



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 0697-03-07 Pad**

**CC Federal 0697-03-03E**

**A-1**

**Plan: Design #4**

## **QES Well Planning Report**

**08 April, 2019**





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC Federal 0697-03-03E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Site:</b>	CC 0697-03-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-03-03E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-1		
<b>Design:</b>	Design #4		

<b>Project</b>	Garfield 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 Central Zone		

Site		CC 0697-03-07 Pad			
Site Position:		Northing:	1,638,132.66 usft	Latitude:	39.554247
From:	Lat/Long	Easting:	2,236,874.96 usft	Longitude:	-108.206835
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.71 °

Well	CC Federal 0697-03-03E					
Well Position	+N/-S	1,554.2 usft	Northing:	1,639,671.36 usft	Latitude:	39.558514
	+E/-W	499.1 usft	Easting:	2,237,420.10 usft	Longitude:	-108.205065
Position Uncertainty	0.0 usft		Wellhead Elevation:		Ground Level:	8,428.0 usft

<b>Wellbore</b>	A-1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	4/2/2019	9.62	65.57	51,317.10870210

<b>Design</b>	Design #4			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	52.13

<b>Plan Sections</b>										
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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,383.7	19.67	52.13	1,364.5	102.7	132.0	2.00	2.00	0.00	52.13	
6,682.0	19.67	52.13	6,353.5	1,197.8	1,540.1	0.00	0.00	0.00	0.00	
7,665.8	0.00	0.00	7,318.0	1,300.4	1,672.2	2.00	-2.00	0.00	180.00	
10,645.8	0.00	0.00	10,298.0	1,300.4	1,672.2	0.00	0.00	0.00	0.00	PBHL - CC Federal



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<b>Site:</b>	CC 0697-03-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-03-03E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-1		
<b>Design:</b>	Design #4		

## 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
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP (Build 2° / 100')</b>									
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	2.00	52.13	500.0	1.1	1.4	1.7	2.00	2.00	0.00
600.0	4.00	52.13	599.8	4.3	5.5	7.0	2.00	2.00	0.00
700.0	6.00	52.13	699.5	9.6	12.4	15.7	2.00	2.00	0.00
800.0	8.00	52.13	798.7	17.1	22.0	27.9	2.00	2.00	0.00
900.0	10.00	52.13	897.5	26.7	34.4	43.5	2.00	2.00	0.00
1,000.0	12.00	52.13	995.6	38.4	49.4	62.6	2.00	2.00	0.00
1,100.0	14.00	52.13	1,093.1	52.2	67.2	85.1	2.00	2.00	0.00
<b>Mahogany</b>									
1,178.5	15.57	52.13	1,169.0	64.5	83.0	105.1	2.00	2.00	0.00
1,200.0	16.00	52.13	1,189.6	68.1	87.6	111.0	2.00	2.00	0.00
1,300.0	18.00	52.13	1,285.3	86.1	110.7	140.2	2.00	2.00	0.00
<b>EOB @ 19.67° Inc. / 52.13° Azm</b>									
1,383.7	19.67	52.13	1,364.5	102.7	132.0	167.2	2.00	2.00	0.00
1,400.0	19.67	52.13	1,379.8	106.0	136.3	172.7	0.00	0.00	0.00
1,500.0	19.67	52.13	1,474.0	126.7	162.9	206.4	0.00	0.00	0.00
1,600.0	19.67	52.13	1,568.2	147.4	189.5	240.1	0.00	0.00	0.00
1,700.0	19.67	52.13	1,662.3	168.0	216.1	273.7	0.00	0.00	0.00
1,800.0	19.67	52.13	1,756.5	188.7	242.7	307.4	0.00	0.00	0.00
1,900.0	19.67	52.13	1,850.6	209.4	269.2	341.1	0.00	0.00	0.00
2,000.0	19.67	52.13	1,944.8	230.0	295.8	374.7	0.00	0.00	0.00
2,100.0	19.67	52.13	2,039.0	250.7	322.4	408.4	0.00	0.00	0.00
2,200.0	19.67	52.13	2,133.1	271.4	349.0	442.1	0.00	0.00	0.00
2,300.0	19.67	52.13	2,227.3	292.1	375.5	475.7	0.00	0.00	0.00
2,400.0	19.67	52.13	2,321.5	312.7	402.1	509.4	0.00	0.00	0.00
2,500.0	19.67	52.13	2,415.6	333.4	428.7	543.1	0.00	0.00	0.00
<b>9 5/8"</b>									
2,530.0	19.67	52.13	2,443.9	339.6	436.7	553.2	0.00	0.00	0.00
2,600.0	19.67	52.13	2,509.8	354.1	455.3	576.7	0.00	0.00	0.00
2,700.0	19.67	52.13	2,603.9	374.7	481.8	610.4	0.00	0.00	0.00
2,800.0	19.67	52.13	2,698.1	395.4	508.4	644.1	0.00	0.00	0.00
2,900.0	19.67	52.13	2,792.3	416.1	535.0	677.7	0.00	0.00	0.00
3,000.0	19.67	52.13	2,886.4	436.7	561.6	711.4	0.00	0.00	0.00
3,100.0	19.67	52.13	2,980.6	457.4	588.2	745.1	0.00	0.00	0.00
3,200.0	19.67	52.13	3,074.7	478.1	614.7	778.7	0.00	0.00	0.00
<b>Wasatch</b>									
3,230.0	19.67	52.13	3,103.0	484.3	622.7	788.8	0.00	0.00	0.00
3,300.0	19.67	52.13	3,168.9	498.7	641.3	812.4	0.00	0.00	0.00
3,400.0	19.67	52.13	3,263.1	519.4	667.9	846.1	0.00	0.00	0.00
3,500.0	19.67	52.13	3,357.2	540.1	694.5	879.7	0.00	0.00	0.00
3,600.0	19.67	52.13	3,451.4	560.7	721.0	913.4	0.00	0.00	0.00
3,700.0	19.67	52.13	3,545.6	581.4	747.6	947.1	0.00	0.00	0.00
3,800.0	19.67	52.13	3,639.7	602.1	774.2	980.8	0.00	0.00	0.00
3,900.0	19.67	52.13	3,733.9	622.8	800.8	1,014.4	0.00	0.00	0.00
4,000.0	19.67	52.13	3,828.0	643.4	827.3	1,048.1	0.00	0.00	0.00
4,100.0	19.67	52.13	3,922.2	664.1	853.9	1,081.8	0.00	0.00	0.00
4,200.0	19.67	52.13	4,016.4	684.8	880.5	1,115.4	0.00	0.00	0.00
4,300.0	19.67	52.13	4,110.5	705.4	907.1	1,149.1	0.00	0.00	0.00
4,400.0	19.67	52.13	4,204.7	726.1	933.6	1,182.8	0.00	0.00	0.00



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<b>Wellbore:</b>	A-1		
<b>Design:</b>	Design #4		

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)
4,500.0	19.67	52.13	4,298.9	746.8	960.2	1,216.4	0.00	0.00	0.00
4,600.0	19.67	52.13	4,393.0	767.4	986.8	1,250.1	0.00	0.00	0.00
4,700.0	19.67	52.13	4,487.2	788.1	1,013.4	1,283.8	0.00	0.00	0.00
4,800.0	19.67	52.13	4,581.3	808.8	1,040.0	1,317.4	0.00	0.00	0.00
4,900.0	19.67	52.13	4,675.5	829.4	1,066.5	1,351.1	0.00	0.00	0.00
<b>Wasatch 'G' Sand</b>									
4,945.1	19.67	52.13	4,718.0	838.8	1,078.5	1,366.3	0.00	0.00	0.00
5,000.0	19.67	52.13	4,769.7	850.1	1,093.1	1,384.8	0.00	0.00	0.00
5,100.0	19.67	52.13	4,863.8	870.8	1,119.7	1,418.4	0.00	0.00	0.00
5,200.0	19.67	52.13	4,958.0	891.4	1,146.3	1,452.1	0.00	0.00	0.00
5,300.0	19.67	52.13	5,052.1	912.1	1,172.8	1,485.8	0.00	0.00	0.00
<b>Fort Union</b>									
5,344.4	19.67	52.13	5,094.0	921.3	1,184.7	1,500.7	0.00	0.00	0.00
5,400.0	19.67	52.13	5,146.3	932.8	1,199.4	1,519.4	0.00	0.00	0.00
5,500.0	19.67	52.13	5,240.5	953.4	1,226.0	1,553.1	0.00	0.00	0.00
5,600.0	19.67	52.13	5,334.6	974.1	1,252.6	1,586.8	0.00	0.00	0.00
5,700.0	19.67	52.13	5,428.8	994.8	1,279.1	1,620.4	0.00	0.00	0.00
5,800.0	19.67	52.13	5,523.0	1,015.5	1,305.7	1,654.1	0.00	0.00	0.00
5,900.0	19.67	52.13	5,617.1	1,036.1	1,332.3	1,687.8	0.00	0.00	0.00
6,000.0	19.67	52.13	5,711.3	1,056.8	1,358.9	1,721.4	0.00	0.00	0.00
6,100.0	19.67	52.13	5,805.4	1,077.5	1,385.5	1,755.1	0.00	0.00	0.00
6,200.0	19.67	52.13	5,899.6	1,098.1	1,412.0	1,788.8	0.00	0.00	0.00
6,300.0	19.67	52.13	5,993.8	1,118.8	1,438.6	1,822.4	0.00	0.00	0.00
6,400.0	19.67	52.13	6,087.9	1,139.5	1,465.2	1,856.1	0.00	0.00	0.00
6,500.0	19.67	52.13	6,182.1	1,160.1	1,491.8	1,889.8	0.00	0.00	0.00
6,600.0	19.67	52.13	6,276.3	1,180.8	1,518.3	1,923.4	0.00	0.00	0.00
<b>Drop 2° / 100'</b>									
6,682.0	19.67	52.13	6,353.5	1,197.8	1,540.1	1,951.1	0.00	0.00	0.00
6,700.0	19.32	52.13	6,370.4	1,201.4	1,544.9	1,957.1	2.00	-2.00	0.00
6,800.0	17.32	52.13	6,465.4	1,220.7	1,569.7	1,988.5	2.00	-2.00	0.00
6,900.0	15.32	52.13	6,561.3	1,238.0	1,591.9	2,016.6	2.00	-2.00	0.00
<b>Ohio Creek</b>									
6,937.9	14.56	52.13	6,598.0	1,244.0	1,599.6	2,026.4	2.00	-2.00	0.00
7,000.0	13.32	52.13	6,658.2	1,253.2	1,611.4	2,041.3	2.00	-2.00	0.00
7,100.0	11.32	52.13	6,755.9	1,266.2	1,628.2	2,062.6	2.00	-2.00	0.00
<b>Williams Fork</b>									
7,127.6	10.76	52.13	6,783.0	1,269.5	1,632.4	2,067.9	2.00	-2.00	0.00
7,200.0	9.32	52.13	6,854.3	1,277.2	1,642.3	2,080.5	2.00	-2.00	0.00
7,300.0	7.32	52.13	6,953.2	1,286.1	1,653.8	2,095.0	2.00	-2.00	0.00
7,400.0	5.32	52.13	7,052.6	1,292.9	1,662.4	2,106.0	2.00	-2.00	0.00
7,500.0	3.32	52.13	7,152.3	1,297.5	1,668.4	2,113.5	2.00	-2.00	0.00
7,600.0	1.32	52.13	7,252.3	1,300.0	1,671.6	2,117.6	2.00	-2.00	0.00
<b>EOD @ Vertical - TOG</b>									
7,665.8	0.00	0.00	7,318.0	1,300.4	1,672.2	2,118.3	2.00	-2.00	-79.28
7,700.0	0.00	0.00	7,352.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
7,800.0	0.00	0.00	7,452.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,552.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,652.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,100.0	0.00	0.00	7,752.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,200.0	0.00	0.00	7,852.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,300.0	0.00	0.00	7,952.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,400.0	0.00	0.00	8,052.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,500.0	0.00	0.00	8,152.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00



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<b>Wellbore:</b>	A-1		
<b>Design:</b>	Design #4		

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)
8,600.0	0.00	0.00	8,252.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,700.0	0.00	0.00	8,352.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,800.0	0.00	0.00	8,452.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
8,900.0	0.00	0.00	8,552.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,000.0	0.00	0.00	8,652.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,100.0	0.00	0.00	8,752.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,200.0	0.00	0.00	8,852.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,300.0	0.00	0.00	8,952.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,400.0	0.00	0.00	9,052.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
<b>Cameo</b>									
9,459.8	0.00	0.00	9,112.0	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,500.0	0.00	0.00	9,152.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,600.0	0.00	0.00	9,252.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,700.0	0.00	0.00	9,352.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,800.0	0.00	0.00	9,452.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,855.8	0.00	0.00	9,508.0	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
<b>Rollins</b>									
9,865.8	0.00	0.00	9,518.0	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
9,900.0	0.00	0.00	9,552.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,000.0	0.00	0.00	9,652.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,100.0	0.00	0.00	9,752.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
<b>Cozzette</b>									
10,105.8	0.00	0.00	9,758.0	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,200.0	0.00	0.00	9,852.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,300.0	0.00	0.00	9,952.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
<b>Corcoran</b>									
10,345.8	0.00	0.00	9,998.0	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,400.0	0.00	0.00	10,052.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,500.0	0.00	0.00	10,152.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
10,600.0	0.00	0.00	10,252.2	1,300.4	1,672.2	2,118.3	0.00	0.00	0.00
<b>TD @ 10645.8' MD / 10298.0' TVD</b>									
10,645.8	0.00	0.00	10,298.0	1,300.4	1,672.2	2,118.3	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
- hit/miss target									
- Shape									
PBHL - CC Federal 0697-03-07 Pad	0.00	0.00	10,298.0	1,300.4	1,672.2	1,640,921.42	2,239,130.23	39.562084	-108.199134
- plan hits target center									
- Ellipse (radii L50.0 W75.0 on 150.00 azi)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
2,530.0	2,443.9	9 5/8"	9-5/8	14-3/4	



# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC Federal 0697-03-03E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	WELL @ 8458.0usft (30' RKB)
<b>Site:</b>	CC 0697-03-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-03-03E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-1		
<b>Design:</b>	Design #4		

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,178.5	1,169.0	Mahogany			
3,230.0	3,103.0	Wasatch			
4,945.1	4,718.0	Wasatch 'G' Sand			
5,344.4	5,094.0	Fort Union			
6,937.9	6,598.0	Ohio Creek			
7,127.6	6,783.0	Williams Fork			
7,665.8	7,318.0	TOG			
9,459.8	9,112.0	Cameo			
9,855.8	9,508.0	Base Cameo Coal			
9,865.8	9,518.0	Rollins			
10,105.8	9,758.0	Cozzette			
10,345.8	9,998.0	Corcoran			
10,645.8	10,298.0	TD			

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.0	400.0	0.0	0.0	KOP (Build 2° / 100')
1,383.7	1,364.5	102.7	132.0	EOB @ 19.67° Inc. / 52.13° Azm
6,682.0	6,353.5	1,197.8	1,540.1	Drop 2° / 100'
7,665.8	7,318.0	1,300.4	1,672.2	EOD @ Vertical
10,645.8	10,298.0	1,300.4	1,672.2	TD @ 10645.8' MD / 10298.0' TVD