



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC Federal 0697-03-08W

Wellbore #1

Design: Wellbore #1

QES Survey Report

10 September, 2019





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well CC Federal 0697-03-08W
Project:	Garfield County, CO	TVD Reference:	Well @ 8639.0usft (H&P #522)
Site:	CC 604-41-32 Pad	MD Reference:	Well @ 8639.0usft (H&P #522)
Well:	CC Federal 0697-03-08W	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Garfield County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site	CC 604-41-32 Pad			
Site Position:		Northing:	1,639,464.67 usft	Latitude: 39.557630
From:	Lat/Long	Easting:	2,233,548.14 usft	Longitude: -108.218770
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -1.71 °

Well	CC Federal 0697-03-08W			
Well Position	+N/-S	0.0 usft	Northing:	1,639,421.25 usft
	+E/-W	0.0 usft	Easting:	2,233,543.09 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft
			Ground Level:	8,609.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/8/2019	9.57	65.78	51,412.60000000

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	72.09	

Survey Program	Date	9/10/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
430.0	10,546.0	QES MWD Surveys (Wellbore #1)	MWD	OWSG MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
First MWD Survey @ 430.0'MD / 429.9' TVD									
430.0	2.30	78.40	429.9	1.7	8.5	8.6	0.53	0.53	0.00
481.0	3.40	81.80	480.8	2.2	11.0	11.1	2.18	2.16	6.67
573.0	5.30	84.70	572.6	2.9	17.9	17.9	2.08	2.07	3.15
664.0	8.10	82.10	662.9	4.2	28.4	28.3	3.09	3.08	-2.86
756.0	10.50	78.20	753.7	6.8	43.0	43.1	2.70	2.61	-4.24
847.0	13.40	70.70	842.7	12.0	61.1	61.8	3.61	3.19	-8.24
939.0	15.60	69.10	931.8	19.9	82.7	84.9	2.43	2.39	-1.74
1,031.0	16.80	64.90	1,020.1	30.0	106.3	110.4	1.82	1.30	-4.57
1,125.0	16.70	67.40	1,110.2	40.9	131.1	137.3	0.77	-0.11	2.66



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,220.0	17.70	71.00	1,200.9	50.9	157.4	165.4	1.54	1.05	3.79
1,315.0	20.00	73.30	1,290.8	60.3	186.6	196.1	2.54	2.42	2.42
1,409.0	20.80	72.90	1,378.9	69.8	217.9	228.8	0.86	0.85	-0.43
1,504.0	21.00	72.80	1,467.7	79.8	250.3	262.7	0.21	0.21	-0.11
1,598.0	21.50	73.30	1,555.3	89.7	282.9	296.8	0.57	0.53	0.53
1,693.0	22.40	73.20	1,643.4	99.9	316.9	332.3	0.95	0.95	-0.11
1,788.0	21.90	72.60	1,731.4	110.5	351.2	368.1	0.58	-0.53	-0.63
1,882.0	21.70	74.50	1,818.7	120.4	384.6	403.0	0.78	-0.21	2.02
1,977.0	22.20	74.00	1,906.8	130.0	418.8	438.5	0.56	0.53	-0.53
2,072.0	21.40	74.50	1,995.0	139.6	452.8	473.7	0.86	-0.84	0.53
2,166.0	21.10	73.30	2,082.6	149.0	485.5	507.8	0.56	-0.32	-1.28
2,261.0	20.10	73.60	2,171.5	158.5	517.5	541.2	1.06	-1.05	0.32
2,356.0	20.00	72.10	2,260.7	168.2	548.6	573.8	0.55	-0.11	-1.58
2,450.0	19.70	71.70	2,349.2	178.1	579.0	605.7	0.35	-0.32	-0.43
2,521.0	19.40	72.60	2,416.1	185.3	601.6	629.4	0.60	-0.42	1.27
2,674.0	16.60	69.80	2,561.6	200.5	646.4	676.7	1.91	-1.83	-1.83
2,769.0	16.50	68.90	2,652.6	210.0	671.7	703.7	0.29	-0.11	-0.95
2,863.0	18.60	70.00	2,742.3	220.0	698.2	732.0	2.26	2.23	1.17
2,958.0	21.00	70.70	2,831.6	230.8	728.5	764.2	2.54	2.53	0.74
3,052.0	22.40	73.10	2,919.0	241.6	761.6	799.0	1.76	1.49	2.55
3,147.0	21.60	72.30	3,007.0	252.1	795.6	834.5	0.90	-0.84	-0.84
3,242.0	22.10	70.20	3,095.2	263.5	829.0	869.9	0.98	0.53	-2.21
3,337.0	18.90	67.80	3,184.2	275.4	860.1	903.1	3.48	-3.37	-2.53
3,432.0	17.80	67.80	3,274.4	286.7	887.8	932.9	1.16	-1.16	0.00
3,526.0	18.50	71.60	3,363.7	296.8	915.2	962.2	1.46	0.74	4.04
3,621.0	19.40	73.50	3,453.5	306.1	944.7	993.0	1.15	0.95	2.00
3,716.0	21.60	72.50	3,542.5	315.8	976.5	1,026.3	2.34	2.32	-1.05
3,810.0	22.00	72.70	3,629.8	326.2	1,009.8	1,061.2	0.43	0.43	0.21
3,905.0	20.30	71.70	3,718.4	336.7	1,042.4	1,095.5	1.83	-1.79	-1.05
4,000.0	21.30	72.60	3,807.2	347.0	1,074.5	1,129.2	1.11	1.05	0.95
4,094.0	18.90	71.20	3,895.5	357.0	1,105.2	1,161.5	2.60	-2.55	-1.49
4,189.0	19.30	71.20	3,985.2	367.1	1,134.7	1,192.6	0.42	0.42	0.00
4,283.0	20.00	73.80	4,073.8	376.6	1,164.8	1,224.2	1.19	0.74	2.77
4,378.0	19.80	72.50	4,163.1	385.9	1,195.8	1,256.5	0.51	-0.21	-1.37
4,472.0	20.20	71.40	4,251.4	395.9	1,226.3	1,288.6	0.58	0.43	-1.17
4,567.0	21.40	72.90	4,340.2	406.2	1,258.4	1,322.4	1.38	1.26	1.58
4,662.0	20.00	71.40	4,429.1	416.5	1,290.4	1,356.0	1.58	-1.47	-1.58
4,756.0	21.20	73.00	4,517.1	426.6	1,321.9	1,389.0	1.41	1.28	1.70
4,851.0	21.00	74.30	4,605.7	436.2	1,354.7	1,423.2	0.54	-0.21	1.37
4,945.0	20.20	74.50	4,693.7	445.1	1,386.6	1,456.3	0.85	-0.85	0.21
5,040.0	20.50	72.30	4,782.8	454.6	1,418.2	1,489.3	0.86	0.32	-2.32
5,135.0	22.30	73.50	4,871.2	464.7	1,451.4	1,523.9	1.95	1.89	1.26
5,230.0	21.50	72.40	4,959.4	475.1	1,485.2	1,559.4	0.95	-0.84	-1.16



Survey Report



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Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,324.0	20.60	72.10	5,047.1	485.4	1,517.4	1,593.1	0.96	-0.96	-0.32	
5,419.0	18.60	71.10	5,136.6	495.5	1,547.6	1,625.0	2.13	-2.11	-1.05	
5,514.0	17.80	71.60	5,226.8	504.9	1,575.7	1,654.7	0.86	-0.84	0.53	
5,608.0	17.70	72.90	5,316.4	513.7	1,603.0	1,683.3	0.43	-0.11	1.38	
5,703.0	18.60	73.10	5,406.6	522.3	1,631.3	1,712.9	0.95	0.95	0.21	
5,798.0	20.30	73.50	5,496.2	531.4	1,661.6	1,744.5	1.79	1.79	0.42	
5,893.0	21.10	73.40	5,585.1	541.0	1,693.8	1,778.1	0.84	0.84	-0.11	
5,987.0	20.20	73.50	5,673.0	550.4	1,725.6	1,811.2	0.96	-0.96	0.11	
6,082.0	20.30	72.20	5,762.2	560.1	1,757.0	1,844.1	0.49	0.11	-1.37	
6,176.0	21.00	72.30	5,850.1	570.2	1,788.6	1,877.3	0.75	0.74	0.11	
6,271.0	20.40	72.50	5,939.0	580.4	1,820.6	1,910.8	0.64	-0.63	0.21	
6,366.0	21.00	72.40	6,027.9	590.5	1,852.6	1,944.4	0.63	0.63	-0.11	
6,461.0	20.00	73.30	6,116.8	600.3	1,884.4	1,977.7	1.10	-1.05	0.95	
6,555.0	21.00	71.40	6,204.9	610.3	1,915.8	2,010.6	1.28	1.06	-2.02	
6,650.0	19.90	71.60	6,293.9	620.9	1,947.2	2,043.8	1.16	-1.16	0.21	
6,745.0	20.50	72.00	6,383.1	631.1	1,978.4	2,076.6	0.65	0.63	0.42	
6,839.0	21.60	70.50	6,470.8	642.0	2,010.4	2,110.4	1.30	1.17	-1.60	
6,934.0	21.30	70.20	6,559.2	653.6	2,043.1	2,145.1	0.34	-0.32	-0.32	
7,029.0	20.00	71.50	6,648.1	664.6	2,074.7	2,178.6	1.45	-1.37	1.37	
7,124.0	18.20	72.90	6,737.9	674.2	2,104.3	2,209.7	1.96	-1.89	1.47	
7,218.0	16.80	74.80	6,827.5	682.0	2,131.4	2,237.9	1.61	-1.49	2.02	
7,313.0	15.40	72.20	6,918.8	689.5	2,156.7	2,264.2	1.66	-1.47	-2.74	
7,408.0	13.10	71.40	7,010.9	696.8	2,178.9	2,287.6	2.43	-2.42	-0.84	
7,503.0	13.50	71.60	7,103.3	703.7	2,199.6	2,309.5	0.42	0.42	0.21	
7,597.0	12.30	70.90	7,194.9	710.5	2,219.5	2,330.4	1.29	-1.28	-0.74	
7,692.0	10.50	71.40	7,288.1	716.5	2,237.3	2,349.2	1.90	-1.89	0.53	
7,787.0	8.70	70.60	7,381.7	721.7	2,252.3	2,365.1	1.90	-1.89	-0.84	
7,881.0	8.30	68.90	7,474.7	726.5	2,265.3	2,378.9	0.50	-0.43	-1.81	
7,976.0	7.50	70.00	7,568.8	731.1	2,277.5	2,392.0	0.86	-0.84	1.16	
8,071.0	6.50	71.70	7,663.1	734.9	2,288.5	2,403.6	1.07	-1.05	1.79	
8,165.0	4.80	74.80	7,756.6	737.6	2,297.3	2,412.8	1.84	-1.81	3.30	
8,259.0	3.80	54.50	7,850.4	740.4	2,303.6	2,419.7	1.92	-1.06	-21.60	
8,353.0	2.50	51.10	7,944.2	743.5	2,307.8	2,424.6	1.40	-1.38	-3.62	
8,447.0	0.80	24.40	8,038.2	745.4	2,309.6	2,426.9	1.94	-1.81	-28.40	
8,541.0	0.50	289.40	8,132.2	746.1	2,309.5	2,427.1	1.04	-0.32	-101.06	
8,635.0	1.50	265.90	8,226.2	746.2	2,307.9	2,425.5	1.13	1.06	-25.00	
8,728.0	2.10	256.90	8,319.1	745.7	2,305.0	2,422.7	0.71	0.65	-9.68	
8,823.0	0.40	276.00	8,414.1	745.4	2,303.0	2,420.6	1.82	-1.79	20.11	
8,917.0	0.40	328.70	8,508.1	745.7	2,302.5	2,420.2	0.38	0.00	56.06	
9,012.0	1.30	279.60	8,603.1	746.1	2,301.3	2,419.2	1.14	0.95	-51.68	
9,107.0	1.80	260.40	8,698.0	746.1	2,298.7	2,416.8	0.75	0.53	-20.21	
9,202.0	2.00	248.60	8,793.0	745.2	2,295.7	2,413.6	0.46	0.21	-12.42	
9,296.0	2.10	238.10	8,886.9	743.7	2,292.7	2,410.3	0.41	0.11	-11.17	



Survey Report



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Well:	CC Federal 0697-03-08W	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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9,391.0	2.60	233.30	8,981.8	741.5	2,289.5	2,406.6	0.57	0.53	-5.05
9,485.0	2.90	226.30	9,075.7	738.6	2,286.1	2,402.5	0.48	0.32	-7.45
9,580.0	3.40	220.20	9,170.6	734.8	2,282.6	2,397.9	0.63	0.53	-6.42
9,675.0	2.80	223.40	9,265.5	730.9	2,279.1	2,393.5	0.66	-0.63	3.37
9,769.0	2.70	233.30	9,359.3	727.9	2,275.8	2,389.4	0.52	-0.11	10.53
9,863.0	3.20	234.30	9,453.2	725.1	2,271.9	2,384.8	0.53	0.53	1.06
9,958.0	3.10	233.30	9,548.1	722.0	2,267.7	2,379.8	0.12	-0.11	-1.05
10,053.0	3.70	233.90	9,642.9	718.7	2,263.1	2,374.5	0.63	0.63	0.63
10,147.0	4.40	237.50	9,736.7	714.9	2,257.6	2,368.1	0.79	0.74	3.83
10,242.0	4.50	243.50	9,831.4	711.3	2,251.2	2,360.9	0.50	0.11	6.32
10,337.0	4.70	244.90	9,926.1	708.0	2,244.4	2,353.3	0.24	0.21	1.47
10,431.0	5.20	248.10	10,019.7	704.8	2,236.9	2,345.3	0.61	0.53	3.40
10,486.0	5.40	243.60	10,074.5	702.7	2,232.3	2,340.2	0.84	0.36	-8.18
TD @ 10546.0' MD / 10134.2' TVD									
10,546.0	5.40	243.60	10,134.2	700.2	2,227.2	2,334.6	0.00	0.00	0.00

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
430.0	429.9	1.7	8.5	First MWD Survey @ 430.0'MD / 429.9' TVD
10,546.0	10,134.2	700.2	2,227.2	TD @ 10546.0' MD / 10134.2' TVD

Checked By: _____	Approved By: _____	Date: _____
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