.0	-7.3	1.37	-1.35	
4,527.0	9.50	271.30	4,479.5	-7.6	-619.8	-7.6	1.50	1.16	
4,622.0	10.90	275.50	4,573.0	-6.6	-636.6	-6.6	1.67	1.47	
4,717.0	10.50	268.90	4,666.3	-5.9	-654.2	-5.9	1.36	-0.42	
4,813.0	9.90	270.50	4,760.8	-6.0	-671.2	-6.0	0.69	-0.62	
4,908.0	8.90	273.50	4,854.6	-5.5	-686.7	-5.5	1.17	-1.05	
5,003.0	10.10	269.10	4,948.3	-5.2	-702.3	-5.2	1.48	1.26	
5,098.0	9.90	261.50	5,041.8	-6.5	-718.7	-6.5	1.40	-0.21	
5,193.0	9.10	261.60	5,135.5	-8.8	-734.2	-8.8	0.84	-0.84	
5,288.0	9.30	269.50	5,229.3	-10.0	-749.3	-10.0	1.35	0.21	
5,383.0	8.10	269.80	5,323.2	-10.1	-763.7	-10.1	1.26	-1.26	
5,478.0	9.80	268.40	5,417.0	-10.3	-778.5	-10.3	1.80	1.79	
5,573.0	10.50	261.40	5,510.6	-11.8	-795.1	-11.8	1.49	0.74	
5,668.0	9.10	261.90	5,604.2	-14.2	-811.1	-14.2	1.48	-1.47	
5,763.0	8.30	263.10	5,698.1	-16.1	-825.4	-16.1	0.86	-0.84	
5,858.0	9.00	270.00	5,792.0	-16.9	-839.6	-16.9	1.32	0.74	
5,954.0	10.10	266.20	5,886.7	-17.5	-855.5	-17.5	1.32	1.15	
6,049.0	9.20	266.30	5,980.3	-18.5	-871.4	-18.5	0.95	-0.95	
6,144.0	9.90	267.90	6,074.0	-19.3	-887.2	-19.3	0.79	0.74	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	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
6,239.0	10.20	270.40	6,167.5	-19.5	-903.7	-19.5	0.56	0.32	
6,334.0	9.00	272.40	6,261.2	-19.2	-919.6	-19.2	1.31	-1.26	
6,429.0	9.10	264.60	6,355.0	-19.6	-934.5	-19.6	1.29	0.11	
6,524.0	9.50	266.30	6,448.8	-20.8	-949.8	-20.8	0.51	0.42	
6,619.0	10.10	265.00	6,542.4	-22.0	-965.9	-22.0	0.67	0.63	
6,714.0	8.90	266.50	6,636.1	-23.2	-981.5	-23.2	1.29	-1.26	
6,809.0	9.40	265.70	6,729.9	-24.2	-996.6	-24.2	0.54	0.53	
6,908.0	9.40	268.30	6,827.6	-25.0	-1,012.7	-25.0	0.43	0.00	
6,955.0	10.50	293.10	6,873.9	-23.5	-1,020.5	-23.5	9.33	2.34	
7,003.0	12.50	309.90	6,920.9	-18.4	-1,028.5	-18.4	8.08	4.17	
7,050.0	15.90	319.40	6,966.5	-10.3	-1,036.6	-10.3	8.75	7.23	
7,098.0	18.20	324.40	7,012.4	0.8	-1,045.3	0.8	5.68	4.79	
7,145.0	21.30	326.90	7,056.6	13.9	-1,054.2	13.9	6.83	6.60	
7,193.0	24.30	335.80	7,100.9	30.3	-1,063.0	30.3	9.51	6.25	
7,240.0	29.10	344.80	7,142.8	50.1	-1,070.0	50.1	13.33	10.21	
7,288.0	35.20	348.60	7,183.5	75.0	-1,075.8	75.0	13.38	12.71	
7,335.0	39.90	347.70	7,220.7	103.0	-1,081.7	103.0	10.07	10.00	
7,384.0	45.00	346.50	7,256.9	135.2	-1,089.1	135.2	10.54	10.41	
7,431.0	49.70	345.50	7,288.7	168.7	-1,097.4	168.7	10.12	10.00	
7,479.0	55.40	346.20	7,317.9	205.7	-1,106.8	205.7	11.93	11.87	
7,526.0	61.50	349.00	7,342.5	244.8	-1,115.3	244.8	13.93	12.98	
7,574.0	65.90	350.90	7,363.7	287.1	-1,122.8	287.1	9.83	9.17	
7,621.0	69.10	352.20	7,381.7	330.1	-1,129.2	330.1	7.27	6.81	
7,670.0	73.40	354.40	7,397.5	376.2	-1,134.6	376.2	9.75	8.78	
7,717.0	79.40	355.90	7,408.5	421.7	-1,138.4	421.7	13.14	12.77	
7,765.0	83.80	356.20	7,415.5	469.0	-1,141.7	469.0	9.19	9.17	
7,812.0	86.10	357.00	7,419.7	515.8	-1,144.5	515.8	5.18	4.89	
7,829.0	87.30	357.80	7,420.6	532.7	-1,145.3	532.7	8.48	7.06	
7,895.0	88.40	357.60	7,423.1	598.6	-1,147.9	598.6	1.69	1.67	
7,988.0	88.10	357.00	7,426.0	691.5	-1,152.3	691.5	0.72	-0.32	
8,081.0	87.60	356.40	7,429.4	784.3	-1,157.6	784.3	0.84	-0.54	
8,175.0	88.00	358.00	7,433.0	878.1	-1,162.2	878.1	1.75	0.43	
8,269.0	89.30	358.60	7,435.3	972.0	-1,165.0	972.0	1.52	1.38	
8,362.0	91.70	359.70	7,434.5	1,065.0	-1,166.4	1,065.0	2.84	2.58	
8,456.0	93.70	3.50	7,430.0	1,158.8	-1,163.8	1,158.8	4.56	2.13	
8,549.0	88.70	3.50	7,428.1	1,251.6	-1,158.1	1,251.6	5.38	-5.38	
8,643.0	89.30	2.00	7,429.7	1,345.5	-1,153.6	1,345.5	1.72	0.64	
8,736.0	90.40	2.40	7,430.0	1,438.4	-1,150.0	1,438.4	1.26	1.18	
8,831.0	91.60	4.50	7,428.3	1,533.2	-1,144.3	1,533.2	2.55	1.26	
8,924.0	89.00	2.40	7,427.8	1,626.0	-1,138.7	1,626.0	3.59	-2.80	
9,018.0	90.70	2.00	7,428.1	1,719.9	-1,135.1	1,719.9	1.86	1.81	
9,111.0	90.40	2.00	7,427.2	1,812.9	-1,131.8	1,812.9	0.32	-0.32	
9,205.0	90.80	2.10	7,426.2	1,906.8	-1,128.5	1,906.8	0.44	0.43	
9,298.0	90.60	0.90	7,425.0	1,999.8	-1,126.0	1,999.8	1.31	-0.22	
9,392.0	90.90	1.20	7,423.8	2,093.8	-1,124.3	2,093.8	0.45	0.32	
9,485.0	91.30	1.50	7,422.0	2,186.7	-1,122.1	2,186.7	0.54	0.43	
9,579.0	91.30	1.10	7,419.9	2,280.7	-1,120.0	2,280.7	0.43	0.00	
9,672.0	90.10	359.90	7,418.8	2,373.7	-1,119.2	2,373.7	1.82	-1.29	
9,766.0	91.80	0.10	7,417.2	2,467.6	-1,119.2	2,467.6	1.82	1.81	
9,859.0	92.70	1.20	7,413.6	2,560.6	-1,118.1	2,560.6	1.53	0.97	
9,953.0	92.00	1.90	7,409.7	2,654.4	-1,115.6	2,654.4	1.05	-0.74	
10,046.0	91.90	2.30	7,406.5	2,747.3	-1,112.2	2,747.3	0.44	-0.11	
10,140.0	90.00	3.00	7,405.0	2,841.2	-1,107.8	2,841.2	2.15	-2.02	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	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
10,233.0	90.60	2.70	7,404.5	2,934.1	-1,103.2	2,934.1	0.72	0.65	
10,327.0	88.70	2.60	7,405.1	3,028.0	-1,098.9	3,028.0	2.02	-2.02	
10,421.0	89.10	2.10	7,406.9	3,121.9	-1,095.0	3,121.9	0.68	0.43	
10,515.0	88.00	1.10	7,409.2	3,215.8	-1,092.4	3,215.8	1.58	-1.17	
10,609.0	88.70	1.80	7,412.0	3,309.7	-1,090.0	3,309.7	1.05	0.74	
10,704.0	90.20	2.40	7,412.9	3,404.7	-1,086.5	3,404.7	1.70	1.58	
10,798.0	90.70	2.50	7,412.1	3,498.6	-1,082.5	3,498.6	0.54	0.53	
10,893.0	92.40	2.50	7,409.6	3,593.4	-1,078.4	3,593.4	1.79	1.79	
10,987.0	92.20	1.60	7,405.8	3,687.3	-1,075.0	3,687.3	0.98	-0.21	
11,081.0	92.40	0.50	7,402.0	3,781.2	-1,073.3	3,781.2	1.19	0.21	
11,176.0	92.70	359.90	7,397.8	3,876.1	-1,073.0	3,876.1	0.71	0.32	
11,271.0	91.80	0.50	7,394.1	3,971.0	-1,072.6	3,971.0	1.14	-0.95	
11,365.0	91.10	0.60	7,391.7	4,065.0	-1,071.7	4,065.0	0.75	-0.74	
11,459.0	91.30	0.30	7,389.7	4,159.0	-1,071.0	4,159.0	0.38	0.21	
11,554.0	89.90	0.90	7,388.7	4,254.0	-1,070.0	4,254.0	1.60	-1.47	
11,648.0	89.80	0.10	7,389.0	4,348.0	-1,069.2	4,348.0	0.86	-0.11	
11,743.0	89.20	0.30	7,389.8	4,443.0	-1,068.9	4,443.0	0.67	-0.63	
11,837.0	90.90	359.90	7,389.7	4,537.0	-1,068.7	4,537.0	1.86	1.81	
11,932.0	90.30	359.60	7,388.7	4,631.9	-1,069.1	4,631.9	0.71	-0.63	
12,026.0	89.90	359.20	7,388.5	4,725.9	-1,070.1	4,725.9	0.60	-0.43	
12,121.0	89.60	359.30	7,389.0	4,820.9	-1,071.3	4,820.9	0.33	-0.32	
12,215.0	89.80	358.80	7,389.5	4,914.9	-1,072.9	4,914.9	0.57	0.21	
12,310.0	91.30	357.60	7,388.5	5,009.9	-1,075.9	5,009.9	2.02	1.58	
12,405.0	91.70	358.10	7,386.1	5,104.8	-1,079.4	5,104.8	0.67	0.42	
12,499.0	91.90	358.20	7,383.1	5,198.7	-1,082.5	5,198.7	0.24	0.21	
12,594.0	93.40	358.20	7,378.7	5,293.5	-1,085.4	5,293.5	1.58	1.58	
12,688.0	90.80	358.40	7,375.3	5,387.4	-1,088.2	5,387.4	2.77	-2.77	
12,783.0	90.40	358.00	7,374.3	5,482.4	-1,091.2	5,482.4	0.60	-0.42	
12,878.0	90.30	357.90	7,373.7	5,577.3	-1,094.6	5,577.3	0.15	-0.11	
12,972.0	89.90	357.60	7,373.5	5,671.2	-1,098.3	5,671.2	0.53	-0.43	
13,066.0	90.10	358.10	7,373.5	5,765.2	-1,101.8	5,765.2	0.57	0.21	
13,161.0	90.90	358.10	7,372.7	5,860.1	-1,105.0	5,860.1	0.84	0.84	
13,255.0	90.90	359.50	7,371.2	5,954.1	-1,107.0	5,954.1	1.49	0.00	
13,350.0	91.20	359.80	7,369.5	6,049.0	-1,107.5	6,049.0	0.45	0.32	
13,446.0	91.60	359.20	7,367.1	6,145.0	-1,108.4	6,145.0	0.75	0.42	
13,540.0	92.90	358.90	7,363.4	6,238.9	-1,109.9	6,238.9	1.42	1.38	
13,635.0	91.30	1.10	7,360.0	6,333.8	-1,109.9	6,333.8	2.86	-1.68	
13,729.0	89.70	0.60	7,359.1	6,427.8	-1,108.5	6,427.8	1.78	-1.70	
13,824.0	89.80	0.80	7,359.6	6,522.8	-1,107.4	6,522.8	0.24	0.11	
13,918.0	90.90	3.00	7,359.0	6,616.8	-1,104.3	6,616.8	2.62	1.17	
14,013.0	89.40	1.90	7,358.7	6,711.7	-1,100.2	6,711.7	1.96	-1.58	
14,107.0	89.30	1.10	7,359.8	6,805.7	-1,097.7	6,805.7	0.86	-0.11	
14,202.0	89.60	358.50	7,360.7	6,900.6	-1,098.1	6,900.6	2.75	0.32	
14,296.0	90.10	2.20	7,361.0	6,994.6	-1,097.5	6,994.6	3.97	0.53	
14,391.0	90.30	3.00	7,360.6	7,089.5	-1,093.2	7,089.5	0.87	0.21	
14,485.0	90.20	356.90	7,360.2	7,183.5	-1,093.3	7,183.5	6.49	-0.11	
14,580.0	90.20	352.70	7,359.9	7,278.1	-1,101.9	7,278.1	4.42	0.00	
14,674.0	92.20	354.70	7,357.9	7,371.5	-1,112.2	7,371.5	3.01	2.13	
14,769.0	92.40	357.60	7,354.1	7,466.2	-1,118.6	7,466.2	3.06	0.21	
14,863.0	92.30	357.60	7,350.3	7,560.0	-1,122.5	7,560.0	0.11	-0.11	
14,958.0	91.30	358.30	7,347.3	7,654.9	-1,125.9	7,654.9	1.28	-1.05	
15,052.0	91.40	357.90	7,345.1	7,748.8	-1,129.0	7,748.8	0.44	0.11	
15,147.0	90.70	359.20	7,343.3	7,843.8	-1,131.4	7,843.8	1.55	-0.74	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	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
15,242.0	90.50	359.20	7,342.3	7,938.8	-1,132.7	7,938.8	0.21	-0.21	
15,336.0	90.20	359.50	7,341.7	8,032.7	-1,133.8	8,032.7	0.45	-0.32	
15,430.0	90.40	359.30	7,341.2	8,126.7	-1,134.8	8,126.7	0.30	0.21	
15,525.0	90.30	359.80	7,340.7	8,221.7	-1,135.5	8,221.7	0.54	-0.11	
15,620.0	90.30	359.50	7,340.2	8,316.7	-1,136.1	8,316.7	0.32	0.00	
15,714.0	89.90	0.00	7,340.0	8,410.7	-1,136.5	8,410.7	0.68	-0.43	
15,810.0	90.10	358.50	7,340.0	8,506.7	-1,137.8	8,506.7	1.58	0.21	
15,905.0	91.10	358.80	7,339.0	8,601.7	-1,140.0	8,601.7	1.10	1.05	
15,999.0	90.30	357.90	7,337.9	8,695.6	-1,142.7	8,695.6	1.28	-0.85	
16,094.0	91.80	359.30	7,336.1	8,790.6	-1,145.0	8,790.6	2.16	1.58	
16,188.0	91.90	0.60	7,333.1	8,884.5	-1,145.1	8,884.5	1.39	0.11	
16,283.0	92.00	0.60	7,329.9	8,979.5	-1,144.1	8,979.5	0.11	0.11	
16,377.0	90.70	0.20	7,327.6	9,073.5	-1,143.5	9,073.5	1.45	-1.38	
16,472.0	90.80	0.30	7,326.4	9,168.4	-1,143.1	9,168.4	0.15	0.11	
16,566.0	90.50	0.40	7,325.3	9,262.4	-1,142.5	9,262.4	0.34	-0.32	
16,660.0	90.40	0.10	7,324.6	9,356.4	-1,142.1	9,356.4	0.34	-0.11	
16,754.0	90.20	359.90	7,324.1	9,450.4	-1,142.1	9,450.4	0.30	-0.21	
16,849.0	91.30	359.40	7,322.9	9,545.4	-1,142.7	9,545.4	1.27	1.16	
16,944.0	90.90	359.00	7,321.0	9,640.4	-1,144.0	9,640.4	0.60	-0.42	
17,039.0	91.00	358.80	7,319.5	9,735.4	-1,145.8	9,735.4	0.24	0.11	
17,075.0	91.00	358.80	7,318.8	9,771.3	-1,146.6	9,771.3	0.00	0.00	Last CES Survey @ 17,075' MD
17,130.0	91.00	358.80	7,317.9	9,826.3	-1,147.7	9,826.3	0.00	0.00	PTB @ 17,130'

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	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)		
Edith Ann-Duckworth 4A	0.00	0.00	7,347.5	9,879.3	-1,154.6	1,295,974.86	3,137,590.43	40.144790	-105.007850
- actual wellpath misses target center by 61.1ft at 17130.0ft MD (7317.9 TVD, 9826.3 N, -1147.7 E)									
- Point									
Edith Ann-Duckworth 4A	0.00	0.00	7,318.9	9,879.3	-1,154.6	1,295,974.86	3,137,590.43	40.144790	-105.007850
- actual wellpath misses target center by 53.5ft at 17130.0ft MD (7317.9 TVD, 9826.3 N, -1147.7 E)									
- Point									
Interp @ 7344.0 (Edith A	0.00	0.00	7,347.5	3,681.5	-1,244.2	1,289,776.68	3,137,535.52	40.127776	-105.008169
- actual wellpath misses target center by 178.8ft at 10977.5ft MD (7406.1 TVD, 3677.9 N, -1075.3 E)									
- Point									
Edith Ann-Duckworth 4A	0.00	0.00	7,266.0	6,352.1	-1,150.9	1,292,447.67	3,137,613.83	40.135107	-105.007836
- actual wellpath misses target center by 102.3ft at 13653.4ft MD (7359.6 TVD, 6352.3 N, -1109.6 E)									
- Point									
Edith Ann-Duckworth 4A	0.00	0.00	7,430.0	778.4	-1,142.8	1,286,874.15	3,137,653.15	40.119807	-105.007806
- actual wellpath misses target center by 14.5ft at 8074.3ft MD (7429.2 TVD, 777.6 N, -1157.2 E)									
- Point									
Edith Ann-Duckworth 4A	0.00	0.00	7,312.0	3,681.5	-1,244.2	1,289,776.68	3,137,535.52	40.127776	-105.008169
- actual wellpath misses target center by 193.4ft at 10979.0ft MD (7406.1 TVD, 3679.3 N, -1075.3 E)									
- Point									
Edith Ann-Duckworth 4A	0.00	0.00	7,266.0	9,879.3	-1,154.6	1,295,974.86	3,137,590.43	40.144790	-105.007850
- actual wellpath misses target center by 74.5ft at 17130.0ft MD (7317.9 TVD, 9826.3 N, -1147.7 E)									
- Point									
Edith Ann-Duckworth 4A	0.00	0.00	7,347.5	6,352.1	-1,150.9	1,292,447.67	3,137,613.83	40.135107	-105.007836
- actual wellpath misses target center by 43.1ft at 13652.7ft MD (7359.6 TVD, 6351.5 N, -1109.6 E)									
- Point									
Interp @ 7339.9 (Edith A	0.00	0.00	7,339.9	778.4	-1,142.8	1,286,874.15	3,137,653.15	40.119807	-105.007806
- actual wellpath misses target center by 90.4ft at 8071.0ft MD (7429.0 TVD, 774.2 N, -1157.0 E)									
- Point									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
17,075.0	7,318.8	9,771.3	-1,146.6	Last CES Survey @ 17,075' MD
17,130.0	7,317.9	9,826.3	-1,147.7	PTB @ 17,130'

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



# **EnCana Oil & Gas (USA) Inc**

**DJ Wattenberg**

**S21-T2N-R68W (Edith Ann-Duckworth)**

**Edith Ann-Duckworth 4A-21H-O268**

**Hz**

**Design: SURVEYS**

## **Survey Report - Geographic**

**25 August, 2014**

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

<b>Project</b>	DJ Wattenberg		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site	S21-T2N-R68W (Edith Ann-Duckworth)				
Site Position:		Northing:	1,290,455.49 ft	Latitude:	40.129630
From:	Lat/Long	Easting:	3,138,171.93 ft	Longitude:	-105.005880
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.32 °

Well	Edith Ann-Duckworth 4A-21H-O268					
Well Position	+N/-S	0.0 ft	Northing:	1,286,102.16 ft	Latitude:	40.117670
	+E/-W	0.0 ft	Easting:	3,138,800.28 ft	Longitude:	-105.003720
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,925.0 ft

<b>Wellbore</b>	Hz				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	8/7/2014	8.54	66.68	52,625

<b>Design</b>	SURVEYS				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	0.00	

<b>Survey Program</b>	<b>Date</b>	8/25/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
164.0	17,130.0	Survey #1 (Hz)	Geolink MWD	Geolink MWD	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Map Northing (ft)</b>	<b>Map Easting (ft)</b>	<b>Latitude</b>	<b>Longitude</b>	
0.0	0.00	0.00	0.0	0.0	0.0	1,286,102.16	3,138,800.28	40.117670	-105.003720	
164.0	0.70	329.40	164.0	0.9	-0.5	1,286,103.02	3,138,799.77	40.117672	-105.003722	
257.0	1.50	320.00	257.0	2.3	-1.6	1,286,104.43	3,138,798.69	40.117676	-105.003726	
349.0	2.40	308.60	348.9	4.4	-3.9	1,286,106.54	3,138,796.40	40.117682	-105.003734	
441.0	3.30	285.00	440.8	6.3	-7.9	1,286,108.41	3,138,792.32	40.117687	-105.003749	
533.0	4.40	274.70	532.6	7.3	-14.0	1,286,109.35	3,138,786.24	40.117690	-105.003770	
625.0	5.40	262.10	624.3	7.0	-21.8	1,286,109.00	3,138,778.44	40.117689	-105.003798	
717.0	5.80	261.60	715.8	5.7	-30.7	1,286,107.67	3,138,769.56	40.117686	-105.003830	
809.0	6.70	263.70	807.3	4.4	-40.6	1,286,106.35	3,138,759.63	40.117682	-105.003866	
858.0	7.00	264.40	855.9	3.8	-46.4	1,286,105.71	3,138,753.82	40.117681	-105.003886	
920.0	7.20	263.00	917.5	3.0	-54.1	1,286,104.83	3,138,746.21	40.117678	-105.003914	
1,013.0	8.70	264.70	1,009.6	1.6	-66.8	1,286,103.40	3,138,733.43	40.117674	-105.003959	

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
1,106.0	9.00	266.50	1,101.5	0.5	-81.1	1,286,102.22	3,138,719.17	40.117671	-105.004010
1,200.0	9.20	266.90	1,194.3	-0.3	-95.9	1,286,101.29	3,138,704.34	40.117669	-105.004063
1,294.0	9.30	266.20	1,287.0	-1.2	-111.0	1,286,100.29	3,138,689.26	40.117667	-105.004117
1,387.0	9.10	266.90	1,378.9	-2.1	-125.9	1,286,099.31	3,138,674.42	40.117664	-105.004170
1,481.0	9.00	267.20	1,471.7	-2.9	-140.6	1,286,098.47	3,138,659.66	40.117662	-105.004223
1,576.0	8.80	267.70	1,565.5	-3.6	-155.3	1,286,097.73	3,138,644.98	40.117660	-105.004276
1,671.0	8.60	269.60	1,659.4	-3.9	-169.7	1,286,097.31	3,138,630.62	40.117659	-105.004327
1,766.0	8.40	268.70	1,753.4	-4.1	-183.7	1,286,097.02	3,138,616.58	40.117659	-105.004377
1,861.0	9.60	272.40	1,847.2	-3.9	-198.6	1,286,097.12	3,138,601.73	40.117659	-105.004430
1,956.0	9.50	271.50	1,940.9	-3.4	-214.3	1,286,097.56	3,138,585.97	40.117661	-105.004487
2,052.0	9.80	270.90	2,035.6	-3.1	-230.4	1,286,097.81	3,138,569.88	40.117662	-105.004544
2,147.0	9.90	267.90	2,129.2	-3.2	-246.7	1,286,097.55	3,138,553.64	40.117661	-105.004602
2,242.0	9.90	268.30	2,222.7	-3.8	-263.0	1,286,096.91	3,138,537.32	40.117660	-105.004661
2,337.0	9.80	267.80	2,316.3	-4.3	-279.2	1,286,096.27	3,138,521.08	40.117658	-105.004719
2,432.0	9.50	268.90	2,410.0	-4.8	-295.1	1,286,095.72	3,138,505.17	40.117657	-105.004776
2,528.0	9.50	269.10	2,504.7	-5.1	-311.0	1,286,095.36	3,138,489.33	40.117656	-105.004832
2,622.0	9.30	269.10	2,597.4	-5.3	-326.3	1,286,095.03	3,138,473.98	40.117655	-105.004887
2,718.0	9.10	269.50	2,692.2	-5.5	-341.7	1,286,094.75	3,138,458.63	40.117655	-105.004942
2,813.0	8.80	269.30	2,786.0	-5.6	-356.5	1,286,094.52	3,138,443.85	40.117655	-105.004995
2,908.0	8.60	268.70	2,879.9	-5.9	-370.8	1,286,094.19	3,138,429.49	40.117654	-105.005046
3,003.0	8.40	269.50	2,973.9	-6.1	-384.9	1,286,093.89	3,138,415.45	40.117653	-105.005096
3,099.0	8.00	270.50	3,068.9	-6.1	-398.6	1,286,093.81	3,138,401.76	40.117653	-105.005145
3,194.0	7.50	270.20	3,163.0	-6.0	-411.4	1,286,093.82	3,138,388.95	40.117653	-105.005191
3,289.0	8.20	264.60	3,257.2	-6.7	-424.3	1,286,093.13	3,138,376.00	40.117652	-105.005237
3,384.0	7.30	267.80	3,351.3	-7.5	-437.1	1,286,092.19	3,138,363.23	40.117649	-105.005283
3,479.0	8.40	274.50	3,445.4	-7.2	-450.0	1,286,092.43	3,138,350.28	40.117650	-105.005329
3,575.0	9.30	271.90	3,540.2	-6.4	-464.8	1,286,093.15	3,138,335.54	40.117652	-105.005382
3,670.0	9.80	269.50	3,633.9	-6.2	-480.5	1,286,093.25	3,138,319.78	40.117653	-105.005439
3,765.0	9.30	269.50	3,727.6	-6.4	-496.3	1,286,093.02	3,138,304.02	40.117653	-105.005495
3,860.0	10.30	271.00	3,821.2	-6.3	-512.5	1,286,093.01	3,138,287.85	40.117653	-105.005553
3,956.0	9.80	272.20	3,915.8	-5.8	-529.2	1,286,093.38	3,138,271.10	40.117654	-105.005613
4,051.0	9.10	271.90	4,009.5	-5.3	-544.8	1,286,093.85	3,138,255.51	40.117656	-105.005668
4,146.0	8.90	272.10	4,103.3	-4.7	-559.7	1,286,094.29	3,138,240.66	40.117657	-105.005721
4,241.0	9.10	265.00	4,197.1	-5.1	-574.5	1,286,093.82	3,138,225.83	40.117656	-105.005774
4,336.0	9.70	266.60	4,290.9	-6.3	-590.0	1,286,092.60	3,138,210.36	40.117653	-105.005830
4,432.0	8.40	265.50	4,385.7	-7.3	-605.0	1,286,091.49	3,138,195.31	40.117650	-105.005884
4,527.0	9.50	271.30	4,479.5	-7.6	-619.8	1,286,091.04	3,138,180.55	40.117649	-105.005936
4,622.0	10.90	275.50	4,573.0	-6.6	-636.6	1,286,091.99	3,138,163.77	40.117652	-105.005996
4,717.0	10.50	268.90	4,666.3	-5.9	-654.2	1,286,092.58	3,138,146.17	40.117654	-105.006059
4,813.0	9.90	270.50	4,760.8	-6.0	-671.2	1,286,092.39	3,138,129.17	40.117654	-105.006120
4,908.0	8.90	273.50	4,854.6	-5.5	-686.7	1,286,092.82	3,138,113.67	40.117655	-105.006176
5,003.0	10.10	269.10	4,948.3	-5.2	-702.3	1,286,093.05	3,138,098.00	40.117656	-105.006232
5,098.0	9.90	261.50	5,041.8	-6.5	-718.7	1,286,091.62	3,138,081.60	40.117652	-105.006290
5,193.0	9.10	261.60	5,135.5	-8.8	-734.2	1,286,089.23	3,138,066.10	40.117646	-105.006346
5,288.0	9.30	269.50	5,229.3	-10.0	-749.3	1,286,087.98	3,138,051.00	40.117643	-105.006400
5,383.0	8.10	269.80	5,323.2	-10.1	-763.7	1,286,087.81	3,138,036.63	40.117642	-105.006451
5,478.0	9.80	268.40	5,417.0	-10.3	-778.5	1,286,087.48	3,138,021.86	40.117642	-105.006504
5,573.0	10.50	261.40	5,510.6	-11.8	-795.1	1,286,085.87	3,138,005.23	40.117638	-105.006563
5,668.0	9.10	261.90	5,604.2	-14.2	-811.1	1,286,083.43	3,137,989.24	40.117631	-105.006621
5,763.0	8.30	263.10	5,698.1	-16.1	-825.4	1,286,081.46	3,137,975.01	40.117626	-105.006672
5,858.0	9.00	270.00	5,792.0	-16.9	-839.6	1,286,080.56	3,137,960.78	40.117624	-105.006722
5,954.0	10.10	266.20	5,886.7	-17.5	-855.5	1,286,079.91	3,137,944.87	40.117622	-105.006779
6,049.0	9.20	266.30	5,980.3	-18.5	-871.4	1,286,078.78	3,137,928.99	40.117619	-105.006836
6,144.0	9.90	267.90	6,074.0	-19.3	-887.2	1,286,077.91	3,137,913.25	40.117617	-105.006892
6,239.0	10.20	270.40	6,167.5	-19.5	-903.7	1,286,077.57	3,137,896.68	40.117616	-105.006952

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
6,334.0	9.00	272.40	6,261.2	-19.2	-919.6	1,286,077.85	3,137,880.84	40.117617	-105.007008
6,429.0	9.10	264.60	6,355.0	-19.6	-934.5	1,286,077.37	3,137,865.94	40.117616	-105.007062
6,524.0	9.50	266.30	6,448.8	-20.8	-949.8	1,286,076.08	3,137,850.65	40.117613	-105.007116
6,619.0	10.10	265.00	6,542.4	-22.0	-965.9	1,286,074.75	3,137,834.53	40.117610	-105.007174
6,714.0	8.90	266.50	6,636.1	-23.2	-981.5	1,286,073.49	3,137,818.90	40.117606	-105.007230
6,809.0	9.40	265.70	6,729.9	-24.2	-996.6	1,286,072.38	3,137,803.84	40.117604	-105.007284
6,908.0	9.40	268.30	6,827.6	-25.0	-1,012.7	1,286,071.44	3,137,787.70	40.117601	-105.007341
6,955.0	10.50	293.10	6,873.9	-23.5	-1,020.5	1,286,072.96	3,137,779.91	40.117606	-105.007369
7,003.0	12.50	309.90	6,920.9	-18.4	-1,028.5	1,286,077.97	3,137,771.87	40.117619	-105.007398
7,050.0	15.90	319.40	6,966.5	-10.3	-1,036.6	1,286,086.08	3,137,763.73	40.117642	-105.007427
7,098.0	18.20	324.40	7,012.4	0.8	-1,045.3	1,286,097.12	3,137,755.03	40.117672	-105.007458
7,145.0	21.30	326.90	7,056.6	13.9	-1,054.2	1,286,110.19	3,137,746.02	40.117708	-105.007490
7,193.0	24.30	335.80	7,100.9	30.3	-1,063.0	1,286,126.46	3,137,737.11	40.117753	-105.007521
7,240.0	29.10	344.80	7,142.8	50.1	-1,070.0	1,286,146.29	3,137,730.03	40.117808	-105.007546
7,288.0	35.20	348.60	7,183.5	75.0	-1,075.8	1,286,171.11	3,137,724.09	40.117876	-105.007567
7,335.0	39.90	347.70	7,220.7	103.0	-1,081.7	1,286,199.10	3,137,718.04	40.117953	-105.007588
7,384.0	45.00	346.50	7,256.9	135.2	-1,089.1	1,286,231.28	3,137,710.47	40.118041	-105.007614
7,431.0	49.70	345.50	7,288.7	168.7	-1,097.4	1,286,264.76	3,137,701.91	40.118133	-105.007644
7,479.0	55.40	346.20	7,317.9	205.7	-1,106.8	1,286,301.65	3,137,692.40	40.118235	-105.007678
7,526.0	61.50	349.00	7,342.5	244.8	-1,115.3	1,286,340.70	3,137,683.61	40.118342	-105.007708
7,574.0	65.90	350.90	7,363.7	287.1	-1,122.8	1,286,383.02	3,137,675.88	40.118458	-105.007735
7,621.0	69.10	352.20	7,381.7	330.1	-1,129.2	1,286,425.92	3,137,669.27	40.118576	-105.007758
7,670.0	73.40	354.40	7,397.5	376.2	-1,134.6	1,286,471.96	3,137,663.61	40.118703	-105.007777
7,717.0	79.40	355.90	7,408.5	421.7	-1,138.4	1,286,517.44	3,137,659.50	40.118827	-105.007791
7,765.0	83.80	356.20	7,415.5	469.0	-1,141.7	1,286,564.78	3,137,655.97	40.118957	-105.007803
7,812.0	86.10	357.00	7,419.7	515.8	-1,144.5	1,286,611.49	3,137,652.93	40.119086	-105.007813
7,829.0	87.30	357.80	7,420.6	532.7	-1,145.3	1,286,628.44	3,137,652.07	40.119132	-105.007815
7,895.0	88.40	357.60	7,423.1	598.6	-1,147.9	1,286,694.34	3,137,649.05	40.119313	-105.007825
7,988.0	88.10	357.00	7,426.0	691.5	-1,152.3	1,286,787.17	3,137,644.15	40.119568	-105.007841
8,081.0	87.60	356.40	7,429.4	784.3	-1,157.6	1,286,879.92	3,137,638.28	40.119823	-105.007860
8,175.0	88.00	358.00	7,433.0	878.1	-1,162.2	1,286,973.71	3,137,633.17	40.120080	-105.007876
8,269.0	89.30	358.60	7,435.3	972.0	-1,165.0	1,287,067.62	3,137,629.86	40.120338	-105.007886
8,362.0	91.70	359.70	7,434.5	1,065.0	-1,166.4	1,287,160.59	3,137,627.96	40.120593	-105.007891
8,456.0	93.70	3.50	7,430.0	1,158.8	-1,163.8	1,287,254.44	3,137,630.05	40.120851	-105.007882
8,549.0	88.70	3.50	7,428.1	1,251.6	-1,158.1	1,287,347.25	3,137,635.21	40.121106	-105.007861
8,643.0	89.30	2.00	7,429.7	1,345.5	-1,153.6	1,287,441.15	3,137,639.19	40.121363	-105.007845
8,736.0	90.40	2.40	7,430.0	1,438.4	-1,150.0	1,287,534.09	3,137,642.24	40.121619	-105.007833
8,831.0	91.60	4.50	7,428.3	1,533.2	-1,144.3	1,287,628.93	3,137,647.42	40.121879	-105.007812
8,924.0	89.00	2.40	7,427.8	1,626.0	-1,138.7	1,287,721.78	3,137,652.50	40.122134	-105.007792
9,018.0	90.70	2.00	7,428.1	1,719.9	-1,135.1	1,287,815.72	3,137,655.58	40.122391	-105.007779
9,111.0	90.40	2.00	7,427.2	1,812.9	-1,131.8	1,287,908.68	3,137,658.31	40.122647	-105.007768
9,205.0	90.80	2.10	7,426.2	1,906.8	-1,128.5	1,288,002.63	3,137,661.14	40.122904	-105.007756
9,298.0	90.60	0.90	7,425.0	1,999.8	-1,126.0	1,288,095.60	3,137,663.06	40.123160	-105.007747
9,392.0	90.90	1.20	7,423.8	2,093.8	-1,124.3	1,288,189.59	3,137,664.25	40.123418	-105.007741
9,485.0	91.30	1.50	7,422.0	2,186.7	-1,122.1	1,288,282.55	3,137,665.92	40.123673	-105.007733
9,579.0	91.30	1.10	7,419.9	2,280.7	-1,120.0	1,288,376.52	3,137,667.53	40.123931	-105.007725
9,672.0	90.10	359.90	7,418.8	2,373.7	-1,119.2	1,288,469.51	3,137,667.82	40.124186	-105.007722
9,766.0	91.80	0.10	7,417.2	2,467.6	-1,119.2	1,288,563.49	3,137,667.30	40.124444	-105.007722
9,859.0	92.70	1.20	7,413.6	2,560.6	-1,118.1	1,288,656.41	3,137,667.83	40.124699	-105.007719
9,953.0	92.00	1.90	7,409.7	2,654.4	-1,115.6	1,288,750.31	3,137,669.84	40.124957	-105.007710
10,046.0	91.90	2.30	7,406.5	2,747.3	-1,112.2	1,288,843.21	3,137,672.73	40.125212	-105.007697
10,140.0	90.00	3.00	7,405.0	2,841.2	-1,107.8	1,288,937.12	3,137,676.55	40.125469	-105.007682
10,233.0	90.60	2.70	7,404.5	2,934.1	-1,103.2	1,289,030.03	3,137,680.66	40.125724	-105.007665
10,327.0	88.70	2.60	7,405.1	3,028.0	-1,098.9	1,289,123.94	3,137,684.48	40.125982	-105.007650
10,421.0	89.10	2.10	7,406.9	3,121.9	-1,095.0	1,289,217.87	3,137,687.80	40.126240	-105.007636

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
10,515.0	88.00	1.10	7,409.2	3,215.8	-1,092.4	1,289,311.81	3,137,689.90	40.126498	-105.007627
10,609.0	88.70	1.80	7,412.0	3,309.7	-1,090.0	1,289,405.75	3,137,691.75	40.126756	-105.007618
10,704.0	90.20	2.40	7,412.9	3,404.7	-1,086.5	1,289,500.70	3,137,694.70	40.127016	-105.007606
10,798.0	90.70	2.50	7,412.1	3,498.6	-1,082.5	1,289,594.61	3,137,698.19	40.127274	-105.007592
10,893.0	92.40	2.50	7,409.6	3,593.4	-1,078.4	1,289,689.50	3,137,701.81	40.127534	-105.007577
10,987.0	92.20	1.60	7,405.8	3,687.3	-1,075.0	1,289,783.38	3,137,704.64	40.127792	-105.007565
11,081.0	92.40	0.50	7,402.0	3,781.2	-1,073.3	1,289,877.30	3,137,705.84	40.128050	-105.007559
11,176.0	92.70	359.90	7,397.8	3,876.1	-1,073.0	1,289,972.20	3,137,705.64	40.128310	-105.007557
11,271.0	91.80	0.50	7,394.1	3,971.0	-1,072.6	1,290,067.13	3,137,705.44	40.128571	-105.007556
11,365.0	91.10	0.60	7,391.7	4,065.0	-1,071.7	1,290,161.10	3,137,705.81	40.128829	-105.007553
11,459.0	91.30	0.30	7,389.7	4,159.0	-1,071.0	1,290,255.08	3,137,706.02	40.129087	-105.007550
11,554.0	89.90	0.90	7,388.7	4,254.0	-1,070.0	1,290,350.07	3,137,706.49	40.129348	-105.007547
11,648.0	89.80	0.10	7,389.0	4,348.0	-1,069.2	1,290,444.06	3,137,706.78	40.129606	-105.007544
11,743.0	89.20	0.30	7,389.8	4,443.0	-1,068.9	1,290,539.06	3,137,706.58	40.129867	-105.007543
11,837.0	90.90	359.90	7,389.7	4,537.0	-1,068.7	1,290,633.06	3,137,706.22	40.130125	-105.007542
11,932.0	90.30	359.60	7,388.7	4,631.9	-1,069.1	1,290,728.05	3,137,705.27	40.130385	-105.007544
12,026.0	89.90	359.20	7,388.5	4,725.9	-1,070.1	1,290,822.03	3,137,703.76	40.130643	-105.007547
12,121.0	89.60	359.30	7,389.0	4,820.9	-1,071.3	1,290,917.02	3,137,701.99	40.130904	-105.007552
12,215.0	89.80	358.80	7,389.5	4,914.9	-1,072.9	1,291,011.01	3,137,699.90	40.131162	-105.007557
12,310.0	91.30	357.60	7,388.5	5,009.9	-1,075.9	1,291,105.94	3,137,696.39	40.131423	-105.007568
12,405.0	91.70	358.10	7,386.1	5,104.8	-1,079.4	1,291,200.82	3,137,692.29	40.131683	-105.007581
12,499.0	91.90	358.20	7,383.1	5,198.7	-1,082.5	1,291,294.71	3,137,688.74	40.131941	-105.007592
12,594.0	93.40	358.20	7,378.7	5,293.5	-1,085.4	1,291,389.54	3,137,685.22	40.132201	-105.007602
12,688.0	90.80	358.40	7,375.3	5,387.4	-1,088.2	1,291,483.41	3,137,681.91	40.132459	-105.007612
12,783.0	90.40	358.00	7,374.3	5,482.4	-1,091.2	1,291,578.34	3,137,678.40	40.132720	-105.007623
12,878.0	90.30	357.90	7,373.7	5,577.3	-1,094.6	1,291,673.25	3,137,674.47	40.132980	-105.007635
12,972.0	89.90	357.60	7,373.5	5,671.2	-1,098.3	1,291,767.16	3,137,670.25	40.133238	-105.007648
13,066.0	90.10	358.10	7,373.5	5,765.2	-1,101.8	1,291,861.07	3,137,666.20	40.133496	-105.007661
13,161.0	90.90	358.10	7,372.7	5,860.1	-1,105.0	1,291,956.00	3,137,662.52	40.133757	-105.007672
13,255.0	90.90	359.50	7,371.2	5,954.1	-1,107.0	1,292,049.95	3,137,660.02	40.134015	-105.007679
13,350.0	91.20	359.80	7,369.5	6,049.0	-1,107.5	1,292,144.90	3,137,658.91	40.134275	-105.007681
13,446.0	91.60	359.20	7,367.1	6,145.0	-1,108.4	1,292,240.86	3,137,657.54	40.134539	-105.007684
13,540.0	92.90	358.90	7,363.4	6,238.9	-1,109.9	1,292,334.76	3,137,655.46	40.134797	-105.007690
13,635.0	91.30	1.10	7,360.0	6,333.8	-1,109.9	1,292,429.69	3,137,654.93	40.135057	-105.007690
13,729.0	89.70	0.60	7,359.1	6,427.8	-1,108.5	1,292,523.68	3,137,655.79	40.135315	-105.007685
13,824.0	89.80	0.80	7,359.6	6,522.8	-1,107.4	1,292,618.68	3,137,656.42	40.135576	-105.007681
13,918.0	90.90	3.00	7,359.0	6,616.8	-1,104.3	1,292,712.63	3,137,659.01	40.135834	-105.007670
14,013.0	89.40	1.90	7,358.7	6,711.7	-1,100.2	1,292,807.59	3,137,662.54	40.136095	-105.007655
14,107.0	89.30	1.10	7,359.8	6,805.7	-1,097.7	1,292,901.56	3,137,664.48	40.136352	-105.007646
14,202.0	89.60	358.50	7,360.7	6,900.6	-1,098.1	1,292,996.55	3,137,663.61	40.136613	-105.007648
14,296.0	90.10	2.20	7,361.0	6,994.6	-1,097.5	1,293,090.53	3,137,663.66	40.136871	-105.007646
14,391.0	90.30	3.00	7,360.6	7,089.5	-1,093.2	1,293,185.45	3,137,667.44	40.137132	-105.007630
14,485.0	90.20	356.90	7,360.2	7,183.5	-1,093.3	1,293,279.41	3,137,666.83	40.137390	-105.007631
14,580.0	90.20	352.70	7,359.9	7,278.1	-1,101.9	1,293,373.94	3,137,657.70	40.137649	-105.007661
14,674.0	92.20	354.70	7,357.9	7,371.5	-1,112.2	1,293,467.29	3,137,646.86	40.137906	-105.007698
14,769.0	92.40	357.60	7,354.1	7,466.2	-1,118.6	1,293,561.95	3,137,639.96	40.138166	-105.007721
14,863.0	92.30	357.60	7,350.2	7,560.0	-1,122.5	1,293,655.76	3,137,635.50	40.138423	-105.007735
14,958.0	91.30	358.30	7,347.3	7,654.9	-1,125.9	1,293,750.63	3,137,631.57	40.138684	-105.007747
15,052.0	91.40	357.90	7,345.1	7,748.8	-1,129.0	1,293,844.54	3,137,627.93	40.138942	-105.007758
15,147.0	90.70	359.20	7,343.3	7,843.8	-1,131.4	1,293,939.47	3,137,625.00	40.139202	-105.007767
15,242.0	90.50	359.20	7,342.3	7,938.8	-1,132.7	1,294,034.45	3,137,623.14	40.139463	-105.007772
15,336.0	90.20	359.50	7,341.7	8,032.7	-1,133.8	1,294,128.44	3,137,621.55	40.139721	-105.007776
15,430.0	90.40	359.30	7,341.2	8,126.7	-1,134.8	1,294,222.42	3,137,620.04	40.139979	-105.007779
15,525.0	90.30	359.80	7,340.7	8,221.7	-1,135.5	1,294,317.41	3,137,618.76	40.140240	-105.007782
15,620.0	90.30	359.50	7,340.2	8,316.7	-1,136.1	1,294,412.40	3,137,617.65	40.140501	-105.007784

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Edith Ann-Duckworth 4A-21H-O268
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Site:</b>	S21-T2N-R68W (Edith Ann-Duckworth)	<b>MD Reference:</b>	KB @ 4953.5ft (Patterson 272)
<b>Well:</b>	Edith Ann-Duckworth 4A-21H-O268	<b>North Reference:</b>	True
<b>Wellbore:</b>	Hz	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
15,714.0	89.90	0.00	7,340.0	8,410.7	-1,136.5	1,294,506.40	3,137,616.71	40.140759	-105.007785
15,810.0	90.10	358.50	7,340.0	8,506.7	-1,137.8	1,294,602.38	3,137,614.92	40.141022	-105.007790
15,905.0	91.10	358.80	7,339.0	8,601.7	-1,140.0	1,294,697.33	3,137,612.15	40.141283	-105.007798
15,999.0	90.30	357.90	7,337.9	8,695.6	-1,142.7	1,294,791.27	3,137,608.91	40.141541	-105.007808
16,094.0	91.80	359.30	7,336.1	8,790.6	-1,145.0	1,294,886.20	3,137,606.06	40.141801	-105.007816
16,188.0	91.90	0.60	7,333.1	8,884.5	-1,145.1	1,294,980.15	3,137,605.45	40.142059	-105.007816
16,283.0	92.00	0.60	7,329.9	8,979.5	-1,144.1	1,295,075.10	3,137,605.92	40.142320	-105.007813
16,377.0	90.70	0.20	7,327.6	9,073.5	-1,143.5	1,295,169.07	3,137,606.05	40.142578	-105.007810
16,472.0	90.80	0.30	7,326.4	9,168.4	-1,143.1	1,295,264.06	3,137,605.93	40.142839	-105.007809
16,566.0	90.50	0.40	7,325.3	9,262.4	-1,142.5	1,295,358.05	3,137,605.98	40.143097	-105.007807
16,660.0	90.40	0.10	7,324.6	9,356.4	-1,142.1	1,295,452.05	3,137,605.86	40.143355	-105.007805
16,754.0	90.20	359.90	7,324.1	9,450.4	-1,142.1	1,295,546.05	3,137,605.34	40.143613	-105.007805
16,849.0	91.30	359.40	7,322.9	9,545.4	-1,142.7	1,295,641.03	3,137,604.22	40.143873	-105.007808
16,944.0	90.90	359.00	7,321.0	9,640.4	-1,144.0	1,295,736.00	3,137,602.37	40.144134	-105.007812
17,039.0	91.00	358.80	7,319.5	9,735.4	-1,145.8	1,295,830.95	3,137,600.01	40.144395	-105.007819
17,075.0	91.00	358.80	7,318.8	9,771.3	-1,146.6	1,295,866.90	3,137,599.06	40.144494	-105.007822
<b>Last CES Survey @ 17,075' MD</b>									
17,130.0	91.00	358.80	7,317.9	9,826.3	-1,147.7	1,295,921.87	3,137,597.60	40.144645	-105.007826
<b>PTB @ 17,130'</b>									

Design 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									
Edith Ann-Duckworth 4A	0.00	0.00	7,318.9	9,879.3	-1,154.6	1,295,974.86	3,137,590.43	40.144790	-105.007850
- actual wellpath misses target center by 53.5ft at 17130.0ft MD (7317.9 TVD, 9826.3 N, -1147.7 E)									
- Point									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
17,075.0	7,318.8	9,771.3	-1,146.6	Last CES Survey @ 17,075' MD	
17,130.0	7,317.9	9,826.3	-1,147.7	PTB @ 17,130'	

Checked By: _____	Approved By: _____	Date: _____
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