



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 603-23-32 Pad**

**CC 0697-03-21E**

**A-3**

**Plan: Permit #1**

## **QES Well Planning Report**

**11 May, 2018**





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-03-21E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Site:</b>	CC 603-23-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-03-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-3		
<b>Design:</b>	Permit #1		

<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 603-23-32 Pad			
Site Position:		Northing:	1,636,139.15 usft	Latitude:	39.548692
From:	Lat/Long	Easting:	2,235,843.66 usft	Longitude:	-108.210280
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.71 °

Well		CC 0697-03-21E				
Well Position	+N/-S	45.5 usft	Northing:	1,636,182.66 usft	Latitude:	39.548817
	+E/-W	66.5 usft	Easting:	2,235,911.54 usft	Longitude:	-108.210044
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,613.0 usft

<b>Wellbore</b>	A-3				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	3/24/2018	9.72	65.58	51,423.81046358

<b>Design</b>	Permit #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<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	76.10

<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	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,200.3	28.51	76.10	1,161.6	55.6	224.8	3.00	3.00	0.00	76.10	
6,892.4	28.51	76.10	6,163.4	708.4	2,862.0	0.00	0.00	0.00	0.00	
7,842.7	0.00	0.00	7,075.0	764.0	3,086.8	3.00	-3.00	0.00	180.00	
10,542.7	0.00	0.00	9,775.0	764.0	3,086.8	0.00	0.00	0.00	0.00	PBHL - CC 0697-03-2



# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-03-21E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Site:</b>	CC 603-23-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-03-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-3		
<b>Design:</b>	Permit #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
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP/ (Build 3.00°/100')</b>									
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	1.50	76.10	300.0	0.2	0.6	0.7	3.00	3.00	0.00
400.0	4.50	76.10	399.8	1.4	5.7	5.9	3.00	3.00	0.00
500.0	7.50	76.10	499.3	3.9	15.9	16.3	3.00	3.00	0.00
600.0	10.50	76.10	598.0	7.7	31.0	32.0	3.00	3.00	0.00
<b>Mahogany</b>									
602.0	10.56	76.10	600.0	7.8	31.4	32.3	3.00	3.00	0.00
700.0	13.50	76.10	695.8	12.7	51.2	52.8	3.00	3.00	0.00
800.0	16.50	76.10	792.4	18.9	76.3	78.6	3.00	3.00	0.00
900.0	19.50	76.10	887.5	26.3	106.3	109.5	3.00	3.00	0.00
1,000.0	22.50	76.10	980.9	34.9	141.1	145.4	3.00	3.00	0.00
1,100.0	25.50	76.10	1,072.2	44.7	180.6	186.0	3.00	3.00	0.00
<b>EOB @ 28.51° Inc / 76.10° Azm</b>									
1,200.3	28.51	76.10	1,161.6	55.6	224.8	231.6	3.00	3.00	0.00
1,300.0	28.51	76.10	1,249.2	67.1	271.0	279.2	0.00	0.00	0.00
1,400.0	28.51	76.10	1,337.1	78.5	317.3	326.9	0.00	0.00	0.00
1,500.0	28.51	76.10	1,424.9	90.0	363.7	374.6	0.00	0.00	0.00
1,600.0	28.51	76.10	1,512.8	101.5	410.0	422.4	0.00	0.00	0.00
1,700.0	28.51	76.10	1,600.7	112.9	456.3	470.1	0.00	0.00	0.00
1,800.0	28.51	76.10	1,688.6	124.4	502.7	517.8	0.00	0.00	0.00
1,900.0	28.51	76.10	1,776.4	135.9	549.0	565.6	0.00	0.00	0.00
2,000.0	28.51	76.10	1,864.3	147.3	595.3	613.3	0.00	0.00	0.00
2,100.0	28.51	76.10	1,952.2	158.8	641.6	661.0	0.00	0.00	0.00
2,200.0	28.51	76.10	2,040.0	170.3	688.0	708.7	0.00	0.00	0.00
2,300.0	28.51	76.10	2,127.9	181.8	734.3	756.5	0.00	0.00	0.00
2,400.0	28.51	76.10	2,215.8	193.2	780.6	804.2	0.00	0.00	0.00
2,500.0	28.51	76.10	2,303.7	204.7	827.0	851.9	0.00	0.00	0.00
<b>8 5/8"</b>									
2,524.0	28.51	76.10	2,324.8	207.4	838.1	863.4	0.00	0.00	0.00
2,600.0	28.51	76.10	2,391.5	216.2	873.3	899.7	0.00	0.00	0.00
2,700.0	28.51	76.10	2,479.4	227.6	919.6	947.4	0.00	0.00	0.00
2,800.0	28.51	76.10	2,567.3	239.1	966.0	995.1	0.00	0.00	0.00
2,900.0	28.51	76.10	2,655.2	250.6	1,012.3	1,042.8	0.00	0.00	0.00
3,000.0	28.51	76.10	2,743.0	262.0	1,058.6	1,090.6	0.00	0.00	0.00
3,100.0	28.51	76.10	2,830.9	273.5	1,105.0	1,138.3	0.00	0.00	0.00
3,200.0	28.51	76.10	2,918.8	285.0	1,151.3	1,186.0	0.00	0.00	0.00
3,300.0	28.51	76.10	3,006.7	296.4	1,197.6	1,233.8	0.00	0.00	0.00
3,400.0	28.51	76.10	3,094.5	307.9	1,244.0	1,281.5	0.00	0.00	0.00
3,500.0	28.51	76.10	3,182.4	319.4	1,290.3	1,329.2	0.00	0.00	0.00
3,600.0	28.51	76.10	3,270.3	330.8	1,336.6	1,377.0	0.00	0.00	0.00
3,700.0	28.51	76.10	3,358.2	342.3	1,383.0	1,424.7	0.00	0.00	0.00
3,800.0	28.51	76.10	3,446.0	353.8	1,429.3	1,472.4	0.00	0.00	0.00
3,900.0	28.51	76.10	3,533.9	365.2	1,475.6	1,520.1	0.00	0.00	0.00
4,000.0	28.51	76.10	3,621.8	376.7	1,522.0	1,567.9	0.00	0.00	0.00
4,100.0	28.51	76.10	3,709.7	388.2	1,568.3	1,615.6	0.00	0.00	0.00
4,200.0	28.51	76.10	3,797.5	399.6	1,614.6	1,663.3	0.00	0.00	0.00
4,300.0	28.51	76.10	3,885.4	411.1	1,660.9	1,711.1	0.00	0.00	0.00
4,400.0	28.51	76.10	3,973.3	422.6	1,707.3	1,758.8	0.00	0.00	0.00
4,500.0	28.51	76.10	4,061.2	434.0	1,753.6	1,806.5	0.00	0.00	0.00
4,600.0	28.51	76.10	4,149.0	445.5	1,799.9	1,854.3	0.00	0.00	0.00



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<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Site:</b>	CC 603-23-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-03-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-3		
<b>Design:</b>	Permit #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)
4,700.0	28.51	76.10	4,236.9	457.0	1,846.3	1,902.0	0.00	0.00	0.00
4,800.0	28.51	76.10	4,324.8	468.4	1,892.6	1,949.7	0.00	0.00	0.00
4,900.0	28.51	76.10	4,412.6	479.9	1,938.9	1,997.4	0.00	0.00	0.00
5,000.0	28.51	76.10	4,500.5	491.4	1,985.3	2,045.2	0.00	0.00	0.00
5,100.0	28.51	76.10	4,588.4	502.8	2,031.6	2,092.9	0.00	0.00	0.00
5,200.0	28.51	76.10	4,676.3	514.3	2,077.9	2,140.6	0.00	0.00	0.00
5,300.0	28.51	76.10	4,764.1	525.8	2,124.3	2,188.4	0.00	0.00	0.00
5,400.0	28.51	76.10	4,852.0	537.2	2,170.6	2,236.1	0.00	0.00	0.00
5,500.0	28.51	76.10	4,939.9	548.7	2,216.9	2,283.8	0.00	0.00	0.00
<b>Wasatch 'G' Sand</b>									
5,596.8	28.51	76.10	5,025.0	559.8	2,261.8	2,330.0	0.00	0.00	0.00
5,600.0	28.51	76.10	5,027.8	560.2	2,263.3	2,331.6	0.00	0.00	0.00
5,700.0	28.51	76.10	5,115.6	571.6	2,309.6	2,379.3	0.00	0.00	0.00
5,800.0	28.51	76.10	5,203.5	583.1	2,355.9	2,427.0	0.00	0.00	0.00
5,900.0	28.51	76.10	5,291.4	594.6	2,402.3	2,474.7	0.00	0.00	0.00
6,000.0	28.51	76.10	5,379.3	606.1	2,448.6	2,522.5	0.00	0.00	0.00
6,100.0	28.51	76.10	5,467.1	617.5	2,494.9	2,570.2	0.00	0.00	0.00
6,200.0	28.51	76.10	5,555.0	629.0	2,541.2	2,617.9	0.00	0.00	0.00
6,300.0	28.51	76.10	5,642.9	640.5	2,587.6	2,665.7	0.00	0.00	0.00
6,400.0	28.51	76.10	5,730.8	651.9	2,633.9	2,713.4	0.00	0.00	0.00
6,500.0	28.51	76.10	5,818.6	663.4	2,680.2	2,761.1	0.00	0.00	0.00
6,600.0	28.51	76.10	5,906.5	674.9	2,726.6	2,808.9	0.00	0.00	0.00
6,700.0	28.51	76.10	5,994.4	686.3	2,772.9	2,856.6	0.00	0.00	0.00
6,800.0	28.51	76.10	6,082.3	697.8	2,819.2	2,904.3	0.00	0.00	0.00
<b>Drop @ 3.00°/100'</b>									
6,892.4	28.51	76.10	6,163.4	708.4	2,862.0	2,948.4	0.00	0.00	0.00
6,900.0	28.28	76.10	6,170.1	709.3	2,865.6	2,952.0	3.00	-3.00	0.00
7,000.0	25.28	76.10	6,259.4	720.1	2,909.3	2,997.1	3.00	-3.00	0.00
7,100.0	22.28	76.10	6,350.9	729.8	2,948.4	3,037.4	3.00	-3.00	0.00
7,200.0	19.28	76.10	6,444.4	738.3	2,982.9	3,072.9	3.00	-3.00	0.00
7,300.0	16.28	76.10	6,539.6	745.6	3,012.5	3,103.4	3.00	-3.00	0.00
7,400.0	13.28	76.10	6,636.3	751.8	3,037.3	3,128.9	3.00	-3.00	0.00
<b>Ohio Creek</b>									
7,490.7	10.56	76.10	6,725.0	756.3	3,055.4	3,147.6	3.00	-3.00	0.00
7,500.0	10.28	76.10	6,734.2	756.7	3,057.1	3,149.3	3.00	-3.00	0.00
7,600.0	7.28	76.10	6,833.0	760.3	3,071.9	3,164.6	3.00	-3.00	0.00
<b>Williams Fork</b>									
7,692.5	4.50	76.10	6,925.0	762.6	3,081.1	3,174.1	3.00	-3.00	0.00
7,700.0	4.28	76.10	6,932.5	762.7	3,081.7	3,174.7	3.00	-3.00	0.00
7,800.0	1.28	76.10	7,032.3	763.9	3,086.4	3,179.5	3.00	-3.00	0.00
<b>EOD @ Vertical</b>									
7,842.7	0.00	0.00	7,075.0	764.0	3,086.8	3,180.0	3.00	-3.00	0.00
7,900.0	0.00	0.00	7,132.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,000.0	0.00	0.00	7,232.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,100.0	0.00	0.00	7,332.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,200.0	0.00	0.00	7,432.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
<b>TOG</b>									
8,292.7	0.00	0.00	7,525.0	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,300.0	0.00	0.00	7,532.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,400.0	0.00	0.00	7,632.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,500.0	0.00	0.00	7,732.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,600.0	0.00	0.00	7,832.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,700.0	0.00	0.00	7,932.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00



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<b>Wellbore:</b>	A-3		
<b>Design:</b>	Permit #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)
8,800.0	0.00	0.00	8,032.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,132.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,000.0	0.00	0.00	8,232.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,100.0	0.00	0.00	8,332.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,200.0	0.00	0.00	8,432.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,300.0	0.00	0.00	8,532.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,400.0	0.00	0.00	8,632.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,500.0	0.00	0.00	8,732.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,600.0	0.00	0.00	8,832.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,700.0	0.00	0.00	8,932.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,032.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
Cameo									
9,892.7	0.00	0.00	9,125.0	764.0	3,086.8	3,180.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,132.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
10,000.0	0.00	0.00	9,232.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
10,100.0	0.00	0.00	9,332.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
10,200.0	0.00	0.00	9,432.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
Base Cameo Coal									
10,282.7	0.00	0.00	9,515.0	764.0	3,086.8	3,180.0	0.00	0.00	0.00
Rollins									
10,292.7	0.00	0.00	9,525.0	764.0	3,086.8	3,180.0	0.00	0.00	0.00
10,300.0	0.00	0.00	9,532.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
10,400.0	0.00	0.00	9,632.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
10,500.0	0.00	0.00	9,732.3	764.0	3,086.8	3,180.0	0.00	0.00	0.00
TD @ 10542.7' MD / 9775.0' TVD									
10,542.7	0.00	0.00	9,775.0	764.0	3,086.8	3,180.0	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 0697-03-21E	0.00	0.00	9,775.0	764.0	3,086.8	1,636,854.28	2,239,019.79	39.550914	-108.199097
- plan hits target center									
- Circle (radius 50.0)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
2,524.0	2,324.8	8 5/8"	8-5/8	11	



## Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-03-21E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Well @ 8637.0usft (H&P 290)
<b>Site:</b>	CC 603-23-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-03-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-3		
<b>Design:</b>	Permit #1		

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
602.0	600.0	Mahogany			
5,596.8	5,025.0	Wasatch 'G' Sand			
7,490.7	6,725.0	Ohio Creek			
7,692.5	6,925.0	Williams Fork			
8,292.7	7,525.0	TOG			
9,892.7	9,125.0	Cameo			
10,282.7	9,515.0	Base Cameo Coal			
10,292.7	9,525.0	Rollins			

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
250.0	250.0	0.0	0.0	KOP/ (Build 3.00°/100')	
1,200.3	1,161.6	55.6	224.8	EOB @ 28.51° Inc / 76.10° Azm	
6,892.4	6,163.4	708.4	2,862.0	Drop @ 3.00°/100'	
7,842.7	7,075.0	764.0	3,086.8	EOD @ Vertical	
10,542.7	9,775.0	764.0	3,086.8	TD @ 10542.7' MD / 9775.0' TVD	