



**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 4F-20H-O264
County & State	Weld County, CO
SDI Job No.	410814HEFK186361
Rig	H&P 278
Survey Date	12-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 11469 feet is true and correct as determined from all available records.

Seth M. Burstad
Signature

16-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 4F-20H-O264

HZ

Design: HZ

Standard Survey Report

16 October, 2014





Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Dale 4F-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 4F-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 4F-20H-O264			
Well Position	+N/-S	0.00 ft	Northing:	1,287,058.90 usft
	+E/-W	0.00 ft	Easting:	3,259,560.93 usft
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	131.08

Survey Program	Date	10/16/2014		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
140.00	1,055.00	Survey #1 - Surface (HZ)	SDI MWD	SDI MWD - Standard ver 1.0.1
1,086.00	7,253.00	Survey #2 - Intermediate (HZ)	MWD	Geolink MWD
7,253.00	11,469.00	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	0.35	15.47	140.00	0.41	0.11	-0.18	0.25	0.25	0.00
First SDI MWD Survey									
232.00	0.18	260.33	232.00	0.66	0.05	-0.40	0.50	-0.18	-125.15
323.00	0.53	124.98	323.00	0.39	0.25	-0.07	0.74	0.38	-148.74
416.00	0.26	348.84	416.00	0.35	0.56	0.19	0.80	-0.29	-146.39
507.00	0.79	105.03	506.99	0.39	1.13	0.59	1.03	0.58	127.68
598.00	1.58	146.34	597.97	-0.81	2.43	2.37	1.23	0.87	45.40
690.00	2.82	129.46	689.91	-3.31	4.88	5.85	1.51	1.35	-18.35

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Well:	Dale 4F-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	3.78	130.87	780.75	-6.69	8.88	11.09	1.06	1.05	1.55
873.00	4.75	136.23	872.50	-11.43	13.80	17.92	1.14	1.05	5.83
964.00	5.81	134.12	963.11	-17.36	19.72	26.27	1.18	1.16	-2.32
1,055.00	5.19	128.76	1,053.69	-23.14	26.23	34.98	0.88	-0.68	-5.89
1,086.00	5.01	129.99	1,084.57	-24.89	28.36	37.73	0.68	-0.58	3.97
1,177.00	4.84	127.00	1,175.23	-29.75	34.47	45.54	0.34	-0.19	-3.29
1,269.00	6.25	136.05	1,266.80	-35.69	41.05	54.40	1.80	1.53	9.84
1,340.00	8.65	134.35	1,337.20	-42.21	47.55	63.58	3.39	3.38	-2.39
1,524.00	9.37	139.38	1,518.93	-63.25	67.20	92.22	0.58	0.39	2.73
1,706.00	10.59	134.25	1,698.18	-86.17	88.82	123.58	0.83	0.67	-2.82
1,889.00	10.54	131.12	1,878.08	-108.91	113.48	157.10	0.31	-0.03	-1.71
2,072.00	10.03	129.74	2,058.13	-130.10	138.34	189.77	0.31	-0.28	-0.75
2,254.00	9.45	126.34	2,237.51	-149.09	162.56	220.51	0.45	-0.32	-1.87
2,437.00	9.04	130.46	2,418.14	-167.32	185.60	249.86	0.43	-0.22	2.25
2,621.00	10.92	132.77	2,599.34	-188.54	209.40	281.73	1.04	1.02	1.26
2,804.00	8.30	129.24	2,779.76	-208.67	232.36	312.27	1.47	-1.43	-1.93
2,994.00	11.27	132.00	2,966.98	-229.77	256.78	344.55	1.58	1.56	1.45
3,183.00	9.44	128.67	3,152.89	-251.82	282.61	378.50	1.02	-0.97	-1.76
3,373.00	10.37	122.22	3,340.07	-270.67	309.24	410.97	0.76	0.49	-3.39
3,563.00	8.35	118.81	3,527.53	-286.44	335.80	441.35	1.10	-1.06	-1.79
3,753.00	7.38	122.97	3,715.74	-299.73	358.13	466.91	0.59	-0.51	2.19
3,942.00	4.59	127.00	3,903.69	-310.89	374.36	486.47	1.49	-1.48	2.13
4,131.00	0.99	146.08	4,092.44	-316.79	381.31	495.60	1.94	-1.90	10.10
4,320.00	0.69	152.89	4,281.42	-319.16	382.74	498.23	0.17	-0.16	3.60
4,510.00	0.43	197.25	4,471.41	-320.86	383.05	499.58	0.26	-0.14	23.35
4,700.00	2.30	43.63	4,661.37	-318.78	385.47	500.04	1.42	0.98	-80.85
4,890.00	0.65	290.21	4,851.32	-315.65	387.09	499.20	1.38	-0.87	-59.69
5,081.00	1.18	302.33	5,042.29	-314.22	384.41	496.25	0.29	0.28	6.35
5,271.00	0.87	266.00	5,232.26	-313.28	381.32	493.29	0.37	-0.16	-19.12
5,461.00	0.96	338.37	5,422.24	-311.90	379.29	490.86	0.57	0.05	38.09
5,652.00	0.74	56.87	5,613.23	-309.74	379.73	489.77	0.57	-0.12	41.10
5,842.00	1.07	56.76	5,803.20	-308.09	382.25	490.59	0.17	0.17	-0.06
6,033.00	1.41	73.11	5,994.16	-306.43	385.99	492.32	0.26	0.18	8.56
6,223.00	1.60	77.63	6,184.09	-305.19	390.81	495.14	0.12	0.10	2.38
6,319.00	1.91	77.86	6,280.05	-304.56	393.69	496.89	0.32	0.32	0.24
6,414.00	4.53	3.09	6,374.92	-300.48	395.44	495.53	4.66	2.76	-78.71
6,509.00	13.37	355.36	6,468.67	-285.76	394.75	485.34	9.37	9.31	-8.14
6,605.00	19.59	351.70	6,560.69	-258.74	391.53	465.16	6.57	6.48	-3.81
6,700.00	29.33	356.53	6,647.07	-219.66	387.81	436.67	10.46	10.25	5.08
6,795.00	42.41	0.30	6,723.89	-164.15	386.56	399.26	13.96	13.77	3.97
6,890.00	50.66	357.12	6,789.20	-95.30	384.88	352.75	9.02	8.68	-3.35
6,985.00	60.06	359.07	6,843.14	-17.27	382.36	299.58	10.04	9.89	2.05
7,080.00	72.18	0.70	6,881.53	69.43	382.25	242.53	12.85	12.76	1.72

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Well:	Dale 4F-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)
7,176.00	80.99	1.76	6,903.78	162.69	384.26	182.76	9.24	9.18	1.10
7,253.00	86.03	3.28	6,912.48	239.10	387.63	135.10	6.83	6.55	1.97
Last Survey in 8 3/4" Hole									
7,357.00	89.36	1.38	6,916.66	342.91	391.85	70.07	3.69	3.20	-1.83
First Survey in 6" Hole									
7,449.00	89.63	0.89	6,917.47	434.89	393.68	11.01	0.61	0.29	-0.53
7,541.00	89.46	359.77	6,918.20	526.88	394.21	-49.04	1.23	-0.18	-1.22
7,633.00	88.66	359.23	6,919.71	618.86	393.40	-110.09	1.05	-0.87	-0.59
7,728.00	90.44	0.10	6,920.46	713.85	392.85	-172.92	2.09	1.87	0.92
7,823.00	90.97	359.76	6,919.29	808.85	392.73	-235.43	0.66	0.56	-0.36
7,918.00	90.27	359.34	6,918.26	903.84	391.99	-298.40	0.86	-0.74	-0.44
8,013.00	90.47	359.26	6,917.65	998.83	390.83	-361.70	0.23	0.21	-0.08
8,109.00	89.77	359.86	6,917.45	1,094.82	390.09	-425.33	0.96	-0.73	0.63
8,204.00	88.99	0.23	6,918.48	1,189.82	390.16	-487.69	0.91	-0.82	0.39
8,299.00	88.96	0.34	6,920.17	1,284.80	390.64	-549.75	0.12	-0.03	0.12
8,394.00	89.09	0.16	6,921.79	1,379.79	391.05	-611.85	0.23	0.14	-0.19
8,489.00	88.69	0.15	6,923.63	1,474.77	391.31	-674.06	0.42	-0.42	-0.01
8,584.00	89.13	0.81	6,925.44	1,569.75	392.10	-735.87	0.83	0.46	0.69
8,680.00	89.23	0.40	6,926.81	1,665.73	393.12	-798.18	0.44	0.10	-0.43
8,775.00	88.39	1.00	6,928.79	1,760.70	394.28	-859.71	1.09	-0.88	0.63
8,871.00	89.40	1.24	6,930.64	1,856.67	396.15	-921.35	1.08	1.05	0.25
8,966.00	88.59	359.92	6,932.30	1,951.64	397.11	-983.03	1.63	-0.85	-1.39
9,061.00	89.87	359.76	6,933.58	2,046.63	396.85	-1,045.65	1.36	1.35	-0.17
9,156.00	90.10	359.48	6,933.60	2,141.63	396.22	-1,108.54	0.38	0.24	-0.29
9,252.00	90.27	359.28	6,933.29	2,237.62	395.18	-1,172.40	0.27	0.18	-0.21
9,347.00	90.13	359.06	6,932.96	2,332.61	393.80	-1,235.85	0.27	-0.15	-0.23
9,442.00	90.97	359.01	6,932.05	2,427.59	392.20	-1,299.47	0.89	0.88	-0.05
9,537.00	91.71	358.54	6,929.83	2,522.55	390.17	-1,363.39	0.92	0.78	-0.49
9,632.00	91.58	358.80	6,927.10	2,617.48	387.97	-1,427.43	0.31	-0.14	0.27
9,727.00	90.54	358.15	6,925.34	2,712.43	385.44	-1,491.73	1.29	-1.09	-0.68
9,822.00	89.76	359.42	6,925.10	2,807.40	383.43	-1,555.65	1.57	-0.82	1.34
9,917.00	89.46	0.76	6,925.74	2,902.40	383.58	-1,617.96	1.45	-0.32	1.41
10,013.00	88.42	0.26	6,927.52	2,998.38	384.43	-1,680.38	1.20	-1.08	-0.52
10,108.00	88.62	359.29	6,929.97	3,093.34	384.06	-1,743.06	1.04	0.21	-1.02
10,203.00	89.60	0.10	6,931.45	3,188.33	383.55	-1,805.85	1.34	1.03	0.85
10,298.00	89.53	359.63	6,932.17	3,283.33	383.33	-1,868.44	0.50	-0.07	-0.49
10,393.00	90.03	358.81	6,932.53	3,378.32	382.04	-1,931.83	1.01	0.53	-0.86
10,488.00	90.67	358.39	6,931.95	3,473.29	379.71	-1,995.98	0.81	0.67	-0.44
10,583.00	89.93	358.88	6,931.46	3,568.26	377.45	-2,060.09	0.93	-0.78	0.52
10,678.00	90.00	0.37	6,931.51	3,663.25	376.83	-2,122.98	1.57	0.07	1.57
10,774.00	89.03	0.60	6,932.33	3,759.24	377.64	-2,185.44	1.04	-1.01	0.24
10,869.00	89.40	0.19	6,933.63	3,854.23	378.30	-2,247.36	0.58	0.39	-0.43
10,964.00	90.07	1.06	6,934.07	3,949.22	379.33	-2,309.00	1.16	0.71	0.92
11,059.00	90.77	0.89	6,933.37	4,044.21	380.95	-2,370.19	0.76	0.74	-0.18



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Well:	Dale 4F-20H-O264	North Reference:	True
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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)	
11,154.00	89.77	0.75	6,932.92	4,139.19	382.31	-2,431.58	1.06	-1.05	-0.15	
11,248.00	89.87	0.33	6,933.22	4,233.19	383.20	-2,492.68	0.46	0.11	-0.45	
11,344.00	90.34	359.58	6,933.04	4,329.19	383.12	-2,555.81	0.92	0.49	-0.78	
11,404.00	90.27	0.06	6,932.72	4,389.19	382.93	-2,595.38	0.81	-0.12	0.80	
Last SDI MWD Survey										
11,469.00	90.27	0.06	6,932.42	4,454.19	383.00	-2,638.04	0.00	0.00	0.00	
Projection to TD										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
140.00	140.00	0.41	0.11	First SDI MWD Survey	
7,253.00	6,912.48	239.10	387.63	Last Survey in 8 3/4" Hole	
7,357.00	6,916.66	342.91	391.85	First Survey in 6" Hole	
11,404.00	6,932.72	4,389.19	382.93	Last SDI MWD Survey	
11,469.00	6,932.42	4,454.19	383.00	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____