



**Scientific  
Drilling**

## Survey Certification

7327 West Barton Road  
Casper, WY 82604  
(307)-472-6621 Fax (307) 472-5439

<b>Operator</b>	EnCana Oil & Gas (USA) Inc
<b>Well Name &amp; No.</b>	Dale 4J-20H-O264
<b>County &amp; State</b>	Weld County, CO
<b>SDI Job No.</b>	410814HEFK186320
<b>Rig</b>	H&P 278
<b>Survey Date</b>	17-Aug-2014

I, Seth M. Burstad, having personal knowledge of all the facts, hereby  
certify that the attached directional survey run from a measured depth of 0 feet to a  
measured depth of 11702 feet is true and correct as determined from all available records.

  
Signature

18-Sep-2014  
Date

**Seth M. Burstad**  
Rockies Region Well Planner  
Scientific Drilling - Rocky Mountain District



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

**DJ Wattenberg**

**S20-T2N-R64W (Dale)**

**Dale 4J-20H-O264**

**HZ**

**Design: HZ**

## **Standard Survey Report**

**18 September, 2014**





<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4J-20H-O264
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 4987.00ft (Original Well Elev)
<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4987.00ft (Original Well Elev)
<b>Well:</b>	Dale 4J-20H-O264	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	Casper District

<b>Project</b>	DJ Wattenberg, Weld County, CO		
<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		

<b>Site</b>	S20-T2N-R64W (Dale)			
<b>Site Position:</b>		<b>Northing:</b>	1,287,026.80 usft	<b>Latitude:</b> 40.117609
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,257,591.72 usft	<b>Longitude:</b> -104.578929
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b> 0.60 °

<b>Well</b>	Dale 4J-20H-O264			
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	1,287,058.90 usft
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	3,259,590.85 usft
<b>Position Uncertainty</b>	0.00 ft		<b>Wellhead Elevation:</b>	ft
			<b>Ground Level:</b>	4,957.00 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	3/31/2014	8.36	66.76	52,708

<b>Design</b>	HZ			
<b>Audit Notes:</b>				
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b> 0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	103.70

<b>Survey Program</b>	<b>Date</b>	9/18/2014		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
140.00	1,087.00	Survey #1 - Surface (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1
1,178.00	7,295.00	Survey #2 - Intermediate (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1
7,433.00	11,702.00	Survey #3 - Lateral (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1

<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>Turn Rate (°/100ft)</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140.00	0.44	53.70	140.00	0.32	0.43	0.35	0.31	0.31	0.00
<b>First SDI MWD Survey</b>									
201.00	0.63	322.38	201.00	0.72	0.42	0.23	1.27	0.31	-149.70
263.00	1.13	91.05	262.99	0.98	0.82	0.56	2.58	0.81	207.53
323.00	1.89	90.18	322.97	0.97	2.40	2.10	1.27	1.27	-1.45
354.00	2.42	106.00	353.95	0.79	3.54	3.26	2.55	1.71	51.03
384.00	3.29	112.41	383.91	0.28	4.95	4.74	3.08	2.90	21.37
445.00	4.34	106.79	444.78	-1.05	8.77	8.77	1.83	1.72	-9.21

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4J-20H-O264
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<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4987.00ft (Original Well Elev)
<b>Well:</b>	Dale 4J-20H-O264	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	Casper District

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
506.00	4.46	104.77	505.60	-2.32	13.28	13.45	0.32	0.20	-3.31
568.00	5.59	108.72	567.36	-3.91	18.47	18.87	1.91	1.82	6.37
629.00	6.78	103.89	628.00	-5.72	24.78	25.43	2.13	1.95	-7.92
689.00	8.24	107.31	687.49	-7.85	32.32	33.26	2.54	2.43	5.70
751.00	9.46	108.63	748.75	-10.80	41.39	42.77	1.99	1.97	2.13
812.00	10.91	106.26	808.78	-14.02	51.68	53.53	2.47	2.38	-3.89
873.00	12.14	104.15	868.55	-17.21	63.45	65.72	2.13	2.02	-3.46
934.00	13.28	101.43	928.06	-20.16	76.53	79.13	2.11	1.87	-4.46
995.00	14.43	100.02	987.28	-22.87	90.89	93.72	1.96	1.89	-2.31
1,043.00	14.34	100.63	1,033.78	-25.01	102.62	105.62	0.37	-0.19	1.27
1,087.00	14.25	101.25	1,076.42	-27.07	113.28	116.47	0.40	-0.20	1.41
1,178.00	13.72	106.44	1,164.72	-32.31	134.62	138.44	1.50	-0.58	5.70
1,270.00	14.87	104.85	1,253.87	-38.43	156.50	161.14	1.32	1.25	-1.73
1,361.00	15.48	104.77	1,341.70	-44.51	179.53	184.96	0.67	0.67	-0.09
1,453.00	15.92	105.03	1,430.27	-50.92	203.58	209.85	0.48	0.48	0.28
1,525.00	15.26	102.40	1,499.62	-55.51	222.37	229.20	1.34	-0.92	-3.65
1,616.00	14.48	100.96	1,587.57	-60.25	245.24	252.53	0.95	-0.86	-1.58
1,708.00	15.25	102.17	1,676.49	-64.98	268.36	276.12	0.90	0.84	1.32
1,800.00	15.13	102.41	1,765.28	-70.11	291.91	300.22	0.15	-0.13	0.26
1,891.00	13.84	106.46	1,853.38	-75.75	313.95	322.96	1.80	-1.42	4.45
2,073.00	14.20	105.53	2,029.96	-87.90	356.34	367.02	0.23	0.20	-0.51
2,256.00	13.57	103.95	2,207.61	-99.08	398.80	410.92	0.40	-0.34	-0.86
2,439.00	13.30	106.85	2,385.61	-110.36	439.78	453.41	0.40	-0.15	1.58
2,622.00	13.46	105.55	2,563.64	-122.17	480.45	495.71	0.19	0.09	-0.71
2,804.00	13.86	105.02	2,740.49	-133.50	521.91	538.68	0.23	0.22	-0.29
2,994.00	14.39	103.30	2,924.75	-144.83	566.86	585.04	0.36	0.28	-0.91
3,184.00	14.74	103.63	3,108.64	-155.95	613.33	632.82	0.19	0.18	0.17
3,373.00	14.17	103.75	3,291.66	-167.12	659.17	679.99	0.30	-0.30	0.06
3,563.00	13.89	104.48	3,475.99	-178.35	703.84	726.05	0.17	-0.15	0.38
3,753.00	13.95	103.89	3,660.41	-189.55	748.15	771.76	0.08	0.03	-0.31
3,942.00	14.23	104.13	3,843.72	-200.69	792.79	817.77	0.15	0.15	0.13
4,131.00	15.79	105.90	4,026.27	-213.41	840.06	866.70	0.86	0.83	0.94
4,320.00	14.61	104.04	4,208.66	-226.23	887.91	916.23	0.68	-0.62	-0.98
4,510.00	16.49	104.64	4,391.69	-238.86	937.25	967.16	0.99	0.99	0.32
4,700.00	14.62	106.62	4,574.73	-252.54	986.33	1,018.07	1.02	-0.98	1.04
4,890.00	15.44	99.89	4,758.24	-263.74	1,034.22	1,067.26	1.01	0.43	-3.54
5,081.00	12.51	99.31	4,943.57	-271.46	1,079.69	1,113.27	1.54	-1.53	-0.30
5,271.00	10.87	105.23	5,129.63	-279.49	1,117.29	1,151.70	1.07	-0.86	3.12
5,461.00	12.08	106.61	5,315.83	-289.88	1,153.63	1,189.46	0.65	0.64	0.73
5,652.00	9.04	102.78	5,503.57	-298.92	1,187.42	1,224.43	1.63	-1.59	-2.01
5,842.00	6.50	113.80	5,691.82	-306.56	1,211.83	1,249.95	1.54	-1.34	5.80
6,033.00	5.38	100.78	5,881.80	-312.60	1,230.51	1,269.54	0.91	-0.59	-6.82
6,223.00	3.93	100.65	6,071.17	-315.47	1,245.66	1,284.94	0.76	-0.76	-0.07

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<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
6,414.00	1.83	84.61	6,261.92	-316.39	1,255.13	1,294.36	1.17	-1.10	-8.40	
6,462.00	1.68	84.08	6,309.90	-316.25	1,256.60	1,295.75	0.31	-0.31	-1.10	
6,509.00	2.03	77.98	6,356.87	-316.00	1,258.10	1,297.14	0.85	0.74	-12.98	
6,556.00	3.43	23.97	6,403.83	-314.54	1,259.48	1,298.14	5.90	2.98	-114.91	
6,605.00	6.12	11.67	6,452.65	-310.65	1,260.61	1,298.31	5.84	5.49	-25.10	
6,652.00	8.46	6.49	6,499.27	-304.76	1,261.50	1,297.79	5.17	4.98	-11.02	
6,700.00	10.95	4.63	6,546.58	-296.70	1,262.27	1,296.63	5.23	5.19	-3.88	
6,747.00	13.93	1.77	6,592.47	-286.60	1,262.81	1,294.76	6.47	6.34	-6.09	
6,795.00	17.58	1.00	6,638.66	-273.57	1,263.11	1,291.97	7.62	7.60	-1.60	
6,842.00	22.26	1.42	6,682.84	-257.56	1,263.46	1,288.51	9.96	9.96	0.89	
6,890.00	25.98	2.59	6,726.64	-237.97	1,264.16	1,284.55	7.81	7.75	2.44	
6,937.00	31.02	3.27	6,767.93	-215.58	1,265.31	1,280.38	10.75	10.72	1.45	
6,985.00	35.44	2.11	6,808.07	-189.31	1,266.53	1,275.34	9.30	9.21	-2.42	
7,034.00	39.98	1.67	6,846.83	-159.36	1,267.51	1,269.20	9.28	9.27	-0.90	
7,081.00	46.55	1.89	6,881.03	-127.18	1,268.52	1,262.56	13.98	13.98	0.47	
7,128.00	54.09	2.49	6,911.02	-91.06	1,269.91	1,255.36	16.07	16.04	1.28	
7,176.00	61.56	1.85	6,936.56	-50.49	1,271.44	1,247.23	15.60	15.56	-1.33	
7,223.00	69.22	0.13	6,956.12	-7.80	1,272.16	1,237.82	16.63	16.30	-3.66	
7,271.00	77.11	358.70	6,970.01	38.10	1,271.68	1,226.49	16.68	16.44	-2.98	
7,295.00	81.18	359.11	6,974.53	61.66	1,271.23	1,220.47	17.04	16.96	1.71	
Last Survey in 8 3/4" Hole										
7,433.00	88.92	0.58	6,986.43	199.04	1,270.86	1,187.59	5.71	5.61	1.07	
First Survey in 6" Hole										
7,524.00	90.40	0.45	6,986.97	290.03	1,271.68	1,166.84	1.63	1.63	-0.14	
7,616.00	91.01	359.13	6,985.84	382.02	1,271.35	1,144.73	1.58	0.66	-1.43	
7,711.00	91.98	359.62	6,983.36	476.98	1,270.31	1,121.23	1.14	1.02	0.52	
7,806.00	92.42	359.38	6,979.71	571.91	1,269.48	1,097.95	0.53	0.46	-0.25	
7,901.00	91.98	358.51	6,976.07	666.82	1,267.73	1,073.78	1.03	-0.46	-0.92	
7,996.00	90.77	358.54	6,973.79	761.76	1,265.29	1,048.92	1.27	-1.27	0.03	
8,091.00	90.27	358.75	6,972.92	856.73	1,263.04	1,024.25	0.57	-0.53	0.22	
8,186.00	89.56	358.73	6,973.07	951.70	1,260.95	999.73	0.75	-0.75	-0.02	
8,280.00	88.39	357.60	6,974.75	1,045.64	1,257.94	974.56	1.73	-1.24	-1.20	
8,377.00	87.95	358.77	6,977.85	1,142.54	1,254.87	948.63	1.29	-0.45	1.21	
8,472.00	87.65	358.73	6,981.49	1,237.45	1,252.80	924.15	0.32	-0.32	-0.04	
8,567.00	89.36	358.84	6,983.97	1,332.39	1,250.79	899.71	1.80	1.80	0.12	
8,661.00	88.63	358.91	6,985.62	1,426.35	1,248.94	875.66	0.78	-0.78	0.07	
8,756.00	89.63	359.64	6,987.06	1,521.33	1,247.74	852.01	1.30	1.05	0.77	
8,851.00	90.57	359.05	6,986.90	1,616.33	1,246.66	828.46	1.17	0.99	-0.62	
8,945.00	88.35	357.92	6,987.78	1,710.28	1,244.17	803.79	2.65	-2.36	-1.20	
9,040.00	88.29	358.89	6,990.57	1,805.20	1,241.53	778.75	1.02	-0.06	1.02	
9,134.00	88.99	0.69	6,992.80	1,899.17	1,241.18	756.16	2.05	0.74	1.91	
9,229.00	88.02	0.98	6,995.28	1,994.13	1,242.57	735.02	1.07	-1.02	0.31	
9,324.00	87.38	359.96	6,999.09	2,089.05	1,243.35	713.30	1.27	-0.67	-1.07	
9,419.00	89.26	0.28	7,001.87	2,184.00	1,243.54	691.01	2.01	1.98	0.34	





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Survey Report



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<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	Casper District

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
9,514.00	92.39	357.50	7,000.51	2,278.95	1,241.71	666.74	4.41	3.29	-2.93	
9,609.00	89.97	357.34	6,998.55	2,373.83	1,237.43	640.12	2.55	-2.55	-0.17	
9,704.00	92.05	356.75	6,996.88	2,468.68	1,232.53	612.90	2.28	2.19	-0.62	
9,800.00	93.39	356.84	6,992.32	2,564.42	1,227.17	585.02	1.40	1.40	0.09	
9,895.00	93.33	0.53	6,986.75	2,659.22	1,225.00	560.46	3.88	-0.06	3.88	
9,990.00	92.98	359.67	6,981.52	2,754.07	1,225.16	538.16	0.98	-0.37	-0.91	
10,085.00	92.52	1.17	6,976.96	2,848.96	1,225.86	516.37	1.65	-0.48	1.58	
10,180.00	90.20	2.19	6,974.71	2,943.88	1,228.64	496.59	2.67	-2.44	1.07	
10,275.00	90.20	1.96	6,974.38	3,038.82	1,232.08	477.46	0.24	0.00	-0.24	
10,371.00	89.50	1.65	6,974.63	3,134.77	1,235.11	457.67	0.80	-0.73	-0.32	
10,466.00	90.81	1.80	6,974.37	3,229.72	1,237.97	437.97	1.39	1.38	0.16	
10,561.00	90.17	1.52	6,973.56	3,324.68	1,240.72	418.15	0.74	-0.67	-0.29	
10,656.00	88.29	1.28	6,974.84	3,419.64	1,243.04	397.92	2.00	-1.98	-0.25	
10,752.00	85.47	0.47	6,980.06	3,515.48	1,244.50	376.65	3.06	-2.94	-0.84	
10,847.00	88.19	0.46	6,985.31	3,610.32	1,245.27	354.94	2.86	2.86	-0.01	
10,942.00	88.93	0.49	6,987.70	3,705.28	1,246.06	333.22	0.78	0.78	0.03	
11,037.00	90.30	0.63	6,988.34	3,800.28	1,246.99	311.63	1.45	1.44	0.15	
11,133.00	89.60	359.57	6,988.42	3,896.27	1,247.16	289.06	1.32	-0.73	-1.10	
11,228.00	90.44	0.39	6,988.39	3,991.27	1,247.12	266.53	1.24	0.88	0.86	
11,323.00	88.66	359.56	6,989.14	4,086.26	1,247.08	244.00	2.07	-1.87	-0.87	
11,419.00	88.92	358.17	6,991.16	4,182.22	1,245.18	219.43	1.47	0.27	-1.45	
11,514.00	88.05	357.10	6,993.67	4,277.10	1,241.26	193.15	1.45	-0.92	-1.13	
11,636.00	85.52	356.33	7,000.52	4,398.70	1,234.28	157.58	2.17	-2.07	-0.63	
<b>Last SDI MWD Survey</b>										
11,702.00	85.52	356.33	7,005.67	4,464.37	1,230.07	137.94	0.00	0.00	0.00	
<b>Projection to TD</b>										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
140.00	140.00	0.32	0.43	First SDI MWD Survey	
7,295.00	6,974.53	61.66	1,271.23	Last Survey in 8 3/4" Hole	
7,433.00	6,986.43	199.04	1,270.86	First Survey in 6" Hole	
11,636.00	7,000.52	4,398.70	1,234.28	Last SDI MWD Survey	
11,702.00	7,005.67	4,464.37	1,230.07	Projection to TD	

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