





# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 604-41-32 Pad**

**CC Federal 0697-04-02E**

**Wellbore #1**

**Plan: Design #3**

## **QES Well Planning Report**

**04 February, 2019**





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC Federal 0697-04-02E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	Well @ 8639.0usft (RKB 30')
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Well @ 8639.0usft (RKB 30')
<b>Site:</b>	CC 604-41-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-04-02E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #3		

<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		

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

<b>Well</b>	CC Federal 0697-04-02E				
<b>Well Position</b>	+N/-S	-2.4 usft	<b>Northing:</b>	1,639,462.30 usft	<b>Latitude:</b> 39.557623
	+E/-W	-0.6 usft	<b>Easting:</b>	2,233,547.42 usft	<b>Longitude:</b> -108.218772
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>		<b>Ground Level:</b> 8,609.0 usft

<b>Wellbore</b>	Wellbore #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	10/4/2017	9.77	65.59	51,479.55803340

<b>Design</b>	Design #3			
<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	345.59

<b>Plan Sections</b>										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Buid 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	
622.4	12.67	345.59	618.9	45.0	-11.6	3.00	3.00	0.00	345.59	
7,198.7	12.67	345.59	7,035.1	1,442.2	-370.5	0.00	0.00	0.00	0.00	
7,621.0	0.00	0.00	7,454.0	1,487.2	-382.0	3.00	-3.00	0.00	180.00	
10,282.0	0.00	0.00	10,115.0	1,487.2	-382.0	0.00	0.00	0.00	0.00	PBHL - CC Federal 01





## Well Planning Report



Database: EDM 5000 1 Single User Db  
Company: Laramie Energy, LLC  
Project: Garfield County, CO  
Site: CC 604-41-32 Pad  
Well: CC Federal 0697-04-02E  
Wellbore: Wellbore #1  
Design: Design #3

### Local Co-ordinate Reference:

TVD Reference:  
MD Reference:  
North Reference:  
Survey Calculation Method:

Well CC Federal 0697-04-02E

Well @ 8639.0usft (RKB 30')

Well @ 8639.0usft (RKB 30')

True

Minimum Curvature

### 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
KOP/ (Build 3.00°/100')									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	3.00	345.59	300.0	2.5	-0.7	2.6	3.00	3.00	0.00
400.0	6.00	345.59	399.6	10.1	-2.6	10.5	3.00	3.00	0.00
500.0	9.00	345.59	498.8	22.8	-5.8	23.5	3.00	3.00	0.00
600.0	12.00	345.59	597.1	40.4	-10.4	41.7	3.00	3.00	0.00
Mahogany									
609.1	12.27	345.59	606.0	42.3	-10.9	43.7	3.00	3.00	0.00
EOB @ 12.67° Inc / 345.59° Azm									
622.4	12.67	345.59	618.9	45.0	-11.6	46.5	3.00	3.00	0.00
700.0	12.67	345.59	694.7	61.5	-15.8	63.5	0.00	0.00	0.00
800.0	12.67	345.59	792.2	82.8	-21.3	85.5	0.00	0.00	0.00
900.0	12.67	345.59	889.8	104.0	-26.7	107.4	0.00	0.00	0.00
1,000.0	12.67	345.59	987.4	125.3	-32.2	129.3	0.00	0.00	0.00
1,100.0	12.67	345.59	1,084.9	146.5	-37.6	151.3	0.00	0.00	0.00
1,200.0	12.67	345.59	1,182.5	167.8	-43.1	173.2	0.00	0.00	0.00
1,300.0	12.67	345.59	1,280.1	189.0	-48.6	195.2	0.00	0.00	0.00
1,400.0	12.67	345.59	1,377.6	210.3	-54.0	217.1	0.00	0.00	0.00
1,500.0	12.67	345.59	1,475.2	231.5	-59.5	239.0	0.00	0.00	0.00
1,600.0	12.67	345.59	1,572.8	252.7	-64.9	261.0	0.00	0.00	0.00
1,700.0	12.67	345.59	1,670.3	274.0	-70.4	282.9	0.00	0.00	0.00
1,800.0	12.67	345.59	1,767.9	295.2	-75.8	304.8	0.00	0.00	0.00
1,900.0	12.67	345.59	1,865.5	316.5	-81.3	326.8	0.00	0.00	0.00
2,000.0	12.67	345.59	1,963.0	337.7	-86.8	348.7	0.00	0.00	0.00
2,100.0	12.67	345.59	2,060.6	359.0	-92.2	370.6	0.00	0.00	0.00
2,200.0	12.67	345.59	2,158.1	380.2	-97.7	392.6	0.00	0.00	0.00
2,300.0	12.67	345.59	2,255.7	401.5	-103.1	414.5	0.00	0.00	0.00
2,400.0	12.67	345.59	2,353.3	422.7	-108.6	436.4	0.00	0.00	0.00
2,500.0	12.67	345.59	2,450.8	444.0	-114.0	458.4	0.00	0.00	0.00
2,600.0	12.67	345.59	2,548.4	465.2	-119.5	480.3	0.00	0.00	0.00
2,700.0	12.67	345.59	2,646.0	486.4	-125.0	502.2	0.00	0.00	0.00
2,800.0	12.67	345.59	2,743.5	507.7	-130.4	524.2	0.00	0.00	0.00
2,900.0	12.67	345.59	2,841.1	528.9	-135.9	546.1	0.00	0.00	0.00
3,000.0	12.67	345.59	2,938.7	550.2	-141.3	568.0	0.00	0.00	0.00
3,100.0	12.67	345.59	3,036.2	571.4	-146.8	590.0	0.00	0.00	0.00
3,200.0	12.67	345.59	3,133.8	592.7	-152.2	611.9	0.00	0.00	0.00
3,300.0	12.67	345.59	3,231.4	613.9	-157.7	633.8	0.00	0.00	0.00
3,400.0	12.67	345.59	3,328.9	635.2	-163.2	655.8	0.00	0.00	0.00
3,500.0	12.67	345.59	3,426.5	656.4	-168.6	677.7	0.00	0.00	0.00
3,600.0	12.67	345.59	3,524.1	677.7	-174.1	699.7	0.00	0.00	0.00
3,700.0	12.67	345.59	3,621.6	698.9	-179.5	721.6	0.00	0.00	0.00
3,800.0	12.67	345.59	3,719.2	720.1	-185.0	743.5	0.00	0.00	0.00
3,900.0	12.67	345.59	3,816.7	741.4	-190.4	765.5	0.00	0.00	0.00
4,000.0	12.67	345.59	3,914.3	762.6	-195.9	787.4	0.00	0.00	0.00
4,100.0	12.67	345.59	4,011.9	783.9	-201.4	809.3	0.00	0.00	0.00
4,200.0	12.67	345.59	4,109.4	805.1	-206.8	831.3	0.00	0.00	0.00
4,300.0	12.67	345.59	4,207.0	826.4	-212.3	853.2	0.00	0.00	0.00
4,400.0	12.67	345.59	4,304.6	847.6	-217.7	875.1	0.00	0.00	0.00
4,500.0	12.67	345.59	4,402.1	868.9	-223.2	897.1	0.00	0.00	0.00
4,600.0	12.67	345.59	4,499.7	890.1	-228.6	919.0	0.00	0.00	0.00
4,700.0	12.67	345.59	4,597.3	911.3	-234.1	940.9	0.00	0.00	0.00



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Well:	CC Federal 0697-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

## 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)
4,800.0	12.67	345.59	4,894.8	932.6	-239.6	962.9	0.00	0.00	0.00
4,900.0	12.67	345.59	4,792.4	953.8	-245.0	984.8	0.00	0.00	0.00
<b>Wasatch 'G' Sand</b>									
4,911.9	12.67	345.59	4,804.0	958.4	-245.7	987.4	0.00	0.00	0.00
5,000.0	12.67	345.59	4,890.0	975.1	-250.5	1,006.7	0.00	0.00	0.00
5,100.0	12.67	345.59	4,987.5	998.3	-255.9	1,028.7	0.00	0.00	0.00
5,200.0	12.67	345.59	5,085.1	1,017.6	-261.4	1,050.6	0.00	0.00	0.00
5,300.0	12.67	345.59	5,182.6	1,038.8	-268.8	1,072.5	0.00	0.00	0.00
5,400.0	12.67	345.59	5,280.2	1,060.1	-272.3	1,094.5	0.00	0.00	0.00
5,500.0	12.67	345.59	5,377.8	1,081.3	-277.8	1,116.4	0.00	0.00	0.00
5,600.0	12.67	345.59	5,475.3	1,102.6	-283.2	1,138.3	0.00	0.00	0.00
5,700.0	12.67	345.59	5,572.9	1,123.8	-288.7	1,160.3	0.00	0.00	0.00
5,800.0	12.67	345.59	5,670.5	1,145.0	-294.1	1,182.2	0.00	0.00	0.00
5,900.0	12.67	345.59	5,768.0	1,168.3	-299.6	1,204.2	0.00	0.00	0.00
6,000.0	12.67	345.59	5,865.6	1,187.5	-305.0	1,226.1	0.00	0.00	0.00
6,100.0	12.67	345.59	5,963.2	1,208.8	-310.5	1,248.0	0.00	0.00	0.00
6,200.0	12.67	345.59	6,060.7	1,230.0	-316.0	1,270.0	0.00	0.00	0.00
6,300.0	12.67	345.59	6,158.3	1,251.3	-321.4	1,291.9	0.00	0.00	0.00
6,400.0	12.67	345.59	6,255.9	1,272.5	-326.9	1,313.8	0.00	0.00	0.00
6,500.0	12.67	345.59	6,353.4	1,293.8	-332.3	1,335.8	0.00	0.00	0.00
6,600.0	12.67	345.59	6,451.0	1,315.0	-337.8	1,357.7	0.00	0.00	0.00
<b>Ohio Creek</b>									
6,654.3	12.67	345.59	6,504.0	1,326.5	-340.7	1,369.6	0.00	0.00	0.00
6,700.0	12.67	345.59	6,548.6	1,336.2	-343.2	1,379.6	0.00	0.00	0.00
6,800.0	12.67	345.59	6,646.1	1,357.5	-348.7	1,401.6	0.00	0.00	0.00
<b>Williams Fork</b>									
6,808.1	12.67	345.59	6,654.0	1,359.2	-349.1	1,403.3	0.00	0.00	0.00
6,900.0	12.67	345.59	6,743.7	1,378.7	-354.2	1,423.5	0.00	0.00	0.00
7,000.0	12.67	345.59	6,841.2	1,400.0	-359.6	1,445.4	0.00	0.00	0.00
7,100.0	12.67	345.59	6,938.8	1,421.2	-365.1	1,467.4	0.00	0.00	0.00
<b>Drop @ 3.00°/100'</b>									
7,198.7	12.67	345.59	7,035.1	1,442.2	-370.5	1,489.0	0.00	0.00	0.00
7,200.0	12.63	345.59	7,036.4	1,442.5	-370.5	1,489.3	3.00	-3.00	0.00
7,300.0	9.63	345.59	7,134.5	1,461.2	-375.3	1,508.6	3.00	-3.00	0.00
7,400.0	6.63	345.59	7,233.5	1,474.9	-378.8	1,522.7	3.00	-3.00	0.00
7,500.0	3.63	345.59	7,333.1	1,483.5	-381.1	1,531.7	3.00	-3.00	0.00
7,600.0	0.63	345.59	7,433.0	1,487.1	-382.0	1,535.4	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
7,621.0	0.00	0.00	7,454.0	1,487.2	-382.0	1,535.5	3.00	-3.00	0.00
7,700.0	0.00	0.00	7,533.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
7,800.0	0.00	0.00	7,633.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,733.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,833.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,100.0	0.00	0.00	7,933.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,200.0	0.00	0.00	8,033.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,300.0	0.00	0.00	8,133.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,400.0	0.00	0.00	8,233.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,500.0	0.00	0.00	8,333.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,600.0	0.00	0.00	8,433.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,700.0	0.00	0.00	8,533.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,800.0	0.00	0.00	8,633.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
8,900.0	0.00	0.00	8,733.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,000.0	0.00	0.00	8,833.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,100.0	0.00	0.00	8,933.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00



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<b>Well:</b>	CC Federal 0697-04-02E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #3		

## 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)
9,200.0	0.00	0.00	9,033.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
<b>Cameo</b>									
9,271.0	0.00	0.00	9,104.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,300.0	0.00	0.00	9,133.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,400.0	0.00	0.00	9,233.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,500.0	0.00	0.00	9,333.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,501.0	0.00	0.00	9,334.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
<b>Rollins</b>									
9,521.0	0.00	0.00	9,354.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,600.0	0.00	0.00	9,433.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,700.0	0.00	0.00	9,533.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
<b>Cozzette</b>									
9,759.0	0.00	0.00	9,592.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,800.0	0.00	0.00	9,633.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
9,900.0	0.00	0.00	9,733.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
10,000.0	0.00	0.00	9,833.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
<b>Corcoran</b>									
10,032.0	0.00	0.00	9,865.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
10,100.0	0.00	0.00	9,933.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
10,200.0	0.00	0.00	10,033.0	1,487.2	-382.0	1,535.5	0.00	0.00	0.00
<b>TD @ 10282.0' MD / 10115.0' TVD</b>									
10,282.0	0.00	0.00	10,115.0	1,487.2	-382.0	1,535.5	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	0.00	0.00	10,115.0	1,487.2	-382.0	1,640,960.31	2,233,210.07	39.561706	-108.220127
- 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	2,480.1	9 5/8"	9-5/8	14-3/4



# Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0897-04-02E
Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0897-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
609.1	606.0	Mahogany			
4,911.9	4,804.0	Wasatch 'G' Sand			
6,654.3	6,504.0	Ohio Creek			
6,808.1	6,654.0	Williams Fork			
7,621.0	7,454.0	TOG			
9,271.0	9,104.0	Cameo			
9,501.0	9,334.0	Base Cameo Coal			
9,521.0	9,354.0	Rollins			
9,759.0	9,592.0	Cozzette			
10,032.0	9,865.0	Corcoran			

## 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	KOP / (Build 3.00"/100')
622.4	618.9	45.0	-11.6	EOB @ 12.67° Inc / 345.59° Azm
7,198.7	7,035.1	1,442.2	-370.5	Drop @ 3.00"/100'
7,621.0	7,454.0	1,487.2	-382.0	EOD @ Vertical
10,282.0	10,115.0	1,487.2	-382.0	TD @ 10282.0' MD / 10115.0' TVD