



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

**DJ Wattenberg**

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

**Dale 4A-20H-O264**

**HZ**

**Design: HZ**

## **Standard Survey Report**

**01 December, 2014**





<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4A-20H-O264
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	WELL @ 4989.00ft (Original Well Elev)
<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4989.00ft (Original Well Elev)
<b>Well:</b>	Dale 4A-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 4A-20H-O264					
Well Position	+N/-S	0.00 ft	Northing:	1,287,058.92 usft	Latitude:	40.117642
	+E/-W	0.00 ft	Easting:	3,259,523.45 usft	Longitude:	-104.572021
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,959.00 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
	BGGM2014	11/7/2014	8.38	66.73	52,533

<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	250.72	

<b>Survey Program</b>	<b>Date</b>	12/1/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
153.00	1,050.00	Survey #1 - Surface (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,153.00	7,455.00	Survey #2 - Intermediate (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	
7,547.00	11,746.00	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
153.00	0.97	267.71	152.99	-0.05	-1.29	1.24	0.63	0.63	0.00
<b>First SDI MWD Survey</b>									
232.00	2.29	261.74	231.96	-0.31	-3.52	3.43	1.68	1.67	-7.56
323.00	2.46	263.06	322.88	-0.80	-7.26	7.12	0.20	0.19	1.45
415.00	3.70	259.01	414.75	-1.61	-12.14	11.99	1.37	1.35	-4.40
507.00	5.54	246.97	506.45	-3.91	-19.14	19.36	2.25	2.00	-13.09

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Dale 4A-20H-O264
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<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4989.00ft (Original Well Elev)
<b>Well:</b>	Dale 4A-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)
598.00	7.30	249.52	596.87	-7.65	-28.60	29.52	1.96	1.93	2.80
690.00	9.06	249.43	687.93	-12.24	-40.86	42.61	1.91	1.91	-0.10
781.00	9.77	249.70	777.71	-17.44	-54.81	57.49	0.78	0.78	0.30
873.00	9.68	248.03	868.38	-23.04	-69.30	73.02	0.32	-0.10	-1.82
964.00	9.68	248.91	958.09	-28.66	-83.53	88.31	0.16	0.00	0.97
1,050.00	9.41	248.29	1,042.90	-33.86	-96.81	102.56	0.34	-0.31	-0.72
Last SDI MWD Surface Survey									
1,153.00	8.57	248.32	1,144.63	-39.81	-111.76	118.64	0.82	-0.82	0.03
First SDI MWD Inter. Survey									
1,337.00	10.57	249.49	1,326.06	-50.79	-140.31	149.21	1.09	1.09	0.64
1,520.00	10.07	250.89	1,506.10	-61.91	-171.15	181.99	0.31	-0.27	0.77
1,703.00	9.88	249.66	1,686.33	-72.60	-200.99	213.69	0.16	-0.10	-0.67
1,886.00	9.48	246.63	1,866.73	-84.04	-229.55	244.42	0.35	-0.22	-1.66
2,069.00	10.77	255.94	2,046.89	-94.17	-259.97	276.48	1.14	0.70	5.09
2,251.00	10.21	251.10	2,225.85	-103.52	-291.73	309.55	0.57	-0.31	-2.66
2,434.00	9.28	250.43	2,406.21	-113.72	-320.97	340.52	0.51	-0.51	-0.37
2,618.00	11.34	251.27	2,587.23	-124.50	-352.09	373.45	1.12	1.12	0.46
2,801.00	9.35	252.24	2,767.24	-134.81	-383.29	406.30	1.09	-1.09	0.53
2,991.00	9.34	250.39	2,954.72	-144.70	-412.51	437.15	0.16	-0.01	-0.97
3,180.00	9.34	253.06	3,141.22	-154.31	-441.63	467.81	0.23	0.00	1.41
3,370.00	9.48	250.15	3,328.66	-164.12	-471.09	498.86	0.26	0.07	-1.53
3,559.00	8.82	251.08	3,515.26	-174.10	-499.44	528.92	0.36	-0.35	0.49
3,749.00	9.46	248.12	3,702.84	-184.64	-527.71	559.08	0.42	0.34	-1.56
3,939.00	7.94	243.67	3,890.65	-196.28	-553.96	587.70	0.87	-0.80	-2.34
4,128.00	10.09	247.77	4,077.31	-208.34	-580.99	617.20	1.19	1.14	2.17
4,316.00	11.93	250.93	4,261.84	-220.92	-614.60	653.08	1.03	0.98	1.68
4,506.00	12.07	244.64	4,447.70	-235.84	-651.12	692.47	0.69	0.07	-3.31
4,697.00	13.34	247.25	4,634.02	-252.92	-689.48	734.32	0.73	0.66	1.37
4,887.00	10.87	246.21	4,819.78	-268.62	-726.10	774.07	1.31	-1.30	-0.55
5,077.00	8.96	251.23	5,006.94	-280.61	-756.50	806.73	1.10	-1.01	2.64
5,268.00	7.89	258.41	5,195.88	-288.03	-783.43	834.59	0.78	-0.56	3.76
5,458.00	5.65	243.84	5,384.56	-294.78	-804.60	856.81	1.48	-1.18	-7.67
5,648.00	1.15	219.77	5,574.18	-300.37	-814.22	867.73	2.43	-2.37	-12.67
5,839.00	0.48	288.28	5,765.16	-301.59	-816.21	870.01	0.56	-0.35	35.87
6,029.00	0.87	358.71	5,955.15	-299.90	-817.00	870.20	0.44	0.21	37.07
6,220.00	1.08	118.26	6,146.14	-299.30	-815.44	868.53	0.88	0.11	62.59
6,411.00	0.20	64.06	6,337.12	-300.01	-813.56	866.99	0.51	-0.46	-28.38
6,506.00	0.34	13.74	6,432.12	-299.66	-813.34	866.67	0.28	0.15	-52.97
6,601.00	4.86	354.73	6,527.00	-295.38	-813.65	865.54	4.78	4.76	-20.01
6,697.00	9.86	356.10	6,622.18	-283.12	-814.58	862.38	5.21	5.21	1.43
6,792.00	16.45	355.57	6,714.64	-261.57	-816.17	856.77	6.94	6.94	-0.56
6,887.00	23.63	357.68	6,803.83	-229.09	-817.98	847.76	7.59	7.56	2.22
6,982.00	29.76	359.87	6,888.66	-186.45	-818.81	834.46	6.53	6.45	2.31
7,077.00	33.91	1.56	6,969.36	-136.36	-818.14	817.29	4.47	4.37	1.78

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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)	
7,172.00	41.30	2.67	7,044.57	-78.47	-815.96	796.12	7.81	7.78	1.17	
7,267.00	53.46	1.08	7,108.78	-8.74	-813.77	771.03	12.86	12.80	-1.67	
7,362.00	72.57	358.69	7,151.69	75.52	-814.09	743.52	20.24	20.12	-2.52	
7,455.00	86.37	1.73	7,168.65	166.72	-813.70	713.04	15.18	14.84	3.27	
Last SDI MWD Inter. Survey										
7,547.00	90.40	1.89	7,171.24	258.62	-810.80	679.96	4.38	4.38	0.17	
First SDI MWD Lateral Survey										
7,638.00	90.94	1.13	7,170.18	349.58	-808.40	647.67	1.02	0.59	-0.84	
7,729.00	92.32	0.78	7,167.59	440.53	-806.88	616.21	1.56	1.52	-0.38	
7,825.00	90.94	0.01	7,164.86	536.48	-806.22	583.91	1.65	-1.44	-0.80	
7,920.00	92.82	359.64	7,161.74	631.43	-806.51	552.84	2.02	1.98	-0.39	
8,015.00	93.74	0.10	7,156.30	726.27	-806.72	521.74	1.08	0.97	0.48	
8,110.00	93.76	359.10	7,150.09	821.06	-807.39	491.07	1.05	0.02	-1.05	
8,205.00	94.57	358.56	7,143.19	915.79	-809.32	461.62	1.02	0.85	-0.57	
8,301.00	92.89	359.26	7,136.95	1,011.57	-811.14	431.72	1.90	-1.75	0.73	
8,396.00	93.76	358.84	7,131.44	1,106.39	-812.72	401.90	1.02	0.92	-0.44	
8,491.00	92.89	359.30	7,125.93	1,201.22	-814.25	372.05	1.04	-0.92	0.48	
8,586.00	93.09	358.81	7,120.97	1,296.08	-815.82	342.21	0.56	0.21	-0.52	
8,681.00	93.23	0.05	7,115.73	1,390.93	-816.76	311.79	1.31	0.15	1.31	
8,776.00	92.65	359.59	7,110.86	1,485.80	-817.06	280.75	0.78	-0.61	-0.48	
8,871.00	93.15	0.48	7,106.05	1,580.68	-817.00	249.37	1.07	0.53	0.94	
8,966.00	93.80	1.59	7,100.30	1,675.48	-815.29	216.46	1.35	0.68	1.17	
9,061.00	93.50	1.17	7,094.25	1,770.26	-813.01	183.01	0.54	-0.32	-0.44	
9,155.00	93.73	0.70	7,088.32	1,864.06	-811.48	150.60	0.56	0.24	-0.50	
9,250.00	93.63	0.75	7,082.22	1,958.86	-810.28	118.18	0.12	-0.11	0.05	
9,345.00	94.27	0.92	7,075.68	2,053.62	-808.90	85.59	0.70	0.67	0.18	
9,439.00	93.36	0.03	7,069.43	2,147.41	-808.12	53.89	1.35	-0.97	-0.95	
9,533.00	92.99	359.76	7,064.22	2,241.27	-808.29	23.07	0.49	-0.39	-0.29	
9,628.00	92.79	0.52	7,059.43	2,336.14	-808.06	-8.47	0.83	-0.21	0.80	
9,723.00	93.30	0.02	7,054.38	2,431.01	-807.61	-40.21	0.75	0.54	-0.53	
9,818.00	91.83	0.73	7,050.13	2,525.91	-806.99	-72.12	1.72	-1.55	0.75	
9,913.00	92.45	0.45	7,046.58	2,620.84	-806.01	-104.39	0.72	0.65	-0.29	
10,008.00	91.28	0.97	7,043.49	2,715.78	-804.84	-136.84	1.35	-1.23	0.55	
10,103.00	91.95	0.70	7,040.81	2,810.73	-803.45	-169.49	0.76	0.71	-0.28	
10,198.00	90.70	1.97	7,038.62	2,905.67	-801.24	-202.92	1.88	-1.32	1.34	
10,294.00	91.04	1.71	7,037.16	3,001.61	-798.16	-237.51	0.45	0.35	-0.27	
10,389.00	89.93	1.76	7,036.36	3,096.56	-795.28	-271.57	1.17	-1.17	0.05	
10,484.00	90.07	1.50	7,036.36	3,191.53	-792.58	-305.47	0.31	0.15	-0.27	
10,579.00	91.18	1.36	7,035.32	3,286.49	-790.21	-339.05	1.18	1.17	-0.15	
10,674.00	90.20	1.51	7,034.18	3,381.45	-787.83	-372.65	1.04	-1.03	0.16	
10,769.00	91.28	0.27	7,032.95	3,476.43	-786.35	-405.40	1.73	1.14	-1.31	
10,865.00	89.80	0.05	7,032.04	3,572.42	-786.09	-437.34	1.56	-1.54	-0.23	
10,960.00	90.30	359.82	7,031.96	3,667.42	-786.19	-468.60	0.58	0.53	-0.24	
11,055.00	91.07	359.49	7,030.83	3,762.41	-786.77	-499.42	0.88	0.81	-0.35	

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<b>Site:</b>	S20-T2N-R64W (Dale)	<b>MD Reference:</b>	WELL @ 4989.00ft (Original Well Elev)
<b>Well:</b>	Dale 4A-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)
11,150.00	90.03	0.19	7,029.91	3,857.40	-787.03	-530.53	1.32	-1.09	0.74
11,246.00	90.97	0.40	7,029.08	3,953.40	-786.54	-562.69	1.00	0.98	0.22
11,341.00	88.52	359.37	7,029.50	4,048.39	-786.73	-593.86	2.80	-2.58	-1.08
11,436.00	89.13	0.01	7,031.45	4,143.37	-787.24	-624.73	0.93	0.64	0.67
11,531.00	89.40	0.15	7,032.67	4,238.36	-787.11	-656.22	0.32	0.28	0.15
11,627.00	89.09	359.87	7,033.93	4,334.35	-787.09	-687.92	0.44	-0.32	-0.29
11,683.00	88.93	359.78	7,034.90	4,390.34	-787.26	-706.25	0.33	-0.29	-0.16
<b>Last SDI MWD Survey</b>									
11,746.00	88.93	359.78	7,036.07	4,453.33	-787.50	-726.81	0.00	0.00	0.00
<b>Projection to TD</b>									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
153.00	152.99	-0.05	-1.29	First SDI MWD Survey
1,050.00	1,042.90	-33.86	-96.81	Last SDI MWD Surface Survey
1,153.00	1,144.63	-39.81	-111.76	First SDI MWD Inter. Survey
7,455.00	7,168.65	166.72	-813.70	Last SDI MWD Inter. Survey
7,547.00	7,171.24	258.62	-810.80	First SDI MWD Lateral Survey
11,683.00	7,034.90	4,390.34	-787.26	Last SDI MWD Survey
11,746.00	7,036.07	4,453.33	-787.50	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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