



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 603-23-32 Pad**

**CC 0697-03-22W**

**B-2**

**Plan: Permit #1**

## **QES Well Planning Report**

**13 May, 2018**





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-03-22W
<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 0697-03-22W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-2		
<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 0697-03-22W					
Well Position	+N/-S	59.7 usft	Northing:	1,636,196.84 usft	Latitude:	39.548856
	+E/-W	67.4 usft	Easting:	2,235,912.81 usft	Longitude:	-108.210041
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,613.0 usft

<b>Wellbore</b>	B-2				
<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	51,423.83177643

<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	42.35

<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	
350.0	0.00	0.00	350.0	0.0	0.0	0.00	0.00	0.00	0.00	
532.8	5.48	42.35	532.5	6.5	5.9	3.00	3.00	0.00	42.35	
7,295.7	5.48	42.35	7,264.5	484.2	441.3	0.00	0.00	0.00	0.00	
7,478.5	0.00	0.00	7,447.0	490.7	447.2	3.00	-3.00	0.00	180.00	
9,728.5	0.00	0.00	9,697.0	490.7	447.2	0.00	0.00	0.00	0.00	PBHL - CC 0697-03-2



# Well Planning Report



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<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 0697-03-22W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-2		
<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
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP/ (Build 3.00°/100')</b>									
350.0	0.00	0.00	350.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	1.50	42.35	400.0	0.5	0.4	0.7	3.00	3.00	0.00
500.0	4.50	42.35	499.8	4.4	4.0	5.9	3.00	3.00	0.00
<b>EOB @ 5.48° Inc / 42.35° Azm</b>									
532.8	5.48	42.35	532.5	6.5	5.9	8.7	3.00	3.00	0.00
600.0	5.48	42.35	599.4	11.2	10.2	15.2	0.00	0.00	0.00
<b>Mahogany</b>									
600.6	5.48	42.35	600.0	11.2	10.3	15.2	0.00	0.00	0.00
700.0	5.48	42.35	699.0	18.3	16.7	24.7	0.00	0.00	0.00
800.0	5.48	42.35	798.5	25.3	23.1	34.3	0.00	0.00	0.00
900.0	5.48	42.35	898.0	32.4	29.5	43.8	0.00	0.00	0.00
1,000.0	5.48	42.35	997.6	39.5	36.0	53.4	0.00	0.00	0.00
1,100.0	5.48	42.35	1,097.1	46.5	42.4	63.0	0.00	0.00	0.00
1,200.0	5.48	42.35	1,196.7	53.6	48.8	72.5	0.00	0.00	0.00
1,300.0	5.48	42.35	1,296.2	60.7	55.3	82.1	0.00	0.00	0.00
1,400.0	5.48	42.35	1,395.8	67.7	61.7	91.6	0.00	0.00	0.00
1,500.0	5.48	42.35	1,495.3	74.8	68.2	101.2	0.00	0.00	0.00
1,600.0	5.48	42.35	1,594.8	81.8	74.6	110.7	0.00	0.00	0.00
1,700.0	5.48	42.35	1,694.4	88.9	81.0	120.3	0.00	0.00	0.00
1,800.0	5.48	42.35	1,793.9	96.0	87.5	129.9	0.00	0.00	0.00
1,900.0	5.48	42.35	1,893.5	103.0	93.9	139.4	0.00	0.00	0.00
2,000.0	5.48	42.35	1,993.0	110.1	100.4	149.0	0.00	0.00	0.00
2,100.0	5.48	42.35	2,092.5	117.2	106.8	158.5	0.00	0.00	0.00
2,200.0	5.48	42.35	2,192.1	124.2	113.2	168.1	0.00	0.00	0.00
2,300.0	5.48	42.35	2,291.6	131.3	119.7	177.7	0.00	0.00	0.00
2,400.0	5.48	42.35	2,391.2	138.4	126.1	187.2	0.00	0.00	0.00
2,500.0	5.48	42.35	2,490.7	145.4	132.6	196.8	0.00	0.00	0.00
<b>8 5/8"</b>									
2,524.0	5.48	42.35	2,514.6	147.1	134.1	199.1	0.00	0.00	0.00
2,600.0	5.48	42.35	2,590.3	152.5	139.0	206.3	0.00	0.00	0.00
2,700.0	5.48	42.35	2,689.8	159.6	145.4	215.9	0.00	0.00	0.00
2,800.0	5.48	42.35	2,789.3	166.6	151.9	225.4	0.00	0.00	0.00
2,900.0	5.48	42.35	2,888.9	173.7	158.3	235.0	0.00	0.00	0.00
3,000.0	5.48	42.35	2,988.4	180.7	164.7	244.6	0.00	0.00	0.00
3,100.0	5.48	42.35	3,088.0	187.8	171.2	254.1	0.00	0.00	0.00
3,200.0	5.48	42.35	3,187.5	194.9	177.6	263.7	0.00	0.00	0.00
3,300.0	5.48	42.35	3,287.1	201.9	184.1	273.2	0.00	0.00	0.00
3,400.0	5.48	42.35	3,386.6	209.0	190.5	282.8	0.00	0.00	0.00
3,500.0	5.48	42.35	3,486.1	216.1	196.9	292.3	0.00	0.00	0.00
3,600.0	5.48	42.35	3,585.7	223.1	203.4	301.9	0.00	0.00	0.00
3,700.0	5.48	42.35	3,685.2	230.2	209.8	311.5	0.00	0.00	0.00
3,800.0	5.48	42.35	3,784.8	237.3	216.3	321.0	0.00	0.00	0.00
3,900.0	5.48	42.35	3,884.3	244.3	222.7	330.6	0.00	0.00	0.00
4,000.0	5.48	42.35	3,983.8	251.4	229.1	340.1	0.00	0.00	0.00
4,100.0	5.48	42.35	4,083.4	258.4	235.6	349.7	0.00	0.00	0.00
4,200.0	5.48	42.35	4,182.9	265.5	242.0	359.3	0.00	0.00	0.00
4,300.0	5.48	42.35	4,282.5	272.6	248.4	368.8	0.00	0.00	0.00
4,400.0	5.48	42.35	4,382.0	279.6	254.9	378.4	0.00	0.00	0.00
4,500.0	5.48	42.35	4,481.6	286.7	261.3	387.9	0.00	0.00	0.00



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<b>Well:</b>	CC 0697-03-22W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-2		
<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)
4,600.0	5.48	42.35	4,581.1	293.8	267.8	397.5	0.00	0.00	0.00
4,700.0	5.48	42.35	4,680.6	300.8	274.2	407.0	0.00	0.00	0.00
4,800.0	5.48	42.35	4,780.2	307.9	280.6	416.6	0.00	0.00	0.00
4,900.0	5.48	42.35	4,879.7	315.0	287.1	426.2	0.00	0.00	0.00
<b>Wasatch 'G' Sand</b>									
4,967.6	5.48	42.35	4,947.0	319.7	291.4	432.6	0.00	0.00	0.00
5,000.0	5.48	42.35	4,979.3	322.0	293.5	435.7	0.00	0.00	0.00
5,100.0	5.48	42.35	5,078.8	329.1	300.0	445.3	0.00	0.00	0.00
5,200.0	5.48	42.35	5,178.4	336.1	306.4	454.8	0.00	0.00	0.00
5,300.0	5.48	42.35	5,277.9	343.2	312.8	464.4	0.00	0.00	0.00
5,400.0	5.48	42.35	5,377.4	350.3	319.3	474.0	0.00	0.00	0.00
5,500.0	5.48	42.35	5,477.0	357.3	325.7	483.5	0.00	0.00	0.00
5,600.0	5.48	42.35	5,576.5	364.4	332.2	493.1	0.00	0.00	0.00
5,700.0	5.48	42.35	5,676.1	371.5	338.6	502.6	0.00	0.00	0.00
5,800.0	5.48	42.35	5,775.6	378.5	345.0	512.2	0.00	0.00	0.00
5,900.0	5.48	42.35	5,875.1	385.6	351.5	521.7	0.00	0.00	0.00
6,000.0	5.48	42.35	5,974.7	392.7	357.9	531.3	0.00	0.00	0.00
6,100.0	5.48	42.35	6,074.2	399.7	364.3	540.9	0.00	0.00	0.00
6,200.0	5.48	42.35	6,173.8	406.8	370.8	550.4	0.00	0.00	0.00
6,300.0	5.48	42.35	6,273.3	413.9	377.2	560.0	0.00	0.00	0.00
6,400.0	5.48	42.35	6,372.9	420.9	383.7	569.5	0.00	0.00	0.00
6,500.0	5.48	42.35	6,472.4	428.0	390.1	579.1	0.00	0.00	0.00
6,600.0	5.48	42.35	6,571.9	435.0	396.5	588.7	0.00	0.00	0.00
<b>Ohio Creek</b>									
6,675.4	5.48	42.35	6,647.0	440.4	401.4	595.9	0.00	0.00	0.00
6,700.0	5.48	42.35	6,671.5	442.1	403.0	598.2	0.00	0.00	0.00
6,800.0	5.48	42.35	6,771.0	449.2	409.4	607.8	0.00	0.00	0.00
<b>Williams Fork</b>									
6,876.3	5.48	42.35	6,847.0	454.6	414.3	615.1	0.00	0.00	0.00
6,900.0	5.48	42.35	6,870.6	456.2	415.9	617.3	0.00	0.00	0.00
7,000.0	5.48	42.35	6,970.1	463.3	422.3	626.9	0.00	0.00	0.00
7,100.0	5.48	42.35	7,069.7	470.4	428.7	636.4	0.00	0.00	0.00
7,200.0	5.48	42.35	7,169.2	477.4	435.2	646.0	0.00	0.00	0.00
<b>Drop @ 3.00°/100'</b>									
7,295.7	5.48	42.35	7,264.5	484.2	441.3	655.1	0.00	0.00	0.00
7,300.0	5.36	42.35	7,268.7	484.5	441.6	655.6	3.00	-3.00	0.00
7,400.0	2.36	42.35	7,368.5	489.5	446.1	662.3	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
7,478.5	0.00	0.00	7,447.0	490.7	447.2	663.9	3.00	-3.00	0.00
7,500.0	0.00	0.00	7,468.5	490.7	447.2	663.9	0.00	0.00	0.00
7,600.0	0.00	0.00	7,568.5	490.7	447.2	663.9	0.00	0.00	0.00
7,700.0	0.00	0.00	7,668.5	490.7	447.2	663.9	0.00	0.00	0.00
7,800.0	0.00	0.00	7,768.5	490.7	447.2	663.9	0.00	0.00	0.00
7,900.0	0.00	0.00	7,868.5	490.7	447.2	663.9	0.00	0.00	0.00
8,000.0	0.00	0.00	7,968.5	490.7	447.2	663.9	0.00	0.00	0.00
8,100.0	0.00	0.00	8,068.5	490.7	447.2	663.9	0.00	0.00	0.00
8,200.0	0.00	0.00	8,168.5	490.7	447.2	663.9	0.00	0.00	0.00
8,300.0	0.00	0.00	8,268.5	490.7	447.2	663.9	0.00	0.00	0.00
8,400.0	0.00	0.00	8,368.5	490.7	447.2	663.9	0.00	0.00	0.00
8,500.0	0.00	0.00	8,468.5	490.7	447.2	663.9	0.00	0.00	0.00
8,600.0	0.00	0.00	8,568.5	490.7	447.2	663.9	0.00	0.00	0.00
8,700.0	0.00	0.00	8,668.5	490.7	447.2	663.9	0.00	0.00	0.00
8,800.0	0.00	0.00	8,768.5	490.7	447.2	663.9	0.00	0.00	0.00



# Well Planning Report



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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 0697-03-22W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-2		
<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)
8,900.0	0.00	0.00	8,868.5	490.7	447.2	663.9	0.00	0.00	0.00
9,000.0	0.00	0.00	8,968.5	490.7	447.2	663.9	0.00	0.00	0.00
<b>Cameo</b>									
9,078.5	0.00	0.00	9,047.0	490.7	447.2	663.9	0.00	0.00	0.00
9,100.0	0.00	0.00	9,068.5	490.7	447.2	663.9	0.00	0.00	0.00
9,200.0	0.00	0.00	9,168.5	490.7	447.2	663.9	0.00	0.00	0.00
9,300.0	0.00	0.00	9,268.5	490.7	447.2	663.9	0.00	0.00	0.00
9,400.0	0.00	0.00	9,368.5	490.7	447.2	663.9	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,468.5	0.00	0.00	9,437.0	490.7	447.2	663.9	0.00	0.00	0.00
<b>Rollins</b>									
9,478.5	0.00	0.00	9,447.0	490.7	447.2	663.9	0.00	0.00	0.00
9,500.0	0.00	0.00	9,468.5	490.7	447.2	663.9	0.00	0.00	0.00
9,600.0	0.00	0.00	9,568.5	490.7	447.2	663.9	0.00	0.00	0.00
9,700.0	0.00	0.00	9,668.5	490.7	447.2	663.9	0.00	0.00	0.00
<b>TD @ 9728.5' MD / 9697.0' TVD</b>									
9,728.5	0.00	0.00	9,697.0	490.7	447.2	663.9	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 0697-03-22V	0.00	0.00	9,697.0	490.7	447.2	1,636,673.94	2,236,374.47	39.550203	-108.208455
- plan hits target center									
- Circle (radius 50.0)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
2,524.0	2,514.6	8 5/8"	8-5/8	11	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
600.6	600.0	Mahogany				
4,967.6	4,947.0	Wasatch 'G' Sand				
6,675.4	6,647.0	Ohio Creek				
6,876.3	6,847.0	Williams Fork				
7,478.5	7,447.0	TOG				
9,078.5	9,047.0	Cameo				
9,468.5	9,437.0	Base Cameo Coal				
9,478.5	9,447.0	Rollins				



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<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 0697-03-22W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-2		
<b>Design:</b>	Permit #1		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
350.0	350.0	0.0	0.0	KOP/ (Build 3.00°/100')
532.8	532.5	6.5	5.9	EOB @ 5.48° Inc / 42.35° Azm
7,295.7	7,264.5	484.2	441.3	Drop @ 3.00°/100'
7,478.5	7,447.0	490.7	447.2	EOD @ Vertical
9,728.5	9,697.0	490.7	447.2	TD @ 9728.5' MD / 9697.0' TVD