



## Survey Certification

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

Operator	EnCana Oil & Gas (USA) Inc.
Well Name & No.	Dale 4E-20H-O264
County & State	Weld County, Co
SDI Job No.	410814HEFK186379
Rig	H&P 278
Survey Date	21-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 11700 feet is true and correct as determined from all available records.

  
Signature

22-Oct-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 4E-20H-O264**

**HZ**

**Design: HZ**

## **Standard Survey Report**

**22 October, 2014**





<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4E-20H-O264
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 4988.00ft (Original Well Elev)
<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4988.00ft (Original Well Elev)
<b>Well:</b>	Dale 4E-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 4E-20H-O264			
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	1,287,058.86 usft
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	3,259,553.38 usft
<b>Position Uncertainty</b>	0.00 ft		<b>Wellhead Elevation:</b>	ft
			<b>Ground Level:</b>	4,958.00 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	6/18/2014	8.33	66.75	52,685

<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	152.45

<b>Survey Program</b>	<b>Date</b>	10/22/2014		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
140.00	1,055.00	Survey #1 - Surface (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1
1,055.00	7,463.00	Survey #2 - Intermediate (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1
7,633.00	11,700.00	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	1.06	102.04	139.99	-0.27	1.27	0.83	0.76	0.76	0.00
<b>First SDI MWD Survey</b>									
232.00	0.70	166.46	231.98	-0.99	2.23	1.91	1.07	-0.39	70.02
323.00	0.70	351.65	322.98	-0.98	2.28	1.93	1.54	0.00	-192.10
415.00	1.06	11.16	414.97	0.41	2.36	0.73	0.50	0.39	21.21
507.00	0.62	170.68	506.97	0.75	2.61	0.54	1.80	-0.48	173.39
598.00	1.41	152.49	597.95	-0.73	3.21	2.13	0.93	0.87	-19.99
690.00	3.08	155.13	689.88	-3.98	4.77	5.73	1.82	1.82	2.87

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4E-20H-O264
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 4988.00ft (Original Well Elev)
<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4988.00ft (Original Well Elev)
<b>Well:</b>	Dale 4E-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)
781.00	4.57	163.48	780.67	-9.67	6.83	11.73	1.74	1.64	9.18
873.00	5.10	162.07	872.34	-17.07	9.13	19.36	0.59	0.58	-1.53
964.00	4.84	151.08	963.00	-24.28	12.23	27.19	1.08	-0.29	-12.08
1,055.00	4.75	150.82	1,053.69	-30.93	15.92	34.79	0.10	-0.10	-0.29
Last SDI MWD Surface Survey									
1,154.00	4.34	144.85	1,152.38	-37.57	20.08	42.60	0.63	-0.41	-6.03
First SDI MWD Intermediate Survey									
1,337.00	8.11	159.39	1,334.27	-55.33	28.61	62.29	2.22	2.06	7.95
1,521.00	10.55	157.55	1,515.83	-83.05	39.61	91.95	1.34	1.33	-1.00
1,703.00	11.46	155.12	1,694.48	-114.85	53.58	126.61	0.56	0.50	-1.34
1,886.00	12.17	148.17	1,873.61	-147.73	71.41	164.01	0.87	0.39	-3.80
2,069.00	10.45	137.85	2,053.07	-176.43	92.72	199.31	1.45	-0.94	-5.64
2,251.00	9.97	139.02	2,232.19	-200.56	114.13	230.61	0.29	-0.26	0.64
2,434.00	9.64	145.18	2,412.52	-225.10	133.27	261.21	0.60	-0.18	3.37
2,618.00	9.94	142.21	2,593.84	-250.30	151.80	292.12	0.32	0.16	-1.61
2,802.00	9.73	135.65	2,775.14	-273.97	172.40	322.64	0.62	-0.11	-3.57
2,992.00	8.23	138.70	2,962.81	-295.66	192.60	351.22	0.83	-0.79	1.61
3,182.00	5.84	136.40	3,151.36	-312.88	208.24	373.72	1.27	-1.26	-1.21
3,373.00	1.22	98.30	3,341.96	-320.22	216.96	384.26	2.59	-2.42	-19.95
3,563.00	0.84	286.16	3,531.95	-320.12	217.62	384.48	1.08	-0.20	-90.60
3,753.00	0.83	307.39	3,721.93	-318.90	215.19	382.27	0.16	-0.01	11.17
3,944.00	0.42	317.40	3,912.92	-317.54	213.62	380.34	0.22	-0.21	5.24
4,135.00	0.50	351.43	4,103.92	-316.20	213.02	378.88	0.15	0.04	17.82
4,325.00	1.13	349.90	4,293.90	-313.54	212.57	376.31	0.33	0.33	-0.81
4,515.00	0.89	355.16	4,483.87	-310.23	212.12	373.16	0.14	-0.13	2.77
4,706.00	0.18	214.68	4,674.86	-308.99	211.82	371.93	0.54	-0.37	-73.55
4,896.00	0.33	267.09	4,864.86	-309.27	211.10	371.84	0.14	0.08	27.58
5,086.00	0.45	281.13	5,054.85	-309.15	209.83	371.15	0.08	0.06	7.39
5,277.00	0.95	312.67	5,245.84	-307.93	207.93	369.19	0.32	0.26	16.51
5,467.00	1.27	335.48	5,435.80	-304.95	205.89	365.60	0.28	0.17	12.01
5,657.00	0.83	188.31	5,625.79	-304.40	204.82	364.62	1.06	-0.23	-77.46
5,847.00	0.68	73.39	5,815.78	-305.44	205.70	365.94	0.67	-0.08	-60.48
6,038.00	1.41	109.04	6,006.75	-305.88	209.01	367.87	0.49	0.38	18.66
6,228.00	1.50	95.07	6,196.69	-306.86	213.70	370.91	0.19	0.05	-7.35
6,418.00	1.88	98.80	6,386.61	-307.56	219.25	374.09	0.21	0.20	1.96
6,514.00	1.58	92.43	6,482.56	-307.85	222.13	375.69	0.37	-0.31	-6.64
6,609.00	4.10	0.84	6,577.47	-304.51	223.49	373.35	4.67	2.65	-96.41
6,704.00	11.67	354.71	6,671.50	-291.53	222.65	361.46	8.01	7.97	-6.45
6,799.00	18.76	356.20	6,763.12	-266.69	220.75	338.55	7.47	7.46	1.57
6,894.00	25.51	0.20	6,851.07	-230.95	219.81	306.43	7.28	7.11	4.21
6,989.00	39.47	358.33	6,931.00	-180.05	219.00	260.93	14.73	14.69	-1.97
7,084.00	48.12	357.09	6,999.51	-114.43	216.32	201.51	9.15	9.11	-1.31
7,179.00	58.06	359.56	7,056.50	-38.60	214.21	133.31	10.67	10.46	2.60
7,274.00	70.18	1.88	7,097.89	46.70	215.37	58.22	12.94	12.76	2.44

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<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)
7,368.00	77.15	359.68	7,124.32	136.83	216.56	-21.14	7.75	7.41	-2.34
7,463.00	83.27	358.45	7,140.46	230.39	215.03	-104.80	6.57	6.44	-1.29
<b>Last SDI MWD Intermediate Survey</b>									
7,633.00	87.58	358.49	7,154.02	399.75	210.51	-257.04	2.54	2.54	0.02
<b>First SDI MWD Lateral Survey</b>									
7,728.00	87.95	357.72	7,157.73	494.62	207.37	-342.61	0.90	0.39	-0.81
7,823.00	88.42	358.92	7,160.74	589.53	204.58	-428.04	1.36	0.49	1.26
7,918.00	90.30	359.94	7,161.80	684.52	203.64	-512.69	2.25	1.98	1.07
8,014.00	89.77	359.03	7,161.74	780.51	202.78	-598.20	1.10	-0.55	-0.95
8,109.00	89.46	358.25	7,162.38	875.48	200.52	-683.44	0.88	-0.33	-0.82
8,204.00	88.56	358.37	7,164.02	970.42	197.72	-768.92	0.96	-0.95	0.13
8,299.00	89.08	359.29	7,165.97	1,065.38	195.78	-854.00	1.11	0.55	0.97
8,394.00	90.30	1.20	7,166.49	1,160.37	196.19	-938.03	2.39	1.28	2.01
8,489.00	89.70	0.86	7,166.49	1,255.36	197.89	-1,021.46	0.73	-0.63	-0.36
8,585.00	89.43	1.15	7,167.22	1,351.34	199.58	-1,105.77	0.41	-0.28	0.30
8,680.00	91.08	2.19	7,166.79	1,446.30	202.35	-1,188.68	2.05	1.74	1.09
8,776.00	92.12	1.74	7,164.11	1,542.20	205.64	-1,272.19	1.18	1.08	-0.47
8,871.00	92.15	1.31	7,160.57	1,637.10	208.16	-1,355.16	0.45	0.03	-0.45
8,966.00	91.71	1.15	7,157.38	1,732.02	210.20	-1,438.37	0.49	-0.46	-0.17
9,061.00	91.55	0.41	7,154.67	1,826.98	211.49	-1,521.96	0.80	-0.17	-0.78
9,157.00	91.81	0.16	7,151.86	1,922.93	211.97	-1,606.81	0.38	0.27	-0.26
9,252.00	91.58	0.95	7,149.05	2,017.89	212.89	-1,690.57	0.87	-0.24	0.83
9,347.00	91.04	2.06	7,146.88	2,112.83	215.39	-1,773.59	1.30	-0.57	1.17
9,442.00	90.27	2.95	7,145.79	2,207.73	219.54	-1,855.81	1.24	-0.81	0.94
9,537.00	89.63	3.96	7,145.87	2,302.55	225.26	-1,937.23	1.26	-0.67	1.06
9,632.00	86.64	4.29	7,148.96	2,397.25	232.09	-2,018.03	3.17	-3.15	0.35
9,727.00	86.47	3.60	7,154.67	2,491.85	238.62	-2,098.88	0.75	-0.18	-0.73
9,823.00	86.50	1.69	7,160.56	2,587.56	243.04	-2,181.70	1.99	0.03	-1.99
9,918.00	87.92	0.24	7,165.18	2,682.43	244.63	-2,265.07	2.14	1.49	-1.53
10,013.00	89.56	359.14	7,167.27	2,777.40	244.12	-2,349.51	2.08	1.73	-1.16
10,108.00	88.79	358.75	7,168.64	2,872.38	242.37	-2,434.52	0.91	-0.81	-0.41
10,203.00	89.63	357.25	7,169.95	2,967.31	239.06	-2,520.22	1.81	0.88	-1.58
10,298.00	91.91	356.95	7,168.67	3,062.17	234.25	-2,606.54	2.42	2.40	-0.32
10,393.00	92.52	357.92	7,165.00	3,157.00	230.00	-2,692.59	1.21	0.64	1.02
10,488.00	90.44	358.10	7,162.55	3,251.91	226.70	-2,778.26	2.20	-2.19	0.19
10,583.00	89.89	358.05	7,162.28	3,346.85	223.51	-2,863.91	0.58	-0.58	-0.05
10,679.00	89.56	357.68	7,162.74	3,442.78	219.94	-2,950.62	0.52	-0.34	-0.39
10,774.00	89.36	357.24	7,163.63	3,537.69	215.73	-3,036.70	0.51	-0.21	-0.46
10,869.00	88.59	355.86	7,165.33	3,632.50	210.01	-3,123.40	1.66	-0.81	-1.45
10,964.00	90.37	356.48	7,166.19	3,727.28	203.67	-3,210.37	1.98	1.87	0.65
11,059.00	90.71	355.20	7,165.30	3,822.02	196.78	-3,297.56	1.39	0.36	-1.35
11,154.00	90.40	354.34	7,164.38	3,916.62	188.12	-3,385.43	0.96	-0.33	-0.91
11,250.00	90.30	355.62	7,163.79	4,012.25	179.72	-3,474.10	1.34	-0.10	1.33





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<b>Well:</b>	Dale 4E-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)	
11,345.00	89.46	354.16	7,163.99	4,106.87	171.26	-3,561.90	1.77	-0.88	-1.54	
11,440.00	90.00	353.72	7,164.44	4,201.33	161.23	-3,650.30	0.73	0.57	-0.46	
11,535.00	89.33	353.15	7,164.99	4,295.71	150.37	-3,738.99	0.93	-0.71	-0.60	
11,630.00	89.66	352.09	7,165.83	4,389.92	138.16	-3,828.16	1.17	0.35	-1.12	
Last SDI MWD Survey										
11,700.00	89.66	352.09	7,166.25	4,459.25	128.53	-3,894.09	0.00	0.00	0.00	
Projection to TD										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
140.00	139.99	-0.27	1.27	First SDI MWD Survey	
1,055.00	1,053.69	-30.93	15.92	Last SDI MWD Surface Survey	
1,154.00	1,152.38	-37.57	20.08	First SDI MWD Intermediate Survey	
7,463.00	7,140.46	230.39	215.03	Last SDI MWD Intermediate Survey	
7,633.00	7,154.02	399.75	210.51	First SDI MWD Lateral Survey	
11,630.00	7,165.83	4,389.92	138.16	Last SDI MWD Survey	
11,700.00	7,166.25	4,459.25	128.53	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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