



Laramie Energy, LLC

Garfield County, CO

CC 0604-15-08 Pad

CC 0697-10-12E - Slot B-8

Wellbore #1

Plan: Design #1

QES Well Planning Report

20 January, 2021





QES

Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-10-12E - Slot B-8
Company:	Laramie Energy, LLC	TVD Reference:	RKB @ 8533.0usft (H&P #522)
Project:	Garfield County, CO	MD Reference:	RKB @ 8533.0usft (H&P #522)
Site:	CC 0604-15-08 Pad	North Reference:	True
Well:	CC 0697-10-12E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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 0604-15-08 Pad			
Site Position:		Northing:	1,627,831.19 usft	Latitude:	39.526131
From:	Lat/Long	Easting:	2,238,751.92 usft	Longitude:	-108.199096
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.70 °

Well	CC 0697-10-12E - Slot B-8					
Well Position	+N/-S	16.5 usft	Northing:	1,627,847.32 usft	Latitude:	39.526176
	+E/-W	11.3 usft	Easting:	2,238,763.75 usft	Longitude:	-108.199056
Position Uncertainty	0.0 usft		Wellhead Elevation:		Ground Level:	8,503.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2020	12/3/2020	9.40	65.72	51,318.50000000

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	359.70

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,080.0	22.00	346.00	1,058.5	161.9	-40.4	2.50	2.50	0.00	346.00	
3,000.0	22.00	346.00	2,838.7	859.8	-214.4	0.00	0.00	0.00	0.00	
3,461.3	29.57	6.30	3,254.6	1,057.4	-222.8	2.50	1.64	4.40	58.91	
6,681.1	29.57	6.30	6,055.2	2,636.6	-48.3	0.00	0.00	0.00	0.00	
7,863.7	0.00	0.00	7,186.0	2,933.2	-15.6	2.50	-2.50	0.00	180.00	
10,550.7	0.00	0.00	9,873.0	2,933.2	-15.6	0.00	0.00	0.00	0.00	10-12E - PBHL



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Site:	CC 0604-15-08 Pad	North Reference:	True
Well:	CC 0697-10-12E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned 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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
Build 2.5° / 100'									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	2.50	346.00	300.0	2.1	-0.5	2.1	2.50	2.50	0.00
400.0	5.00	346.00	399.7	8.5	-2.1	8.5	2.50	2.50	0.00
500.0	7.50	346.00	499.1	19.0	-4.7	19.0	2.50	2.50	0.00
600.0	10.00	346.00	598.0	33.8	-8.4	33.8	2.50	2.50	0.00
700.0	12.50	346.00	696.0	52.7	-13.1	52.8	2.50	2.50	0.00
Mahogany									
776.0	14.40	346.00	770.0	69.9	-17.4	70.0	2.50	2.50	0.00
800.0	15.00	346.00	793.2	75.8	-18.9	75.9	2.50	2.50	0.00
900.0	17.50	346.00	889.2	102.9	-25.7	103.1	2.50	2.50	0.00
1,000.0	20.00	346.00	983.9	134.1	-33.4	134.3	2.50	2.50	0.00
EOB @ 22.00° Inc. / 346.00° Azm									
1,080.0	22.00	346.00	1,058.5	161.9	-40.4	162.1	2.50	2.50	0.00
1,100.0	22.00	346.00	1,077.1	169.2	-42.2	169.4	0.00	0.00	0.00
1,200.0	22.00	346.00	1,169.8	205.5	-51.2	205.8	0.00	0.00	0.00
1,300.0	22.00	346.00	1,262.5	241.9	-60.3	242.2	0.00	0.00	0.00
1,400.0	22.00	346.00	1,355.2	278.2	-69.4	278.6	0.00	0.00	0.00
1,500.0	22.00	346.00	1,448.0	314.6	-78.4	315.0	0.00	0.00	0.00
1,600.0	22.00	346.00	1,540.7	350.9	-87.5	351.4	0.00	0.00	0.00
1,700.0	22.00	346.00	1,633.4	387.3	-96.6	387.8	0.00	0.00	0.00
1,800.0	22.00	346.00	1,726.1	423.6	-105.6	424.2	0.00	0.00	0.00
1,900.0	22.00	346.00	1,818.8	460.0	-114.7	460.6	0.00	0.00	0.00
2,000.0	22.00	346.00	1,911.5	496.3	-123.7	497.0	0.00	0.00	0.00
2,100.0	22.00	346.00	2,004.3	532.7	-132.8	533.4	0.00	0.00	0.00
2,200.0	22.00	346.00	2,097.0	569.0	-141.9	569.8	0.00	0.00	0.00
2,300.0	22.00	346.00	2,189.7	605.4	-150.9	606.2	0.00	0.00	0.00
2,400.0	22.00	346.00	2,282.4	641.7	-160.0	642.6	0.00	0.00	0.00
2,500.0	22.00	346.00	2,375.1	678.1	-169.1	679.0	0.00	0.00	0.00
9 5/8"									
2,530.0	22.00	346.00	2,403.0	689.0	-171.8	689.9	0.00	0.00	0.00
2,600.0	22.00	346.00	2,467.9	714.4	-178.1	715.3	0.00	0.00	0.00
2,700.0	22.00	346.00	2,560.6	750.8	-187.2	751.7	0.00	0.00	0.00
2,800.0	22.00	346.00	2,653.3	787.1	-196.2	788.1	0.00	0.00	0.00
Wasatch									
2,891.4	22.00	346.00	2,738.0	820.3	-204.5	821.4	0.00	0.00	0.00
2,900.0	22.00	346.00	2,746.0	823.5	-205.3	824.5	0.00	0.00	0.00
Build 2.5° / 100'									
3,000.0	22.00	346.00	2,838.7	859.8	-214.4	860.9	0.00	0.00	0.00
3,100.0	23.38	351.40	2,931.0	897.6	-221.9	898.8	2.50	1.38	5.40
3,200.0	24.93	356.20	3,022.2	938.3	-226.2	939.5	2.50	1.55	4.80
3,300.0	26.62	0.45	3,112.3	981.7	-227.5	982.9	2.50	1.69	4.25
3,400.0	28.42	4.21	3,201.0	1,027.8	-225.5	1,029.0	2.50	1.80	3.76
EOB @ 29.57° Inc. / 6.30° Azm									
3,461.3	29.57	6.30	3,254.6	1,057.4	-222.8	1,058.6	2.50	1.87	3.42
3,500.0	29.57	6.30	3,288.3	1,076.4	-220.7	1,077.6	0.00	0.00	0.00
3,600.0	29.57	6.30	3,375.2	1,125.5	-215.3	1,126.6	0.00	0.00	0.00
3,700.0	29.57	6.30	3,462.2	1,174.5	-209.9	1,175.6	0.00	0.00	0.00
3,800.0	29.57	6.30	3,549.2	1,223.5	-204.5	1,224.6	0.00	0.00	0.00
3,900.0	29.57	6.30	3,636.2	1,272.6	-199.0	1,273.6	0.00	0.00	0.00
4,000.0	29.57	6.30	3,723.2	1,321.6	-193.6	1,322.6	0.00	0.00	0.00



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Wellbore:	Wellbore #1		
Design:	Design #1		

Planned 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)
4,100.0	29.57	6.30	3,810.1	1,370.7	-188.2	1,371.7	0.00	0.00	0.00
4,200.0	29.57	6.30	3,897.1	1,419.7	-182.8	1,420.7	0.00	0.00	0.00
4,300.0	29.57	6.30	3,984.1	1,468.8	-177.4	1,469.7	0.00	0.00	0.00
4,400.0	29.57	6.30	4,071.1	1,517.8	-171.9	1,518.7	0.00	0.00	0.00
4,500.0	29.57	6.30	4,158.1	1,566.8	-166.5	1,567.7	0.00	0.00	0.00
4,600.0	29.57	6.30	4,245.0	1,615.9	-161.1	1,616.7	0.00	0.00	0.00
4,700.0	29.57	6.30	4,332.0	1,664.9	-155.7	1,665.7	0.00	0.00	0.00
4,800.0	29.57	6.30	4,419.0	1,714.0	-150.3	1,714.8	0.00	0.00	0.00
4,900.0	29.57	6.30	4,506.0	1,763.0	-144.9	1,763.8	0.00	0.00	0.00
5,000.0	29.57	6.30	4,592.9	1,812.1	-139.4	1,812.8	0.00	0.00	0.00
5,100.0	29.57	6.30	4,679.9	1,861.1	-134.0	1,861.8	0.00	0.00	0.00
Wasatch 'G' Sand									
5,166.8	29.57	6.30	4,738.0	1,893.9	-130.4	1,894.5	0.00	0.00	0.00
5,200.0	29.57	6.30	4,766.9	1,910.2	-128.6	1,910.8	0.00	0.00	0.00
5,300.0	29.57	6.30	4,853.9	1,959.2	-123.2	1,959.8	0.00	0.00	0.00
5,400.0	29.57	6.30	4,940.9	2,008.2	-117.8	2,008.8	0.00	0.00	0.00
Fort Union									
5,408.2	29.57	6.30	4,948.0	2,012.3	-117.3	2,012.9	0.00	0.00	0.00
5,500.0	29.57	6.30	5,027.8	2,057.3	-112.3	2,057.9	0.00	0.00	0.00
5,600.0	29.57	6.30	5,114.8	2,106.3	-106.9	2,106.9	0.00	0.00	0.00
5,700.0	29.57	6.30	5,201.8	2,155.4	-101.5	2,155.9	0.00	0.00	0.00
5,800.0	29.57	6.30	5,288.8	2,204.4	-96.1	2,204.9	0.00	0.00	0.00
5,900.0	29.57	6.30	5,375.8	2,253.5	-90.7	2,253.9	0.00	0.00	0.00
6,000.0	29.57	6.30	5,462.7	2,302.5	-85.3	2,302.9	0.00	0.00	0.00
6,100.0	29.57	6.30	5,549.7	2,351.6	-79.8	2,351.9	0.00	0.00	0.00
6,200.0	29.57	6.30	5,636.7	2,400.6	-74.4	2,401.0	0.00	0.00	0.00
6,300.0	29.57	6.30	5,723.7	2,449.6	-69.0	2,450.0	0.00	0.00	0.00
6,400.0	29.57	6.30	5,810.7	2,498.7	-63.6	2,499.0	0.00	0.00	0.00
6,500.0	29.57	6.30	5,897.6	2,547.7	-58.2	2,548.0	0.00	0.00	0.00
6,600.0	29.57	6.30	5,984.6	2,596.8	-52.7	2,597.0	0.00	0.00	0.00
Drop 2.5° /100'									
6,681.1	29.57	6.30	6,055.2	2,636.6	-48.3	2,636.8	0.00	0.00	0.00
6,700.0	29.09	6.30	6,071.6	2,645.8	-47.3	2,646.0	2.50	-2.50	0.00
6,800.0	26.59	6.30	6,160.0	2,692.2	-42.2	2,692.4	2.50	-2.50	0.00
6,900.0	24.09	6.30	6,250.4	2,734.7	-37.5	2,734.9	2.50	-2.50	0.00
Ohio Creek									
6,923.6	23.50	6.30	6,272.0	2,744.2	-36.5	2,744.3	2.50	-2.50	0.00
7,000.0	21.59	6.30	6,342.6	2,773.3	-33.2	2,773.4	2.50	-2.50	0.00
7,100.0	19.09	6.30	6,436.3	2,807.8	-29.4	2,808.0	2.50	-2.50	0.00
Williams Fork									
7,125.0	18.47	6.30	6,460.0	2,815.9	-28.5	2,816.0	2.50	-2.50	0.00
7,200.0	16.59	6.30	6,531.5	2,838.3	-26.1	2,838.4	2.50	-2.50	0.00
7,300.0	14.09	6.30	6,627.9	2,864.6	-23.2	2,864.7	2.50	-2.50	0.00
7,400.0	11.59	6.30	6,725.4	2,886.7	-20.7	2,886.8	2.50	-2.50	0.00
7,500.0	9.09	6.30	6,823.8	2,904.5	-18.7	2,904.6	2.50	-2.50	0.00
7,600.0	6.59	6.30	6,922.8	2,918.1	-17.2	2,918.2	2.50	-2.50	0.00
7,700.0	4.09	6.30	7,022.4	2,927.4	-16.2	2,927.4	2.50	-2.50	0.00
7,800.0	1.59	6.30	7,122.3	2,932.3	-15.7	2,932.3	2.50	-2.50	0.00
EOD @ Vertical - TOG									
7,863.7	0.00	0.00	7,186.0	2,933.2	-15.6	2,933.2	2.50	-2.50	0.00
7,900.0	0.00	0.00	7,222.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,000.0	0.00	0.00	7,322.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,100.0	0.00	0.00	7,422.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00



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Planned 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)
8,200.0	0.00	0.00	7,522.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,300.0	0.00	0.00	7,622.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,400.0	0.00	0.00	7,722.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,500.0	0.00	0.00	7,822.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,600.0	0.00	0.00	7,922.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,700.0	0.00	0.00	8,022.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,800.0	0.00	0.00	8,122.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
8,900.0	0.00	0.00	8,222.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,000.0	0.00	0.00	8,322.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,100.0	0.00	0.00	8,422.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,200.0	0.00	0.00	8,522.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,300.0	0.00	0.00	8,622.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
Cameo									
9,387.7	0.00	0.00	8,710.0	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,400.0	0.00	0.00	8,722.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,500.0	0.00	0.00	8,822.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,600.0	0.00	0.00	8,922.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,700.0	0.00	0.00	9,022.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
Base Cameo Coal									
9,785.7	0.00	0.00	9,108.0	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,800.0	0.00	0.00	9,122.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
Rollins									
9,800.7	0.00	0.00	9,123.0	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
9,900.0	0.00	0.00	9,222.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
10,000.0	0.00	0.00	9,322.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
Cozzette									
10,050.7	0.00	0.00	9,373.0	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
10,100.0	0.00	0.00	9,422.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
10,200.0	0.00	0.00	9,522.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
Corcoran									
10,270.7	0.00	0.00	9,593.0	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
10,300.0	0.00	0.00	9,622.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
10,400.0	0.00	0.00	9,722.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
10,500.0	0.00	0.00	9,822.3	2,933.2	-15.6	2,933.2	0.00	0.00	0.00
TD @ 10550.7' MD / 9873.0' TVD - TD - 10-12E - PBHL									
10,550.7	0.00	0.00	9,873.0	2,933.2	-15.6	2,933.2	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
10-12E - PBHL	0.00	0.00	9,873.0	2,933.2	-15.6	1,630,779.65	2,238,835.31	39.534229	-108.199111
- hit/miss target									
- Shape									
- plan hits target center									
- Ellipse (radii L50.0 W75.0 on 150.00 azi)									



QES

Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-10-12E - Slot B-8
Company:	Laramie Energy, LLC	TVD Reference:	RKB @ 8533.0usft (H&P #522)
Project:	Garfield County, CO	MD Reference:	RKB @ 8533.0usft (H&P #522)
Site:	CC 0604-15-08 Pad	North Reference:	True
Well:	CC 0697-10-12E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,403.0	9 5/8"	9-5/8	14-1/2

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
776.0	770.0	Mahogany			
2,891.4	2,738.0	Wasatch			
5,166.8	4,738.0	Wasatch 'G' Sand			
5,408.2	4,948.0	Fort Union			
6,923.6	6,272.0	Ohio Creek			
7,125.0	6,460.0	Williams Fork			
7,863.7	7,186.0	TOG			
9,387.7	8,710.0	Cameo			
9,785.7	9,108.0	Base Cameo Coal			
9,800.7	9,123.0	Rollins			
10,050.7	9,373.0	Cozzette			
10,270.7	9,593.0	Corcoran			
10,550.7	9,873.0	TD			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
200.0	200.0	0.0	0.0	Build 2.5° / 100'
1,080.0	1,058.5	161.9	-40.4	EOB @ 22.00° Inc. / 346.00° Azm
3,000.0	2,838.7	859.8	-214.4	Build 2.5° / 100'
3,461.3	3,254.6	1,057.4	-222.8	EOB @ 29.57° Inc. / 6.30° Azm
6,681.1	6,055.2	2,636.6	-48.3	Drop 2.5° / 100'
7,863.7	7,186.0	2,933.2	-15.6	EOD @ Vertical
10,550.7	9,873.0	2,933.2	-15.6	TD @ 10550.7' MD / 9873.0' TVD