

**PROJECT DETAILS: Garfield County, CO**

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Central Zone  
System Datum: Mean Sea Level

**WELL DETAILS: CC Federal 0697-03-03E**

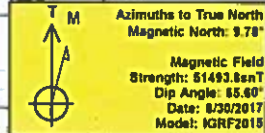
+N-S 0.0 +E-W 0.0 Northing 1639636.94 Easting 2237413.43  
8428.0 Latitude 39.558419 Longitude -108.205085

Project: Garfield County, CO  
Site: CC 0697-03-07 Pad  
Well: CC Federal 0697-03-03E  
Wellbore: Wellbore #1  
Design: Design #2  
Latitude: 39.558419  
Longitude: -108.205085  
Ground Level: 8428.0  
WELL @ 8458.0usft (30' RKB)



**REFERENCE INFORMATION**

Co-ordinate (N/E) Reference: Well CC Federal 0697-03-03E, True North  
Vertical (TVD) Reference: WELL @ 8458.0usft (30' RKB)  
Section (VS) Reference: Slot - (0.0N, 0.0E)  
Measured Depth Reference: WELL @ 8458.0usft (30' RKB)  
Calculation Method: Minimum Curvature



**FORMATION TDP DETAILS**

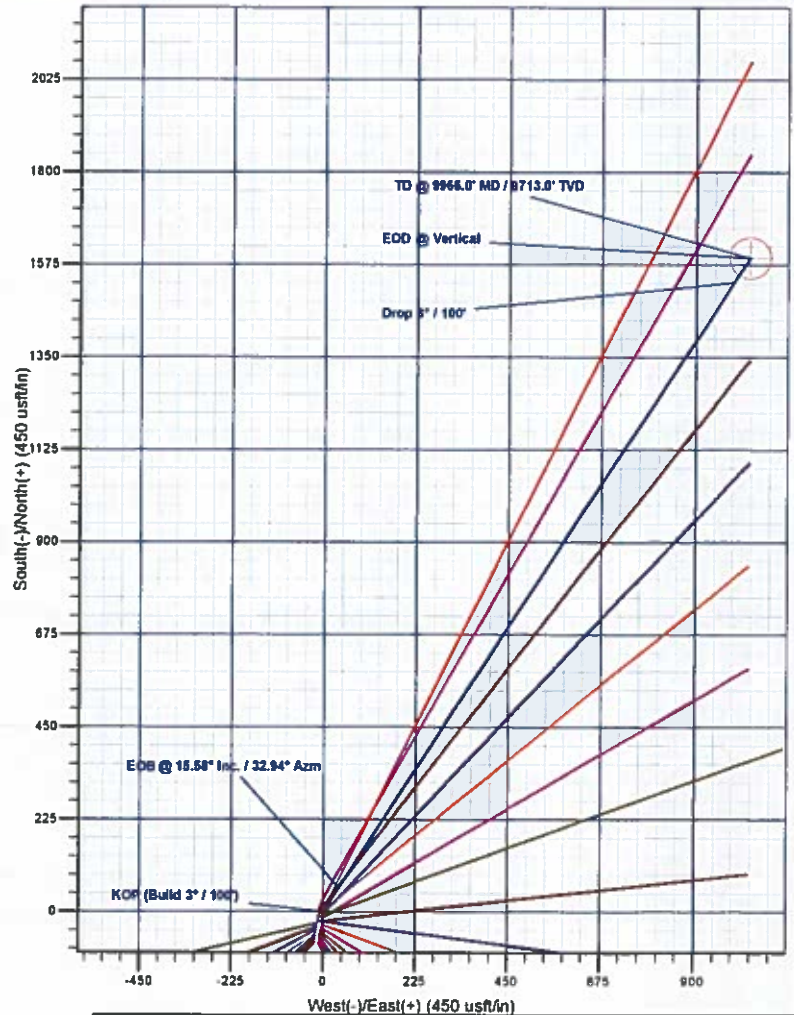
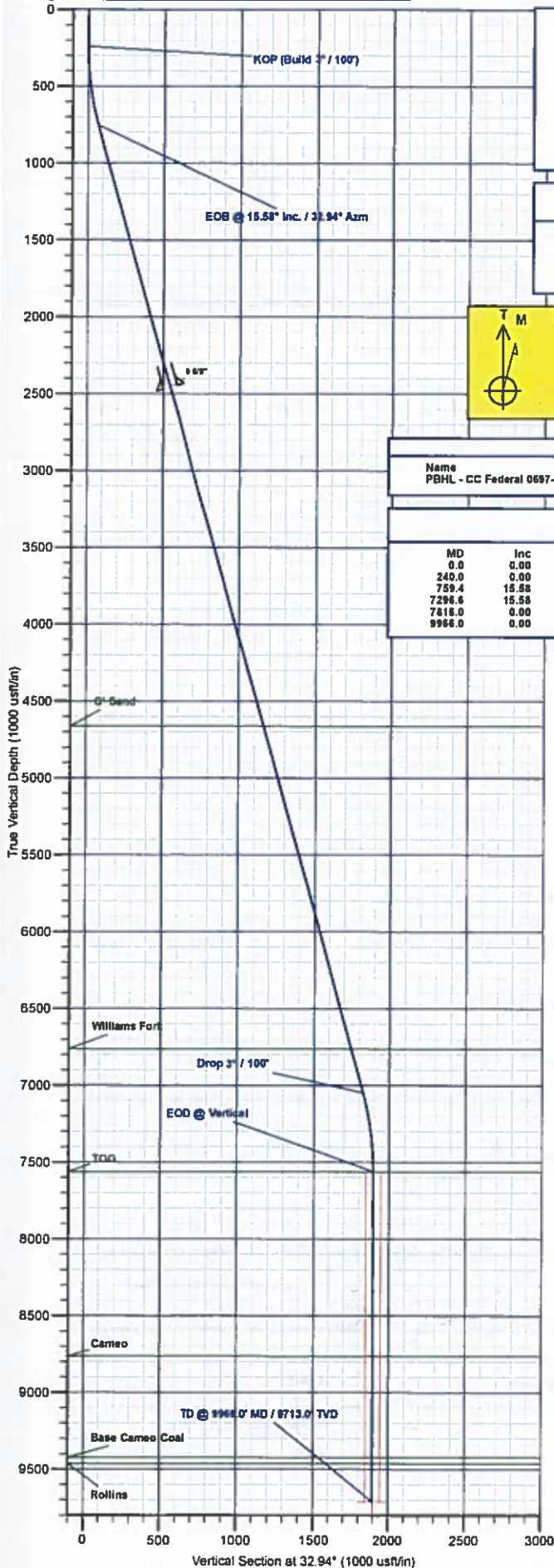
TVDPath	MDPath	Formation
4463.0	4818.6	G' Sand
6763.0	6996.7	Williams Fork
7563.0	7816.0	TCG
8763.0	9016.0	Cameo
9423.0	9676.0	Base Cameo Coal
9463.0	9716.0	Rollins

**DESIGN TARGET DETAILS**

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-03-03E	9713.0	1591.4	1031.3	1641196.96	2238491.66	39.562788	-108.201427

**SECTION DETAILS**

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
240.0	0.00	0.00	240.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3' / 100')
759.4	15.58	32.94	753.0	58.9	36.2	3.00	32.94	70.2	EOB @ 15.58° Inc. / 32.94° Azm
7296.6	15.58	32.94	7050.0	1532.5	992.1	0.00	0.00	1826.2	Drop 3' / 100'
7616.0	0.00	0.00	7843.0	1591.4	1031.3	3.00	180.00	1896.4	EOD @ Vertical
9966.0	0.00	0.00	9713.0	1591.4	1031.3	0.00	0.00	1896.4	TD @ 9966.0' MD / 9713.0' TVD



Plan: Design #2 (CC Federal 0697-03-03E/Wellbore #1)

Created By: Will Jircik Date: 9:53, October 24 2017



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 0697-03-07 Pad**

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

**Wellbore #1**

**Plan: Design #2**

## **QES Well Planning Report**

**24 October, 2017**





# Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-03E
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8458 0usft (30' RKB)
Project:	Garfield County, CO	MD Reference:	WELL @ 8458 0usft (30' RKB)
Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC Federal 0697-03-03E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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

Well	CC Federal 0697-03-03E		
Well Position	+N/-S	1,519.6 usft	Northing:
	+E/-W	493.4 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	
		Latitude:	39.558419
		Longitude:	-108.205085
		Ground Level:	8,428.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	IGRF2015	8/30/2017	9.78
			Dip Angle
			65.60
			Field Strength
			51,493.78390475

Design	Design #2		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			32.94

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	
240.0	0.00	0.00	240.0	0.0	0.0	0.00	0.00	0.00	0.00	
759.4	15.58	32.94	753.0	58.9	38.2	3.00	3.00	0.00	32.94	
7,296.6	15.58	32.94	7,050.0	1,532.5	993.1	0.00	0.00	0.00	0.00	
7,816.0	0.00	0.00	7,563.0	1,591.4	1,031.3	3.00	-3.00	0.00	180.00	
9,966.0	0.00	0.00	9,713.0	1,591.4	1,031.3	0.00	0.00	0.00	0.00	PBHL - CC Federal 0697-03-03E





# Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-03E
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8458 0usft (30' RKB)
Project:	Garfield County, CO	MD Reference:	WELL @ 8458 0usft (30' RKB)
Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC Federal 0697-03-03E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

## 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° / 100')</b>									
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	1.80	32.94	300.0	0.8	0.5	0.9	3.00	3.00	0.00
400.0	4.80	32.94	399.8	5.6	3.6	6.7	3.00	3.00	0.00
500.0	7.80	32.94	499.2	14.8	9.6	17.7	3.00	3.00	0.00
600.0	10.80	32.94	597.9	28.4	18.4	33.8	3.00	3.00	0.00
700.0	13.80	32.94	695.6	46.3	30.0	55.1	3.00	3.00	0.00
<b>EOB @ 15.58° Inc. / 32.94° Azm</b>									
759.4	15.58	32.94	753.0	58.9	38.2	70.2	3.00	3.00	0.00
800.0	15.58	32.94	792.1	68.1	44.1	81.1	0.00	0.00	0.00
900.0	15.58	32.94	888.5	90.6	58.7	108.0	0.00	0.00	0.00
1,000.0	15.58	32.94	984.8	113.1	73.3	134.8	0.00	0.00	0.00
1,100.0	15.58	32.94	1,081.1	135.7	87.9	161.7	0.00	0.00	0.00
1,200.0	15.58	32.94	1,177.4	158.2	102.5	188.5	0.00	0.00	0.00
1,300.0	15.58	32.94	1,273.8	180.8	117.1	215.4	0.00	0.00	0.00
1,400.0	15.58	32.94	1,370.1	203.3	131.8	242.3	0.00	0.00	0.00
1,500.0	15.58	32.94	1,466.4	225.9	146.4	269.1	0.00	0.00	0.00
1,600.0	15.58	32.94	1,562.7	248.4	161.0	296.0	0.00	0.00	0.00
1,700.0	15.58	32.94	1,659.1	270.9	175.6	322.9	0.00	0.00	0.00
1,800.0	15.58	32.94	1,755.4	293.5	190.2	349.7	0.00	0.00	0.00
1,900.0	15.58	32.94	1,851.7	316.0	204.8	376.6	0.00	0.00	0.00
2,000.0	15.58	32.94	1,948.0	338.6	219.4	403.4	0.00	0.00	0.00
2,100.0	15.58	32.94	2,044.4	361.1	234.0	430.3	0.00	0.00	0.00
2,200.0	15.58	32.94	2,140.7	383.6	248.6	457.2	0.00	0.00	0.00
2,300.0	15.58	32.94	2,237.0	406.2	263.2	484.0	0.00	0.00	0.00
2,400.0	15.58	32.94	2,333.3	428.7	277.8	510.9	0.00	0.00	0.00
2,500.0	15.58	32.94	2,429.7	451.3	292.4	537.7	0.00	0.00	0.00
<b>9 5/8"</b>									
2,530.0	15.58	32.94	2,458.5	458.0	296.8	545.8	0.00	0.00	0.00
2,600.0	15.58	32.94	2,526.0	473.8	307.1	564.6	0.00	0.00	0.00
2,700.0	15.58	32.94	2,622.3	496.4	321.7	591.5	0.00	0.00	0.00
2,800.0	15.58	32.94	2,718.6	518.9	336.3	618.3	0.00	0.00	0.00
2,900.0	15.58	32.94	2,814.9	541.4	350.9	645.2	0.00	0.00	0.00
3,000.0	15.58	32.94	2,911.3	564.0	365.5	672.0	0.00	0.00	0.00
3,100.0	15.58	32.94	3,007.6	586.5	380.1	698.9	0.00	0.00	0.00
3,200.0	15.58	32.94	3,103.9	609.1	394.7	725.8	0.00	0.00	0.00
3,300.0	15.58	32.94	3,200.2	631.6	409.3	752.6	0.00	0.00	0.00
3,400.0	15.58	32.94	3,296.6	654.1	423.9	779.5	0.00	0.00	0.00
3,500.0	15.58	32.94	3,392.9	676.7	438.5	806.4	0.00	0.00	0.00
3,600.0	15.58	32.94	3,489.2	699.2	453.1	833.2	0.00	0.00	0.00
3,700.0	15.58	32.94	3,585.5	721.8	467.7	860.1	0.00	0.00	0.00
3,800.0	15.58	32.94	3,681.9	744.3	482.3	886.9	0.00	0.00	0.00
3,900.0	15.58	32.94	3,778.2	766.9	497.0	913.8	0.00	0.00	0.00
4,000.0	15.58	32.94	3,874.5	789.4	511.6	940.7	0.00	0.00	0.00
4,100.0	15.58	32.94	3,970.8	811.9	526.2	967.5	0.00	0.00	0.00
4,200.0	15.58	32.94	4,067.2	834.5	540.8	994.4	0.00	0.00	0.00
4,300.0	15.58	32.94	4,163.5	857.0	555.4	1,021.2	0.00	0.00	0.00
4,400.0	15.58	32.94	4,259.8	879.6	570.0	1,048.1	0.00	0.00	0.00
4,500.0	15.58	32.94	4,356.1	902.1	584.6	1,075.0	0.00	0.00	0.00
4,600.0	15.58	32.94	4,452.5	924.7	599.2	1,101.8	0.00	0.00	0.00



# 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>	Wellbore #1		
<b>Design:</b>	Design #2		

## 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	15.58	32.94	4,548.8	947.2	613.8	1,128.7	0.00	0.00	0.00
4,800.0	15.58	32.94	4,645.1	969.7	628.4	1,155.6	0.00	0.00	0.00
<b>G' Sand</b>									
4,818.6	15.58	32.94	4,663.0	973.9	631.1	1,160.5	0.00	0.00	0.00
4,900.0	15.58	32.94	4,741.4	992.3	643.0	1,182.4	0.00	0.00	0.00
5,000.0	15.58	32.94	4,837.8	1,014.8	657.6	1,209.3	0.00	0.00	0.00
5,100.0	15.58	32.94	4,934.1	1,037.4	672.3	1,236.1	0.00	0.00	0.00
5,200.0	15.58	32.94	5,030.4	1,059.9	686.9	1,263.0	0.00	0.00	0.00
5,300.0	15.58	32.94	5,126.7	1,082.4	701.5	1,289.9	0.00	0.00	0.00
5,400.0	15.58	32.94	5,223.1	1,105.0	716.1	1,316.7	0.00	0.00	0.00
5,500.0	15.58	32.94	5,319.4	1,127.5	730.7	1,343.6	0.00	0.00	0.00
5,600.0	15.58	32.94	5,415.7	1,150.1	745.3	1,370.4	0.00	0.00	0.00
5,700.0	15.58	32.94	5,512.0	1,172.6	759.9	1,397.3	0.00	0.00	0.00
5,800.0	15.58	32.94	5,608.4	1,195.2	774.5	1,424.2	0.00	0.00	0.00
5,900.0	15.58	32.94	5,704.7	1,217.7	789.1	1,451.0	0.00	0.00	0.00
6,000.0	15.58	32.94	5,801.0	1,240.2	803.7	1,477.9	0.00	0.00	0.00
6,100.0	15.58	32.94	5,897.3	1,262.8	818.3	1,504.8	0.00	0.00	0.00
6,200.0	15.58	32.94	5,993.7	1,285.3	832.9	1,531.6	0.00	0.00	0.00
6,300.0	15.58	32.94	6,090.0	1,307.9	847.6	1,558.5	0.00	0.00	0.00
6,400.0	15.58	32.94	6,186.3	1,330.4	862.2	1,585.3	0.00	0.00	0.00
6,500.0	15.58	32.94	6,282.6	1,352.9	876.8	1,612.2	0.00	0.00	0.00
6,600.0	15.58	32.94	6,379.0	1,375.5	891.4	1,639.1	0.00	0.00	0.00
6,700.0	15.58	32.94	6,475.3	1,398.0	906.0	1,665.9	0.00	0.00	0.00
6,800.0	15.58	32.94	6,571.6	1,420.6	920.6	1,692.8	0.00	0.00	0.00
6,900.0	15.58	32.94	6,667.9	1,443.1	935.2	1,719.6	0.00	0.00	0.00
<b>Williams Fork</b>									
6,998.7	15.58	32.94	6,763.0	1,465.4	949.6	1,746.2	0.00	0.00	0.00
7,000.0	15.58	32.94	6,764.3	1,465.7	949.8	1,746.5	0.00	0.00	0.00
7,100.0	15.58	32.94	6,860.6	1,488.2	964.4	1,773.4	0.00	0.00	0.00
7,200.0	15.58	32.94	6,956.9	1,510.7	979.0	1,800.2	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
7,296.6	15.58	32.94	7,050.0	1,532.5	993.1	1,826.2	0.00	0.00	0.00
7,300.0	15.48	32.94	7,053.2	1,533.3	993.6	1,827.1	3.00	-3.00	0.00
7,400.0	12.48	32.94	7,150.3	1,553.6	1,006.8	1,851.2	3.00	-3.00	0.00
7,500.0	9.48	32.94	7,248.4	1,569.5	1,017.1	1,870.3	3.00	-3.00	0.00
7,600.0	6.48	32.94	7,347.4	1,581.2	1,024.7	1,884.2	3.00	-3.00	0.00
7,700.0	3.48	32.94	7,447.1	1,588.5	1,029.4	1,892.9	3.00	-3.00	0.00
7,800.0	0.48	32.94	7,547.0	1,591.4	1,031.3	1,896.3	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
7,816.0	0.00	0.00	7,563.0	1,591.4	1,031.3	1,896.4	3.00	-3.00	0.00
7,900.0	0.00	0.00	7,647.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,747.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,847.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,200.0	0.00	0.00	7,947.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,300.0	0.00	0.00	8,047.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,400.0	0.00	0.00	8,147.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,247.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,600.0	0.00	0.00	8,347.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,700.0	0.00	0.00	8,447.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,800.0	0.00	0.00	8,547.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
8,900.0	0.00	0.00	8,647.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,000.0	0.00	0.00	8,747.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
<b>Cameo</b>									
9,016.0	0.00	0.00	8,763.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00



# Well Planning Report



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Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC Federal 0697-03-03E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

## 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)
9,100.0	0.00	0.00	8,847.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,200.0	0.00	0.00	8,947.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,300.0	0.00	0.00	9,047.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,400.0	0.00	0.00	9,147.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,500.0	0.00	0.00	9,247.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,600.0	0.00	0.00	9,347.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,676.0	0.00	0.00	9,423.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,700.0	0.00	0.00	9,447.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
<b>Rollins</b>									
9,716.0	0.00	0.00	9,463.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,800.0	0.00	0.00	9,547.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
9,900.0	0.00	0.00	9,647.0	1,591.4	1,031.3	1,896.4	0.00	0.00	0.00
<b>TD @ 9966.0' MD / 9713.0' TVD</b>									
9,966.0	0.00	0.00	9,713.0	1,591.4	1,031.3	1,896.4	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	9,713.0	1,591.4	1,031.3	1,641,196.95	2,238,491.66	39.562788	-108.201427
- plan hits target center									
- Circle (radius 50.0)									

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,458.5	9 5/8"	9-5/8	12-1/4

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,818.6	4,663.0	G' Sand			
6,998.7	6,763.0	Williams Fork			
7,816.0	7,583.0	TOG			
9,016.0	8,763.0	Cameo			
9,676.0	9,423.0	Base Cameo Coal			
9,716.0	9,463.0	Rollins			



## 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>	Wellbore #1		
<b>Design:</b>	Design #2		

### Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
240.0	240.0	0.0	0.0	KOP (Build 3" / 100')
759.4	753.0	58.9	38.2	EOB @ 15.58" Inc. / 32.94" Azm
7,296.6	7,050.0	1,532.5	993.1	Drop 3" / 100'
7,816.0	7,563.0	1,591.4	1,031.3	EOD @ Vertical
9,966.0	9,713.0	1,591.4	1,031.3	TD @ 9966.0' MD / 9713.0' TVD