



## 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 4D-20H-O264
County & State	Weld County, CO
SDI Job No.	410814HEFK186387
Rig	H&P 278
Survey Date	30-Oct-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 11626 feet is true and correct as determined from all available records.

Seth Burstad  
Signature

3-Nov-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 4D-20H-O264**

**HZ**

**Design: HZ**

## **Standard Survey Report**

**03 November, 2014**





<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4D-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 4D-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		

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

Well	Dale 4D-20H-O264					
Well Position	+N/-S	0.00 ft	Northing:	1,287,059.18 usft	Latitude:	40.117642
	+E/-W	0.00 ft	Easting:	3,259,546.10 usft	Longitude:	-104.571940
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	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	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	178.37	

<b>Survey Program</b>	<b>Date</b>	11/3/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
140.00	1,040.00	Survey #1 - Surface (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,155.00	7,274.00	Survey #2 - Intermediate (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	
7,452.00	11,626.00	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	0.18	242.67	140.00	-0.10	-0.20	0.10	0.13	0.13	0.00	
<b>First SDI MWD Survey</b>										
232.00	0.44	271.14	232.00	-0.16	-0.68	0.14	0.32	0.28	30.95	
323.00	0.26	322.73	323.00	0.01	-1.15	-0.04	0.38	-0.20	56.69	
415.00	0.97	191.07	414.99	-0.59	-1.43	0.55	1.26	0.77	-143.11	
507.00	1.58	164.62	506.97	-2.57	-1.24	2.54	0.90	0.66	-28.75	
598.00	2.73	169.01	597.90	-5.91	-0.49	5.90	1.28	1.26	4.82	
690.00	2.55	169.54	689.81	-10.07	0.29	10.08	0.20	-0.20	0.58	

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4D-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 4D-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	4.05	176.57	780.65	-15.27	0.85	15.29	1.70	1.65	7.73
873.00	4.31	175.87	872.41	-21.96	1.30	21.99	0.29	0.28	-0.76
964.00	3.96	184.39	963.17	-28.51	1.30	28.53	0.78	-0.38	9.36
1,040.00	3.52	183.69	1,039.01	-33.45	0.95	33.47	0.58	-0.58	-0.92
Last SDI MWD Surface Survey									
1,155.00	3.03	189.70	1,153.82	-39.97	0.21	39.96	0.52	-0.43	5.23
First SDI MWD Intermediate Survey									
1,338.00	8.70	184.90	1,335.79	-58.54	-1.79	58.47	3.11	3.10	-2.62
1,522.00	10.69	186.01	1,517.15	-89.38	-4.76	89.21	1.09	1.08	0.60
1,704.00	10.69	183.51	1,696.00	-123.02	-7.56	122.76	0.25	0.00	-1.37
1,887.00	11.28	183.33	1,875.64	-157.83	-9.64	157.49	0.32	0.32	-0.10
2,070.00	10.69	182.13	2,055.29	-192.66	-11.31	192.26	0.35	-0.32	-0.66
2,252.00	9.86	175.09	2,234.38	-225.05	-10.60	224.66	0.83	-0.46	-3.87
2,436.00	9.33	176.41	2,415.80	-255.64	-8.32	255.30	0.31	-0.29	0.72
2,619.00	11.16	183.07	2,595.88	-288.13	-8.34	287.78	1.19	1.00	3.64
2,802.00	8.52	186.75	2,776.18	-319.28	-10.88	318.84	1.48	-1.44	2.01
2,992.00	7.83	185.69	2,964.25	-346.14	-13.82	345.60	0.37	-0.36	-0.56
3,182.00	0.44	58.07	3,153.67	-358.65	-14.49	358.09	4.27	-3.89	-67.17
3,373.00	0.70	65.49	3,344.66	-357.78	-12.80	357.27	0.14	0.14	3.88
3,563.00	0.88	63.20	3,534.64	-356.64	-10.44	356.20	0.10	0.09	-1.21
3,753.00	1.40	2.73	3,724.61	-353.66	-9.03	353.26	0.65	0.27	-31.83
3,944.00	2.05	334.56	3,915.53	-348.25	-10.39	347.81	0.55	0.34	-14.75
4,135.00	0.69	300.69	4,106.47	-344.58	-12.84	344.07	0.80	-0.71	-17.73
4,325.00	1.10	238.70	4,296.45	-344.94	-15.39	344.36	0.52	0.22	-32.63
4,516.00	1.17	258.58	4,487.42	-346.28	-18.86	345.60	0.21	0.04	10.41
4,706.00	0.67	284.19	4,677.39	-346.39	-21.84	345.63	0.33	-0.26	13.48
4,896.00	1.74	298.94	4,867.35	-344.72	-25.44	343.86	0.58	0.56	7.76
5,086.00	1.33	100.05	5,057.32	-343.71	-25.80	342.84	1.59	-0.22	84.79
5,277.00	1.65	28.68	5,248.27	-341.69	-22.30	340.91	0.92	0.17	-37.37
5,467.00	1.77	50.65	5,438.19	-337.42	-18.71	336.76	0.35	0.06	11.56
5,657.00	0.55	20.35	5,628.15	-334.71	-16.13	334.11	0.70	-0.64	-15.95
5,847.00	2.02	119.27	5,818.11	-335.49	-12.89	334.99	1.14	0.77	52.06
6,038.00	2.72	135.19	6,008.94	-340.35	-6.76	340.02	0.50	0.37	8.34
6,228.00	1.19	159.55	6,198.83	-345.40	-2.89	345.18	0.90	-0.81	12.82
6,419.00	1.44	84.23	6,389.79	-347.02	0.19	346.88	0.85	0.13	-39.43
6,514.00	3.91	353.12	6,484.71	-343.68	0.99	343.57	4.41	2.60	-95.91
6,609.00	13.00	347.38	6,578.58	-330.01	-1.74	329.83	9.60	9.57	-6.04
6,704.00	17.73	346.96	6,670.16	-305.48	-7.34	305.14	4.98	4.98	-0.44
6,799.00	25.15	349.19	6,758.52	-271.51	-14.40	270.99	7.86	7.81	2.35
6,894.00	37.30	351.20	6,839.61	-223.05	-22.62	222.31	12.83	12.79	2.12
6,990.00	52.20	352.97	6,907.60	-156.28	-31.76	155.31	15.57	15.52	1.84
7,085.00	61.57	356.45	6,959.45	-77.15	-38.96	76.01	10.33	9.86	3.66
7,179.00	72.51	358.21	6,996.07	9.18	-42.93	-10.40	11.76	11.64	1.87
7,274.00	82.82	357.10	7,016.34	101.78	-46.74	-103.07	10.91	10.85	-1.17

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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)
Last SDI MWD Intermediate Survey									
7,452.00	89.43	357.44	7,028.36	279.07	-55.20	-280.53	3.72	3.71	0.19
First SDI MWD Lateral Survey									
7,543.00	89.76	358.86	7,029.00	370.02	-58.13	-371.53	1.60	0.36	1.56
7,634.00	91.28	0.23	7,028.18	461.01	-58.86	-462.50	2.25	1.67	1.51
7,729.00	91.85	0.76	7,025.58	555.97	-58.04	-557.40	0.82	0.60	0.56
7,824.00	91.65	0.60	7,022.68	650.92	-56.91	-652.28	0.27	-0.21	-0.17
7,919.00	90.87	0.73	7,020.59	745.89	-55.81	-747.18	0.83	-0.82	0.14
8,015.00	90.00	0.94	7,019.86	841.88	-54.41	-843.08	0.93	-0.91	0.22
8,110.00	90.10	0.11	7,019.78	936.87	-53.54	-938.01	0.88	0.11	-0.87
8,205.00	90.94	359.51	7,018.92	1,031.86	-53.85	-1,032.98	1.09	0.88	-0.63
8,300.00	90.94	359.74	7,017.36	1,126.85	-54.47	-1,127.94	0.24	0.00	0.24
8,395.00	90.37	1.06	7,016.27	1,221.84	-53.81	-1,222.88	1.51	-0.60	1.39
8,490.00	89.60	1.48	7,016.30	1,316.81	-51.71	-1,317.75	0.92	-0.81	0.44
8,585.00	89.06	1.51	7,017.41	1,411.78	-49.23	-1,412.60	0.57	-0.57	0.03
8,681.00	89.87	1.93	7,018.31	1,507.73	-46.35	-1,508.44	0.95	0.84	0.44
8,776.00	90.57	0.30	7,017.94	1,602.70	-44.50	-1,603.32	1.87	0.74	-1.72
8,872.00	91.55	359.42	7,016.17	1,698.69	-44.73	-1,699.27	1.37	1.02	-0.92
8,967.00	91.34	359.94	7,013.77	1,793.65	-45.26	-1,794.22	0.59	-0.22	0.55
9,062.00	89.70	358.72	7,012.91	1,888.64	-46.37	-1,889.19	2.15	-1.73	-1.28
9,157.00	89.23	357.31	7,013.79	1,983.57	-49.66	-1,984.18	1.56	-0.49	-1.48
9,253.00	88.96	357.26	7,015.31	2,079.45	-54.21	-2,080.15	0.29	-0.28	-0.05
9,348.00	88.89	357.19	7,017.09	2,174.33	-58.81	-2,175.12	0.10	-0.07	-0.07
9,443.00	89.23	357.17	7,018.65	2,269.20	-63.48	-2,270.09	0.36	0.36	-0.02
9,538.00	88.76	357.02	7,020.32	2,364.06	-68.30	-2,365.05	0.52	-0.49	-0.16
9,633.00	88.89	357.10	7,022.27	2,458.92	-73.17	-2,460.00	0.16	0.14	0.08
9,728.00	88.82	356.67	7,024.16	2,553.76	-78.33	-2,554.95	0.46	-0.07	-0.45
9,824.00	89.23	357.77	7,025.80	2,649.63	-82.98	-2,650.92	1.22	0.43	1.15
9,919.00	88.99	357.22	7,027.27	2,744.53	-87.13	-2,745.89	0.63	-0.25	-0.58
10,014.00	89.60	358.73	7,028.44	2,839.46	-90.49	-2,840.88	1.71	0.64	1.59
10,109.00	89.97	357.97	7,028.80	2,934.42	-93.23	-2,935.88	0.89	0.39	-0.80
10,204.00	90.84	358.16	7,028.13	3,029.36	-96.43	-3,030.88	0.94	0.92	0.20
10,299.00	91.08	357.52	7,026.54	3,124.28	-100.01	-3,125.86	0.72	0.25	-0.67
10,394.00	91.07	359.32	7,024.75	3,219.22	-102.63	-3,220.84	1.89	-0.01	1.89
10,489.00	91.04	359.00	7,023.00	3,314.19	-104.03	-3,315.81	0.34	-0.03	-0.34
10,584.00	91.41	358.58	7,020.97	3,409.15	-106.03	-3,410.79	0.59	0.39	-0.44
10,679.00	90.30	358.91	7,019.56	3,504.11	-108.11	-3,505.77	1.22	-1.17	0.35
10,775.00	91.14	359.27	7,018.35	3,600.09	-109.64	-3,601.76	0.95	0.88	0.38
10,870.00	90.50	0.00	7,016.99	3,695.08	-110.24	-3,696.72	1.02	-0.67	0.77
10,965.00	90.00	2.00	7,016.58	3,790.06	-108.58	-3,791.62	2.17	-0.53	2.11
11,060.00	90.10	2.51	7,016.49	3,884.99	-104.85	-3,886.40	0.55	0.11	0.54
11,155.00	89.36	4.00	7,016.94	3,979.83	-99.45	-3,981.05	1.75	-0.78	1.57
11,251.00	89.90	4.08	7,017.56	4,075.59	-92.69	-4,076.58	0.57	0.56	0.08





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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)
11,346.00	90.10	3.79	7,017.56	4,170.36	-86.17	-4,171.13	0.37	0.21	-0.31
11,441.00	91.18	3.99	7,016.50	4,265.14	-79.72	-4,265.68	1.16	1.14	0.21
11,536.00	90.94	2.47	7,014.74	4,359.97	-74.37	-4,360.32	1.62	-0.25	-1.60
11,563.00	91.14	2.29	7,014.25	4,386.94	-73.25	-4,387.25	1.00	0.74	-0.67
Last SDI MWD Survey									
11,626.00	91.14	2.29	7,013.00	4,449.88	-70.74	-4,450.09	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	140.00	-0.10	-0.20	First SDI MWD Survey
1,040.00	1,039.01	-33.45	0.95	Last SDI MWD Surface Survey
1,155.00	1,153.82	-39.97	0.21	First SDI MWD Intermediate Survey
7,274.00	7,016.34	101.78	-46.74	Last SDI MWD Intermediate Survey
7,452.00	7,028.36	279.07	-55.20	First SDI MWD Lateral Survey
11,563.00	7,014.25	4,386.94	-73.25	Last SDI MWD Survey
11,626.00	7,013.00	4,449.88	-70.74	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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