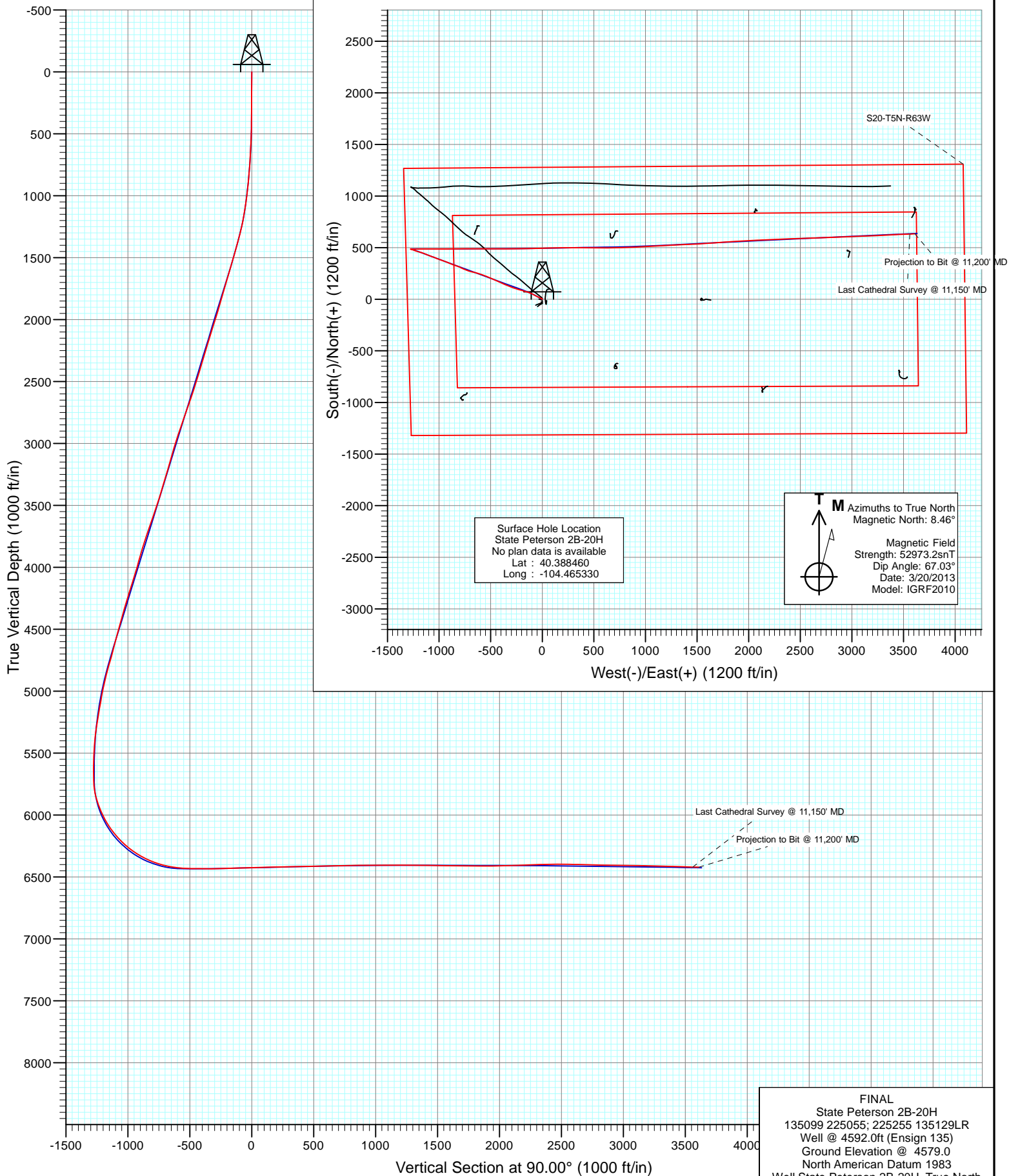




Project: DJ Wattenberg
Site: S20-T5N-R63W (State Peterson)
Well: State Peterson 2B-20H
Wellbore: Hz
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State Peterson 2B-20H
Project:	DJ Wattenberg	TVD Reference:	Well @ 4592.0ft (Ensign 135)
Site:	S20-T5N-R63W (State Peterson)	MD Reference:	Well @ 4592.0ft (Ensign 135)
Well:	State Peterson 2B-20H	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		S20-T5N-R63W (State Peterson)			
Site Position:		Northing:	1,386,047.92 ft	Latitude:	40.388480
From:	Lat/Long	Easting:	3,288,215.31 ft	Longitude:	-104.465330
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.67 °

Well	State Peterson 2B-20H					
Well Position	+N/-S	0.0 ft	Northing:	1,386,040.62 ft	Latitude:	40.388460
	+E/-W	0.0 ft	Easting:	3,288,215.40 ft	Longitude:	-104.465330
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,579.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/20/2013	8.46	67.03	52,973

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	3/27/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
228.0	11,200.0	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	
228.0	0.40	356.00	228.0	0.8	-0.1	-0.1	0.18	0.18	
320.0	0.40	320.00	320.0	1.4	-0.3	-0.3	0.27	0.00	
412.0	0.90	310.90	412.0	2.1	-1.0	-1.0	0.55	0.54	
504.0	2.00	308.90	504.0	3.6	-2.8	-2.8	1.20	1.20	
596.0	3.00	299.50	595.9	5.8	-6.2	-6.2	1.17	1.09	
688.0	4.10	295.30	687.7	8.3	-11.2	-11.2	1.23	1.20	
780.0	5.10	292.80	779.4	11.3	-18.0	-18.0	1.11	1.09	
872.0	6.10	294.20	871.0	14.9	-26.2	-26.2	1.10	1.09	
914.0	6.50	293.50	912.7	16.8	-30.4	-30.4	0.97	0.95	
1,005.0	6.60	294.60	1,003.1	21.0	-39.9	-39.9	0.18	0.11	
1,097.0	9.70	298.50	1,094.2	26.9	-51.5	-51.5	3.42	3.37	
1,189.0	12.50	298.90	1,184.4	35.4	-67.1	-67.1	3.04	3.04	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State Peterson 2B-20H
Project:	DJ Wattenberg	TVD Reference:	Well @ 4592.0ft (Ensign 135)
Site:	S20-T5N-R63W (State Peterson)	MD Reference:	Well @ 4592.0ft (Ensign 135)
Well:	State Peterson 2B-20H	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
1,281.0	14.80	298.00	1,273.8	45.8	-86.2	-86.2	2.51	2.50	
1,373.0	16.60	294.00	1,362.4	56.6	-108.5	-108.5	2.28	1.96	
1,465.0	17.40	289.30	1,450.4	66.5	-133.5	-133.5	1.73	0.87	
1,557.0	16.60	284.50	1,538.4	74.4	-159.2	-159.2	1.76	-0.87	
1,649.0	16.40	286.60	1,626.6	81.4	-184.4	-184.4	0.68	-0.22	
1,741.0	16.70	284.70	1,714.8	88.4	-209.6	-209.6	0.67	0.33	
1,833.0	17.20	287.40	1,802.8	95.8	-235.4	-235.4	1.01	0.54	
1,925.0	17.30	289.40	1,890.6	104.5	-261.3	-261.3	0.65	0.11	
2,020.0	18.60	290.80	1,981.0	114.5	-288.8	-288.8	1.44	1.37	
2,114.0	18.40	290.20	2,070.2	125.0	-316.7	-316.7	0.29	-0.21	
2,209.0	17.90	289.90	2,160.4	135.1	-344.5	-344.5	0.54	-0.53	
2,304.0	18.00	293.70	2,250.8	146.0	-371.7	-371.7	1.24	0.11	
2,399.0	18.50	295.60	2,341.0	158.4	-398.7	-398.7	0.82	0.53	
2,493.0	18.70	294.70	2,430.1	171.1	-425.9	-425.9	0.37	0.21	
2,588.0	18.30	292.50	2,520.2	183.2	-453.5	-453.5	0.85	-0.42	
2,682.0	20.00	294.00	2,609.0	195.4	-481.8	-481.8	1.88	1.81	
2,777.0	22.00	294.70	2,697.7	209.4	-512.8	-512.8	2.12	2.11	
2,872.0	20.10	292.40	2,786.3	223.1	-544.1	-544.1	2.18	-2.00	
2,966.0	20.20	290.00	2,874.6	234.8	-574.2	-574.2	0.89	0.11	
3,060.0	19.10	288.10	2,963.1	245.1	-604.1	-604.1	1.35	-1.17	
3,155.0	16.80	283.20	3,053.5	253.1	-632.3	-632.3	2.89	-2.42	
3,250.0	16.00	285.40	3,144.6	259.7	-658.3	-658.3	1.07	-0.84	
3,345.0	16.90	283.30	3,235.7	266.4	-684.3	-684.3	1.14	0.95	
3,439.0	17.40	285.90	3,325.6	273.4	-711.1	-711.1	0.97	0.53	
3,534.0	18.20	293.30	3,416.0	283.1	-738.4	-738.4	2.52	0.84	
3,628.0	20.00	295.30	3,504.9	295.8	-766.4	-766.4	2.04	1.91	
3,723.0	20.80	292.80	3,593.9	309.3	-796.7	-796.7	1.25	0.84	
3,818.0	20.90	291.00	3,682.7	321.9	-828.0	-828.0	0.68	0.11	
3,913.0	18.20	288.50	3,772.2	332.7	-857.9	-857.9	2.97	-2.84	
4,007.0	18.30	292.00	3,861.5	342.9	-885.5	-885.5	1.17	0.11	
4,102.0	16.80	292.60	3,952.0	353.7	-912.1	-912.1	1.59	-1.58	
4,197.0	17.90	292.10	4,042.7	364.5	-938.3	-938.3	1.17	1.16	
4,292.0	18.10	288.80	4,133.1	374.7	-965.8	-965.8	1.09	0.21	
4,386.0	18.80	290.20	4,222.2	384.7	-993.8	-993.8	0.88	0.74	
4,481.0	17.70	291.00	4,312.5	395.1	-1,021.6	-1,021.6	1.19	-1.16	
4,576.0	16.30	290.80	4,403.3	405.0	-1,047.6	-1,047.6	1.47	-1.47	
4,671.0	16.10	289.60	4,494.5	414.2	-1,072.5	-1,072.5	0.41	-0.21	
4,765.0	15.30	291.30	4,585.0	423.1	-1,096.3	-1,096.3	0.98	-0.85	
4,860.0	16.00	291.70	4,676.5	432.5	-1,120.1	-1,120.1	0.75	0.74	
4,955.0	17.30	291.10	4,767.5	442.4	-1,145.5	-1,145.5	1.38	1.37	
5,050.0	15.90	289.40	4,858.6	451.8	-1,170.9	-1,170.9	1.56	-1.47	
5,144.0	11.80	283.70	4,949.8	458.4	-1,192.4	-1,192.4	4.59	-4.36	
5,239.0	11.70	287.70	5,042.8	463.6	-1,211.0	-1,211.0	0.86	-0.11	
5,334.0	10.50	290.20	5,136.0	469.5	-1,228.3	-1,228.3	1.36	-1.26	
5,429.0	9.60	291.00	5,229.6	475.3	-1,243.9	-1,243.9	0.96	-0.95	
5,523.0	8.20	288.80	5,322.4	480.3	-1,257.5	-1,257.5	1.53	-1.49	
5,618.0	4.70	286.10	5,416.8	483.6	-1,267.7	-1,267.7	3.70	-3.68	
5,713.0	2.90	291.00	5,511.6	485.5	-1,273.7	-1,273.7	1.92	-1.89	
5,808.0	1.20	276.50	5,606.6	486.5	-1,276.9	-1,276.9	1.86	-1.79	
5,902.0	2.50	116.20	5,700.5	485.7	-1,276.0	-1,276.0	3.89	1.38	
5,934.0	2.20	111.70	5,732.5	485.2	-1,274.8	-1,274.8	1.10	-0.94	
5,966.0	4.10	101.40	5,764.5	484.7	-1,273.1	-1,273.1	6.17	5.94	
5,997.0	8.40	98.20	5,795.3	484.2	-1,269.8	-1,269.8	13.91	13.87	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State Peterson 2B-20H
Project:	DJ Wattenberg	TVD Reference:	Well @ 4592.0ft (Ensign 135)
Site:	S20-T5N-R63W (State Peterson)	MD Reference:	Well @ 4592.0ft (Ensign 135)
Well:	State Peterson 2B-20H	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
6,029.0	11.90	93.90	5,826.8	483.6	-1,264.2	-1,264.2	11.18	10.94	
6,061.0	15.10	91.00	5,857.9	483.3	-1,256.7	-1,256.7	10.22	10.00	
6,092.0	18.10	88.80	5,887.6	483.3	-1,247.9	-1,247.9	9.89	9.68	
6,124.0	20.30	85.60	5,917.8	483.9	-1,237.4	-1,237.4	7.62	6.87	
6,155.0	22.20	85.60	5,946.7	484.7	-1,226.2	-1,226.2	6.13	6.13	
6,187.0	23.90	87.00	5,976.1	485.5	-1,213.7	-1,213.7	5.58	5.31	
6,218.0	25.80	87.50	6,004.3	486.2	-1,200.7	-1,200.7	6.17	6.13	
6,250.0	28.00	87.60	6,032.8	486.8	-1,186.2	-1,186.2	6.88	6.87	
6,282.0	30.50	87.70	6,060.7	487.4	-1,170.6	-1,170.6	7.81	7.81	
6,313.0	33.20	89.20	6,087.0	487.8	-1,154.2	-1,154.2	9.08	8.71	
6,345.0	36.20	91.40	6,113.3	487.7	-1,136.0	-1,136.0	10.16	9.37	
6,376.0	38.30	91.60	6,138.0	487.2	-1,117.3	-1,117.3	6.79	6.77	
6,408.0	39.60	90.90	6,162.9	486.8	-1,097.2	-1,097.2	4.29	4.06	
6,440.0	41.90	90.20	6,187.2	486.6	-1,076.3	-1,076.3	7.33	7.19	
6,471.0	44.90	89.70	6,209.7	486.6	-1,055.0	-1,055.0	9.74	9.68	
6,503.0	47.50	89.60	6,231.8	486.8	-1,031.9	-1,031.9	8.13	8.12	
6,534.0	49.20	89.70	6,252.4	486.9	-1,008.7	-1,008.7	5.49	5.48	
6,566.0	51.60	89.90	6,272.8	487.0	-984.1	-984.1	7.52	7.50	
6,598.0	54.70	90.70	6,292.0	486.9	-958.5	-958.5	9.89	9.69	
6,629.0	57.90	90.50	6,309.2	486.6	-932.7	-932.7	10.34	10.32	
6,661.0	60.10	90.00	6,325.7	486.5	-905.2	-905.2	7.00	6.87	
6,692.0	61.70	89.70	6,340.8	486.5	-878.2	-878.2	5.23	5.16	
6,724.0	64.10	89.30	6,355.3	486.8	-849.7	-849.7	7.58	7.50	
6,756.0	66.50	89.50	6,368.7	487.1	-820.6	-820.6	7.52	7.50	
6,787.0	69.10	89.10	6,380.4	487.5	-791.9	-791.9	8.47	8.39	
6,819.0	71.70	88.90	6,391.2	488.0	-761.8	-761.8	8.15	8.12	
6,850.0	74.60	88.80	6,400.1	488.6	-732.1	-732.1	9.36	9.35	
6,882.0	77.20	89.20	6,407.9	489.1	-701.1	-701.1	8.21	8.12	
6,914.0	79.10	89.40	6,414.5	489.5	-669.8	-669.8	5.97	5.94	
6,945.0	80.90	89.50	6,419.9	489.8	-639.2	-639.2	5.82	5.81	
6,977.0	81.50	90.10	6,424.8	489.9	-607.6	-607.6	2.64	1.87	
7,008.0	83.60	90.80	6,428.8	489.7	-576.9	-576.9	7.13	6.77	
7,031.0	86.10	91.90	6,430.9	489.1	-554.0	-554.0	11.87	10.87	
7,100.0	89.70	90.70	6,433.4	487.6	-485.1	-485.1	5.50	5.22	
7,164.0	89.60	90.30	6,433.8	487.0	-421.1	-421.1	0.64	-0.16	
7,258.0	90.10	89.20	6,434.0	487.4	-327.1	-327.1	1.29	0.53	
7,353.0	91.30	88.70	6,432.9	489.1	-232.1	-232.1	1.37	1.26	
7,448.0	91.30	89.10	6,430.7	491.0	-137.1	-137.1	0.42	0.00	
7,543.0	91.30	88.80	6,428.6	492.7	-42.2	-42.2	0.32	0.00	
7,637.0	92.00	88.60	6,425.9	494.8	51.8	51.8	0.77	0.74	
7,732.0	92.30	88.30	6,422.3	497.4	146.7	146.7	0.45	0.32	
7,827.0	92.10	89.80	6,418.6	499.0	241.6	241.6	1.59	-0.21	
7,922.0	91.40	90.00	6,415.7	499.1	336.5	336.5	0.77	-0.74	
8,016.0	91.20	90.60	6,413.6	498.7	430.5	430.5	0.67	-0.21	
8,111.0	90.90	89.90	6,411.9	498.2	525.5	525.5	0.80	-0.32	
8,206.0	90.10	90.10	6,411.0	498.2	620.5	620.5	0.87	-0.84	
8,301.0	91.30	89.10	6,409.9	498.9	715.5	715.5	1.64	1.26	
8,371.6	91.00	88.35	6,408.5	500.5	786.0	786.0	1.15	-0.43	State Peterson 2B-20H 8400' MD TGT
8,395.0	90.90	88.10	6,408.1	501.2	809.4	809.4	1.15	-0.43	
8,490.0	90.10	87.20	6,407.2	505.1	904.3	904.3	1.27	-0.84	
8,585.0	91.30	87.10	6,406.1	509.8	999.2	999.2	1.27	1.26	
8,679.0	90.50	86.60	6,404.6	515.0	1,093.1	1,093.1	1.00	-0.85	
8,774.0	89.60	86.90	6,404.5	520.4	1,187.9	1,187.9	1.00	-0.95	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State Peterson 2B-20H
Project:	DJ Wattenberg	TVD Reference:	Well @ 4592.0ft (Ensign 135)
Site:	S20-T5N-R63W (State Peterson)	MD Reference:	Well @ 4592.0ft (Ensign 135)
Well:	State Peterson 2B-20H	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
8,869.0	89.60	87.40	6,405.2	525.1	1,282.8	1,282.8	0.53	0.00	
8,964.0	89.10	87.40	6,406.3	529.4	1,377.7	1,377.7	0.53	-0.53	
9,059.0	88.70	87.20	6,408.1	533.9	1,472.6	1,472.6	0.47	-0.42	
9,154.0	89.20	86.20	6,409.8	539.3	1,567.4	1,567.4	1.18	0.53	
9,249.0	89.50	85.40	6,410.9	546.3	1,662.1	1,662.1	0.90	0.32	
9,343.0	89.20	86.20	6,412.0	553.2	1,755.9	1,755.9	0.91	-0.32	
9,438.0	90.10	86.90	6,412.6	558.9	1,850.7	1,850.7	1.20	0.95	
9,533.0	90.80	87.10	6,411.8	563.9	1,945.6	1,945.6	0.77	0.74	
9,627.0	91.40	86.50	6,410.0	569.1	2,039.4	2,039.4	0.90	0.64	
9,722.0	91.80	86.60	6,407.3	574.8	2,134.2	2,134.2	0.43	0.42	
9,817.0	92.40	87.20	6,403.9	580.0	2,229.0	2,229.0	0.89	0.63	
9,872.0	91.87	87.90	6,401.8	582.3	2,283.8	2,283.8	1.60	-0.96	State Peterson 2B-20H 9900' MD TGT
9,911.0	91.50	88.40	6,400.7	583.6	2,322.9	2,322.9	1.60	-0.96	
10,006.0	90.90	88.20	6,398.7	586.4	2,417.8	2,417.8	0.67	-0.63	
10,101.0	89.50	88.50	6,398.3	589.1	2,512.8	2,512.8	1.51	-1.47	
10,196.0	89.50	88.40	6,399.2	591.7	2,607.7	2,607.7	0.11	0.00	
10,290.0	87.40	87.80	6,401.7	594.8	2,701.6	2,701.6	2.32	-2.23	
10,385.0	89.40	88.10	6,404.4	598.2	2,796.5	2,796.5	2.13	2.11	
10,480.0	89.20	87.80	6,405.5	601.6	2,891.5	2,891.5	0.38	-0.21	
10,574.0	89.30	87.40	6,406.8	605.5	2,985.4	2,985.4	0.44	0.11	
10,669.0	88.70	87.20	6,408.4	610.0	3,080.2	3,080.2	0.67	-0.63	
10,763.0	88.90	87.00	6,410.4	614.8	3,174.1	3,174.1	0.30	0.21	
10,858.0	89.10	87.20	6,412.0	619.6	3,269.0	3,269.0	0.30	0.21	
10,952.0	88.20	87.80	6,414.3	623.7	3,362.8	3,362.8	1.15	-0.96	
11,047.0	88.00	87.80	6,417.4	627.3	3,457.7	3,457.7	0.21	-0.21	
11,142.0	88.40	87.80	6,420.4	631.0	3,552.6	3,552.6	0.42	0.42	
11,150.0	88.50	87.60	6,420.6	631.3	3,560.6	3,560.6	2.79	1.25	Last Cathedral Survey @ 11,150' MD
11,200.0	88.50	87.60	6,421.9	633.4	3,610.5	3,610.5	0.00	0.00	Projection to Bit @ 11,200' MD - State Peterson

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well State Peterson 2B-20H
Project:	DJ Wattenberg	TVD Reference:	Well @ 4592.0ft (Ensign 135)
Site:	S20-T5N-R63W (State Peterson)	MD Reference:	Well @ 4592.0ft (Ensign 135)
Well:	State Peterson 2B-20H	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 Peterson 2B-20H I - actual wellpath misses target center by 9.2ft at 9872.0ft MD (6401.8 TVD, 582.3 N, 2283.9 E) - Point	0.00	0.00	6,409.0	576.6	2,284.3	1,386,643.82	3,290,492.81	40.390042	-104.457129
State Peterson 2B-20H I - actual wellpath misses target center by 7.2ft at 8371.7ft MD (6408.5 TVD, 500.5 N, 786.1 E) - Point	0.00	0.00	6,409.0	507.7	785.9	1,386,557.42	3,288,995.30	40.389853	-104.462509
State Peterson 2B-20H I - actual wellpath misses target center by 22.8ft at 11200.0ft MD (6421.9 TVD, 633.4 N, 3610.5 E) - Point	0.00	0.00	6,426.0	638.7	3,632.3	1,386,721.65	3,291,840.01	40.390212	-104.452290
State Peterson 2B-20H I - actual wellpath misses target center by 759.5ft at 11200.0ft MD (6421.9 TVD, 633.4 N, 3610.5 E) - Point	0.00	0.00	7,181.0	648.7	3,632.3	1,386,731.68	3,291,839.89	40.390240	-104.452290
State Peterson 2B-20H I - actual wellpath misses target center by 752.0ft at 7046.1ft MD (6431.8 TVD, 488.7 N, -538.9 E) - Point	0.00	0.00	7,181.0	430.7	-567.7	1,386,464.67	3,287,642.72	40.389642	-104.467368
State Peterson 2B-20H I - actual wellpath misses target center by 163.8ft at 5930.2ft MD (5728.7 TVD, 485.2 N, -1275.0 E) - Point	0.00	0.00	5,731.8	648.7	-1,283.9	1,386,674.29	3,286,924.02	40.390241	-104.469939

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,150.0	6,420.6	631.3	3,560.6	Last Cathedral Survey @ 11,150' MD
11,200.0	6,421.9	633.4	3,610.5	Projection to Bit @ 11,200' MD

Checked By: _____ Approved By: _____ Date: _____