



**Scientific
Drilling**

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 4G-20I-O264
County & State	Weld County, CO
SDI Job No.	410814HEFK186353
Rig	H&P 278
Survey Date	7-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 140 feet to a
measured depth of 11498 feet is true and correct as determined from all available records.

Seth M. Burstad
Signature

8-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 4G-20H-O264

HZ

Design: HZ

Standard Survey Report

08 October, 2014





Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Dale 4G-20H-O264
Project:	DJ Wattenberg	TVD Reference:	WELL @ 4988.00ft (Original Well Elev)
Site:	S20-T2N-R64W (Dale)	MD Reference:	WELL @ 4988.00ft (Original Well Elev)
Well:	Dale 4G-20H-O264	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	HZ	Database:	Casper District

Project	DJ Wattenberg, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	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 4G-20H-O264					
Well Position	+N/-S	0.00 ft	Northing:	1,287,059.05 usft	Latitude:	40.117641
	+E/-W	0.00 ft	Easting:	3,259,568.48 usft	Longitude:	-104.571860
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,958.00 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/31/2014	8.36	66.76	52,708

Design	HZ				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	117.49	

Survey Program	Date	10/8/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
140.00	1,056.00	Survey #1 - Surface (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,177.00	7,312.00	Survey #2 - Intermediate (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	
7,445.00	11,562.00	Survey #3 - Lateral (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1	

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140.00	0.70	321.50	140.00	0.67	-0.53	-0.78	0.50	0.50	0.00
First SDI MWD Survey									
232.00	0.44	105.03	231.99	1.02	-0.54	-0.95	1.18	-0.28	156.01
323.00	0.79	17.05	322.99	1.53	-0.02	-0.72	0.98	0.38	-96.68
414.00	1.32	77.96	413.98	2.35	1.19	-0.03	1.28	0.58	66.93
506.00	2.55	116.98	505.93	1.64	4.05	2.84	1.89	1.34	42.41
598.00	2.99	124.28	597.82	-0.64	7.86	7.27	0.61	0.48	7.93
689.00	2.99	132.71	688.70	-3.59	11.56	11.91	0.48	0.00	9.26

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Well:	Dale 4G-20H-O264	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	HZ	Database:	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	4.31	121.20	780.51	-7.01	16.28	17.68	1.63	1.43	-12.51
873.00	4.75	120.85	872.22	-10.75	22.51	24.93	0.48	0.48	-0.38
964.00	4.66	123.13	962.91	-14.70	28.84	32.37	0.23	-0.10	2.51
1,056.00	5.19	116.10	1,054.58	-18.58	35.71	40.25	0.87	0.58	-7.64
1,177.00	6.33	120.41	1,174.96	-24.36	46.37	52.38	1.01	0.94	3.56
1,269.00	9.15	125.68	1,266.12	-31.20	56.69	64.69	3.16	3.07	5.73
1,361.00	8.97	123.75	1,356.97	-39.45	68.60	79.06	0.38	-0.20	-2.10
1,452.00	10.82	125.51	1,446.61	-48.35	81.45	94.57	2.06	2.03	1.93
1,524.00	10.48	126.30	1,517.37	-56.15	92.23	107.73	0.51	-0.47	1.10
1,707.00	10.93	122.85	1,697.19	-75.42	120.22	141.46	0.43	0.25	-1.89
1,890.00	10.95	120.92	1,876.86	-93.76	149.70	176.08	0.20	0.01	-1.05
2,073.00	10.34	117.58	2,056.71	-110.29	179.17	209.85	0.47	-0.33	-1.83
2,255.00	9.89	114.24	2,235.89	-124.27	207.90	241.79	0.41	-0.25	-1.84
2,438.00	8.70	115.92	2,416.48	-136.78	234.68	271.32	0.67	-0.65	0.92
2,621.00	10.64	121.99	2,596.88	-151.78	261.46	302.00	1.20	1.06	3.32
2,805.00	10.02	117.18	2,777.90	-168.09	290.11	334.94	0.58	-0.34	-2.61
2,995.00	9.35	116.61	2,965.19	-182.55	318.61	366.90	0.36	-0.35	-0.30
3,184.00	9.90	116.59	3,151.53	-196.70	346.87	398.50	0.29	0.29	-0.01
3,374.00	9.16	118.03	3,338.90	-211.12	374.82	429.95	0.41	-0.39	0.76
3,563.00	10.69	124.12	3,525.07	-228.02	402.62	462.41	0.98	0.81	3.22
3,753.00	9.30	120.51	3,712.19	-245.70	430.43	495.25	0.80	-0.73	-1.90
3,943.00	10.92	123.31	3,899.23	-263.38	458.70	528.48	0.89	0.85	1.47
4,131.00	11.31	118.13	4,083.71	-281.85	489.84	564.64	0.57	0.21	-2.76
4,320.00	9.40	115.59	4,269.62	-297.26	520.11	598.60	1.04	-1.01	-1.34
4,510.00	11.66	120.40	4,456.42	-313.68	550.67	633.28	1.28	1.19	2.53
4,701.00	9.02	116.77	4,644.30	-330.19	580.69	667.54	1.42	-1.38	-1.90
4,891.00	5.25	116.95	4,832.79	-340.85	601.74	691.13	1.98	-1.98	0.09
5,081.00	1.55	357.06	5,022.54	-342.22	609.37	698.53	3.25	-1.95	-63.10
5,271.00	0.95	336.56	5,212.50	-338.21	608.61	696.00	0.39	-0.32	-10.79
5,462.00	0.69	353.46	5,403.48	-335.61	607.85	694.13	0.18	-0.14	8.85
5,652.00	0.84	14.85	5,593.46	-333.13	608.07	693.19	0.17	0.08	11.26
5,843.00	0.39	46.94	5,784.45	-331.33	608.91	693.10	0.29	-0.24	16.80
6,033.00	0.15	21.46	5,974.45	-330.66	609.47	693.29	0.14	-0.13	-13.41
6,224.00	0.79	79.37	6,165.44	-330.19	610.86	694.30	0.38	0.34	30.32
6,415.00	1.29	59.65	6,356.41	-328.86	614.01	696.48	0.32	0.26	-10.32
6,510.00	3.55	344.53	6,451.34	-325.48	614.14	695.04	3.63	2.38	-79.07
6,605.00	12.34	343.38	6,545.33	-312.89	610.45	685.95	9.25	9.25	-1.21
6,700.00	23.49	350.96	6,635.60	-284.37	604.55	667.56	11.97	11.74	7.98
6,796.00	36.54	353.28	6,718.55	-236.89	598.17	639.98	13.65	13.59	2.42
6,891.00	45.10	356.73	6,790.38	-175.09	592.93	606.81	9.32	9.01	3.63
6,986.00	54.87	357.00	6,851.39	-102.53	588.97	569.81	10.29	10.28	0.28
7,081.00	63.17	356.60	6,900.25	-21.28	584.42	528.27	8.74	8.74	-0.42
7,176.00	69.86	357.92	6,938.09	65.70	580.28	484.45	7.16	7.04	1.39

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Well:	Dale 4G-20H-O264	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	HZ	Database:	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)
7,271.00	77.40	359.40	6,964.84	156.76	578.17	440.55	8.08	7.94	1.56
7,312.00	83.24	1.06	6,971.73	197.15	578.34	422.06	14.79	14.24	4.05
Last Survey in 8 3/4" Hole									
7,445.00	85.46	1.24	6,984.83	329.47	581.00	363.34	1.67	1.67	0.14
First Survey in 6" Hole									
7,535.00	86.23	1.84	6,991.35	419.20	583.41	324.07	1.08	0.86	0.67
7,625.00	86.77	2.24	6,996.84	508.98	586.61	285.47	0.75	0.60	0.44
7,720.00	89.02	2.96	7,000.33	603.81	590.91	245.52	2.49	2.37	0.76
7,816.00	90.37	2.73	7,000.84	699.69	595.68	205.49	1.43	1.41	-0.24
7,911.00	89.43	1.54	7,001.01	794.62	599.22	164.82	1.60	-0.99	-1.25
8,006.00	90.50	1.06	7,001.07	889.59	601.37	122.89	1.23	1.13	-0.51
8,101.00	89.76	359.68	7,000.85	984.59	601.99	79.59	1.65	-0.78	-1.45
8,196.00	89.80	358.29	7,001.22	1,079.57	600.30	34.26	1.46	0.04	-1.46
8,291.00	90.10	359.10	7,001.30	1,174.54	598.14	-11.50	0.91	0.32	0.85
8,386.00	91.31	0.07	7,000.13	1,269.53	597.45	-55.95	1.63	1.27	1.02
8,482.00	91.08	1.42	6,998.13	1,365.50	598.70	-99.14	1.43	-0.24	1.41
8,577.00	92.05	2.86	6,995.53	1,460.39	602.25	-139.79	1.83	1.02	1.52
8,672.00	90.47	1.63	6,993.44	1,555.29	605.97	-180.29	2.11	-1.66	-1.29
8,768.00	88.89	1.09	6,993.98	1,651.26	608.24	-222.56	1.74	-1.65	-0.56
8,863.00	88.72	1.47	6,995.96	1,746.22	610.37	-264.51	0.44	-0.18	0.40
8,958.00	88.66	1.13	6,998.13	1,841.17	612.52	-306.42	0.36	-0.06	-0.36
9,053.00	88.35	359.86	7,000.61	1,936.13	613.34	-349.52	1.38	-0.33	-1.34
9,149.00	89.77	359.25	7,002.19	2,032.11	612.60	-394.48	1.61	1.48	-0.64
9,244.00	90.03	359.19	7,002.35	2,127.10	611.30	-439.48	0.28	0.27	-0.06
9,339.00	90.20	358.77	7,002.16	2,222.09	609.61	-484.82	0.48	0.18	-0.44
9,434.00	89.50	358.41	7,002.41	2,317.06	607.27	-530.72	0.83	-0.74	-0.38
9,529.00	90.40	358.72	7,002.49	2,412.03	604.89	-576.67	1.00	0.95	0.33
9,624.00	89.43	359.03	7,002.63	2,507.01	603.03	-622.16	1.07	-1.02	0.33
9,720.00	89.93	359.09	7,003.17	2,602.99	601.45	-667.86	0.52	0.52	0.06
9,815.00	88.32	359.50	7,004.62	2,697.97	600.29	-712.73	1.75	-1.69	0.43
9,910.00	89.76	359.87	7,006.21	2,792.95	599.76	-757.04	1.57	1.52	0.39
10,005.00	90.97	359.57	7,005.61	2,887.95	599.30	-801.29	1.31	1.27	-0.32
10,100.00	89.80	0.08	7,004.97	2,982.94	599.01	-845.40	1.34	-1.23	0.54
10,195.00	91.34	0.24	7,004.02	3,077.93	599.27	-889.00	1.63	1.62	0.17
10,290.00	90.57	0.22	7,002.44	3,172.92	599.66	-932.51	0.81	-0.81	-0.02
10,385.00	89.90	0.19	7,002.05	3,267.92	600.00	-976.05	0.71	-0.71	-0.03
10,481.00	89.09	1.34	7,002.90	3,363.90	601.28	-1,019.22	1.47	-0.84	1.20
10,576.00	89.76	0.92	7,003.85	3,458.88	603.15	-1,061.39	0.83	0.71	-0.44
10,671.00	90.13	359.98	7,003.94	3,553.87	603.90	-1,104.58	1.06	0.39	-0.99
10,766.00	90.50	0.16	7,003.42	3,648.87	604.01	-1,148.32	0.43	0.39	0.19
10,861.00	89.90	359.54	7,003.09	3,743.87	603.76	-1,192.39	0.91	-0.63	-0.65
10,956.00	87.88	0.26	7,004.93	3,838.85	603.60	-1,236.37	2.26	-2.13	0.76
11,051.00	87.98	359.48	7,008.36	3,933.78	603.38	-1,280.38	0.83	0.11	-0.82
11,147.00	88.72	358.71	7,011.12	4,029.73	601.87	-1,326.01	1.11	0.77	-0.80



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Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
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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)
11,242.00	89.36	358.76	7,012.72	4,124.69	599.77	-1,371.70	0.68	0.67	0.05
11,337.00	89.80	358.89	7,013.41	4,219.67	597.82	-1,417.26	0.48	0.46	0.14
11,432.00	90.20	358.64	7,013.41	4,314.65	595.77	-1,462.92	0.50	0.42	-0.26
11,498.00	89.87	358.24	7,013.37	4,380.62	593.98	-1,494.96	0.79	-0.50	-0.61
Last SDI MWD Survey									
11,562.00	89.87	358.24	7,013.52	4,444.59	592.01	-1,526.23	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	0.67	-0.53	First SDI MWD Survey
7,312.00	6,971.73	197.15	578.34	Last Survey in 8 3/4" Hole
7,445.00	6,984.83	329.47	581.00	First Survey in 6" Hole
11,498.00	7,013.37	4,380.62	593.98	Last SDI MWD Survey
11,562.00	7,013.52	4,444.59	592.01	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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