

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Drieth 4D-6H-I368
Project:	DJ Wattenberg	TVD Reference:	30' KB @ 5140.0ft (H&P 522)
Site:	S6-T3N-R68W (Zisch/Drieth)	MD Reference:	30' KB @ 5140.0ft (H&P 522)
Well:	Drieth 4D-6H-I368	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		S6-T3N-R68W (Zisch/Drieth)			
Site Position:		Northing:	1,333,692.14 ft	Latitude:	40.248510
From:	Lat/Long	Easting:	3,124,995.76 ft	Longitude:	-105.052220
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.29 °

Well	Drieth 4D-6H-I368					
Well Position	+N/-S	0.0 ft	Northing:	1,335,758.97 ft	Latitude:	40.254130
	+E/-W	0.0 ft	Easting:	3,128,800.81 ft	Longitude:	-105.038550
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,110.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/10/2014	8.55	66.77	52,674

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	270.00	

Survey Program	Date	10/15/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
140.0	11,477.0	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		
140.0	0.90	313.70	140.0	0.8	-0.8	0.8	0.64	0.64		
232.0	1.20	285.20	232.0	1.5	-2.2	2.2	0.64	0.33		
324.0	0.70	295.80	324.0	2.0	-3.7	3.7	0.57	-0.54		
416.0	0.80	95.70	416.0	2.2	-3.5	3.5	1.61	0.11		
507.0	0.80	84.10	507.0	2.2	-2.3	2.3	0.18	0.00		
599.0	1.10	118.50	598.9	1.8	-0.9	0.9	0.69	0.33		
691.0	2.00	95.30	690.9	1.3	1.5	-1.5	1.17	0.98		
783.0	2.20	82.40	782.8	1.4	4.9	-4.9	0.56	0.22		
830.0	2.50	75.50	829.8	1.7	6.7	-6.7	0.88	0.64		
926.0	4.50	85.90	925.6	2.5	12.5	-12.5	2.18	2.08		
1,020.0	4.60	82.10	1,019.3	3.3	19.9	-19.9	0.34	0.11		
1,112.0	4.40	77.40	1,111.0	4.6	27.0	-27.0	0.46	-0.22		

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Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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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
1,204.0	4.40	73.00	1,202.8	6.4	33.9	-33.9	0.37	0.00	
1,295.0	5.10	86.50	1,293.5	7.6	41.2	-41.2	1.44	0.77	
1,387.0	4.80	81.40	1,385.1	8.5	49.1	-49.1	0.58	-0.33	
1,479.0	5.00	78.50	1,476.8	9.8	56.9	-56.9	0.35	0.22	
1,571.0	4.90	97.00	1,568.5	10.2	64.7	-64.7	1.73	-0.11	
1,663.0	5.20	91.30	1,660.1	9.6	72.7	-72.7	0.64	0.33	
1,755.0	5.50	106.40	1,751.7	8.3	81.1	-81.1	1.56	0.33	
1,847.0	5.40	102.10	1,843.3	6.1	89.6	-89.6	0.46	-0.11	
1,940.0	5.30	98.90	1,935.9	4.5	98.1	-98.1	0.34	-0.11	
2,032.0	5.20	95.70	2,027.5	3.5	106.5	-106.5	0.34	-0.11	
2,123.0	5.20	93.80	2,118.1	2.8	114.7	-114.7	0.19	0.00	
2,216.0	5.00	89.70	2,210.8	2.5	123.0	-123.0	0.45	-0.22	
2,307.0	5.20	106.50	2,301.4	1.4	130.9	-130.9	1.65	0.22	
2,399.0	5.10	103.50	2,393.0	-0.8	138.8	-138.8	0.31	-0.11	
2,491.0	4.70	102.40	2,484.7	-2.5	146.5	-146.5	0.45	-0.43	
2,584.0	5.90	105.60	2,577.3	-4.6	154.8	-154.8	1.33	1.29	
2,676.0	5.60	102.90	2,668.8	-6.9	163.8	-163.8	0.44	-0.33	
2,767.0	5.40	99.30	2,759.4	-8.6	172.3	-172.3	0.44	-0.22	
2,859.0	5.00	96.20	2,851.0	-9.7	180.6	-180.6	0.53	-0.43	
2,951.0	4.70	96.40	2,942.7	-10.6	188.3	-188.3	0.33	-0.33	
3,043.0	5.80	97.50	3,034.3	-11.6	196.7	-196.7	1.20	1.20	
3,135.0	5.50	95.00	3,125.9	-12.6	205.7	-205.7	0.42	-0.33	
3,227.0	5.20	92.70	3,217.5	-13.2	214.2	-214.2	0.40	-0.33	
3,321.0	4.70	91.30	3,311.1	-13.5	222.3	-222.3	0.55	-0.53	
3,416.0	5.90	96.30	3,405.7	-14.1	231.1	-231.1	1.35	1.26	
3,510.0	5.30	93.50	3,499.3	-14.9	240.2	-240.2	0.70	-0.64	
3,605.0	5.20	92.00	3,593.9	-15.3	248.9	-248.9	0.18	-0.11	
3,699.0	5.10	88.40	3,687.5	-15.3	257.3	-257.3	0.36	-0.11	
3,794.0	5.00	88.90	3,782.1	-15.1	265.7	-265.7	0.12	-0.11	
3,888.0	4.50	87.90	3,875.8	-14.9	273.5	-273.5	0.54	-0.53	
3,983.0	6.20	83.20	3,970.4	-14.2	282.3	-282.3	1.85	1.79	
4,077.0	5.50	81.40	4,063.9	-12.9	291.8	-291.8	0.77	-0.74	
4,172.0	5.30	78.30	4,158.5	-11.3	300.6	-300.6	0.37	-0.21	
4,266.0	5.80	100.80	4,252.0	-11.4	309.5	-309.5	2.36	0.53	
4,361.0	5.10	97.00	4,346.6	-12.8	318.4	-318.4	0.83	-0.74	
4,456.0	4.70	90.40	4,441.3	-13.3	326.5	-326.5	0.73	-0.42	
4,550.0	4.40	86.30	4,535.0	-13.1	333.9	-333.9	0.47	-0.32	
4,645.0	6.20	96.30	4,629.6	-13.4	342.7	-342.7	2.12	1.89	
4,739.0	5.30	93.10	4,723.1	-14.2	352.0	-352.0	1.02	-0.96	
4,834.0	4.90	89.50	4,817.7	-14.4	360.5	-360.5	0.54	-0.42	
4,928.0	4.30	85.70	4,911.4	-14.1	368.0	-368.0	0.72	-0.64	
5,023.0	5.10	89.10	5,006.1	-13.8	375.8	-375.8	0.89	0.84	
5,118.0	4.50	82.70	5,100.7	-13.3	383.7	-383.7	0.85	-0.63	
5,212.0	3.90	78.10	5,194.5	-12.1	390.5	-390.5	0.73	-0.64	
5,307.0	6.10	94.90	5,289.1	-11.9	398.7	-398.7	2.76	2.32	
5,401.0	5.10	88.50	5,382.7	-12.2	407.8	-407.8	1.25	-1.06	
5,496.0	4.10	86.40	5,477.4	-11.9	415.4	-415.4	1.07	-1.05	
5,590.0	5.50	106.70	5,571.1	-13.0	423.1	-423.1	2.32	1.49	
5,685.0	4.40	93.90	5,665.7	-14.5	431.1	-431.1	1.63	-1.16	
5,780.0	4.60	103.20	5,760.4	-15.6	438.5	-438.5	0.80	0.21	
5,874.0	4.00	91.60	5,854.1	-16.6	445.4	-445.4	1.12	-0.64	
5,969.0	5.10	107.00	5,948.8	-17.9	452.8	-452.8	1.72	1.16	
6,064.0	6.00	102.60	6,043.4	-20.2	461.6	-461.6	1.05	0.95	

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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
6,158.0	4.80	97.70	6,137.0	-21.8	470.3	-470.3	1.37	-1.28	
6,253.0	4.00	84.20	6,231.7	-22.0	477.6	-477.6	1.37	-0.84	
6,347.0	3.20	76.70	6,325.5	-21.1	483.4	-483.4	0.99	-0.85	
6,395.0	2.10	86.80	6,373.5	-20.7	485.6	-485.6	2.48	-2.29	
6,442.0	4.00	231.90	6,420.4	-21.7	485.1	-485.1	12.44	4.04	
6,490.0	8.70	259.80	6,468.1	-23.4	480.2	-480.2	11.44	9.79	
6,537.0	12.20	270.60	6,514.4	-24.0	471.8	-471.8	8.50	7.45	
6,584.0	12.20	266.10	6,560.3	-24.2	461.8	-461.8	2.02	0.00	
6,631.0	13.70	265.50	6,606.1	-25.0	451.3	-451.3	3.20	3.19	
6,679.0	15.90	265.70	6,652.5	-26.0	439.1	-439.1	4.58	4.58	
6,726.0	20.40	274.00	6,697.2	-25.9	424.5	-424.5	11.02	9.57	
6,774.0	25.20	276.60	6,741.4	-24.1	406.0	-406.0	10.22	10.00	
6,821.0	28.90	272.70	6,783.3	-22.4	384.7	-384.7	8.73	7.87	
6,868.0	30.90	271.50	6,824.0	-21.6	361.3	-361.3	4.44	4.26	
6,915.0	32.90	268.20	6,863.9	-21.7	336.5	-336.5	5.64	4.26	
6,963.0	37.90	267.20	6,903.0	-22.8	308.7	-308.7	10.49	10.42	
7,010.0	40.00	269.30	6,939.6	-23.7	279.2	-279.2	5.28	4.47	
7,057.0	44.00	270.20	6,974.5	-23.8	247.7	-247.7	8.61	8.51	
7,104.0	46.50	272.60	7,007.6	-23.0	214.4	-214.4	6.44	5.32	
7,152.0	53.30	275.60	7,038.5	-20.3	177.8	-177.8	14.95	14.17	
7,199.0	59.90	275.90	7,064.3	-16.4	138.8	-138.8	14.05	14.04	
7,246.0	60.80	274.70	7,087.6	-12.6	98.1	-98.1	2.93	1.91	
7,293.0	64.40	272.60	7,109.2	-10.0	56.5	-56.5	8.63	7.66	
7,341.0	71.20	269.80	7,127.3	-9.1	12.1	-12.1	15.16	14.17	
7,388.0	77.50	269.90	7,140.0	-9.2	-33.2	33.2	13.41	13.40	
7,436.0	83.70	269.50	7,147.9	-9.4	-80.5	80.5	12.94	12.92	
7,472.0	88.60	270.30	7,150.3	-9.5	-116.4	116.4	13.79	13.61	
7,598.0	88.40	270.90	7,153.6	-8.2	-242.4	242.4	0.50	-0.16	
7,695.0	89.90	268.50	7,155.0	-8.7	-339.3	339.3	2.92	1.55	
7,789.0	90.90	269.10	7,154.4	-10.6	-433.3	433.3	1.24	1.06	
7,883.0	94.40	269.40	7,150.0	-11.9	-527.2	527.2	3.74	3.72	
7,977.0	98.50	269.30	7,139.4	-12.9	-620.6	620.6	4.36	4.36	
8,072.0	96.00	269.10	7,127.5	-14.2	-714.8	714.8	2.64	-2.63	
8,166.0	89.30	270.40	7,123.1	-14.7	-808.6	808.6	7.26	-7.13	
8,260.0	90.50	269.00	7,123.3	-15.1	-902.6	902.6	1.96	1.28	
8,354.0	89.20	267.30	7,123.5	-18.2	-996.6	996.6	2.28	-1.38	
8,448.0	90.00	264.60	7,124.2	-24.8	-1,090.3	1,090.3	3.00	0.85	
8,543.0	94.40	266.20	7,120.5	-32.4	-1,184.9	1,184.9	4.93	4.63	
8,637.0	95.00	269.00	7,112.8	-36.4	-1,278.5	1,278.5	3.04	0.64	
8,731.0	90.60	268.90	7,108.2	-38.1	-1,372.4	1,372.4	4.68	-4.68	
8,826.0	92.10	268.40	7,106.0	-40.3	-1,467.3	1,467.3	1.66	1.58	
8,920.0	92.30	270.00	7,102.4	-41.6	-1,561.2	1,561.2	1.71	0.21	
9,014.0	92.20	270.50	7,098.7	-41.2	-1,655.2	1,655.2	0.54	-0.11	
9,109.0	91.20	267.30	7,095.9	-43.0	-1,750.1	1,750.1	3.53	-1.05	
9,203.0	92.80	274.20	7,092.6	-41.8	-1,844.0	1,844.0	7.53	1.70	
9,298.0	90.30	273.40	7,090.0	-35.5	-1,938.7	1,938.7	2.76	-2.63	
9,392.0	88.30	272.90	7,091.2	-30.4	-2,032.6	2,032.6	2.19	-2.13	
9,487.0	87.00	272.10	7,095.1	-26.2	-2,127.4	2,127.4	1.61	-1.37	
9,581.0	89.10	269.70	7,098.3	-24.7	-2,221.3	2,221.3	3.39	2.23	
9,676.0	91.50	269.30	7,097.8	-25.6	-2,316.3	2,316.3	2.56	2.53	
9,770.0	92.00	269.20	7,094.9	-26.8	-2,410.2	2,410.2	0.54	0.53	
9,865.0	96.10	270.20	7,088.2	-27.3	-2,505.0	2,505.0	4.44	4.32	
9,959.0	93.80	270.50	7,080.1	-26.7	-2,598.6	2,598.6	2.47	-2.45	

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Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
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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
10,054.0	90.80	271.10	7,076.3	-25.4	-2,693.5	2,693.5	3.22	-3.16	
10,148.0	90.80	270.20	7,075.0	-24.3	-2,787.5	2,787.5	0.96	0.00	
10,243.0	90.20	269.50	7,074.1	-24.6	-2,882.5	2,882.5	0.97	-0.63	
10,337.0	90.10	269.30	7,073.9	-25.6	-2,976.5	2,976.5	0.24	-0.11	
10,432.0	92.80	272.00	7,071.5	-24.5	-3,071.4	3,071.4	4.02	2.84	
10,526.0	91.70	265.50	7,067.8	-26.5	-3,165.3	3,165.3	7.01	-1.17	
10,621.0	90.90	264.10	7,065.6	-35.1	-3,259.9	3,259.9	1.70	-0.84	
10,716.0	90.20	262.90	7,064.7	-45.9	-3,354.2	3,354.2	1.46	-0.74	
10,810.0	92.90	265.80	7,062.2	-55.2	-3,447.7	3,447.7	4.21	2.87	
10,905.0	91.90	269.90	7,058.2	-58.7	-3,542.6	3,542.6	4.44	-1.05	
10,999.0	91.70	272.40	7,055.2	-56.8	-3,636.5	3,636.5	2.67	-0.21	
11,094.0	91.40	271.30	7,052.7	-53.8	-3,731.4	3,731.4	1.20	-0.32	
11,188.0	90.50	273.70	7,051.1	-49.7	-3,825.3	3,825.3	2.73	-0.96	
11,283.0	88.40	273.30	7,052.0	-43.9	-3,920.1	3,920.1	2.25	-2.21	
11,378.0	86.20	272.70	7,056.5	-38.9	-4,014.9	4,014.9	2.40	-2.32	
11,427.0	84.60	272.10	7,060.4	-36.8	-4,063.7	4,063.7	3.49	-3.27	Last CES Survey @ 11,427' MD
11,477.0	84.60	272.10	7,065.1	-35.0	-4,113.4	4,113.4	0.00	0.00	PTB @ 11,477'

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									
Drieth 4D-6H-I368 PBHL	0.00	0.00	7,001.0	-21.5	-4,156.0	1,335,715.85	3,124,645.02	40.254070	-105.053440
- actual wellpath misses target center by 78.1ft at 11477.0ft MD (7065.1 TVD, -35.0 N, -4113.4 E)									
- Point									
Drieth 4D-6H-I368 PBHL	0.00	0.00	7,060.0	-21.5	-4,156.0	1,335,715.85	3,124,645.02	40.254070	-105.053440
- actual wellpath misses target center by 44.9ft at 11477.0ft MD (7065.1 TVD, -35.0 N, -4113.4 E)									
- Point									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
11,427.0	7,060.4	-36.8	-4,063.7	Last CES Survey @ 11,427' MD	
11,477.0	7,065.1	-35.0	-4,113.4	PTB @ 11,477'	

Checked By: _____	Approved By: _____	Date: _____
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