

**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 0697-03-10E**

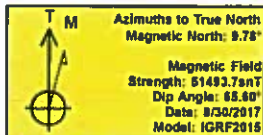
+N-S 0.0 +E-W 0.0 Northing 1639616.55 Easting 2237399.26  
Latitude 39.558362 Longitude -108.205133

Project: Garfield County, CO  
Site: CC 0697-03-07 Pad  
Well: CC 0697-03-10E  
Wellbore: Wellbore #1  
Design: Design #2  
Latitude: 39.558362  
Longitude: -108.205133  
Ground Level: 8428.0  
WELL @ 8458.0usft (30' RKB)



**REFERENCE INFORMATION**

Co-ordinate (N/E) Reference: Well CC 0697-03-10E, 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 TOP DETAILS**

TVDPath	MDPath	Formation
4656.0	4705.3	G' Sand
6756.0	6840.7	Williams Fork
7556.0	7650.3	TOG
8456.0	8550.3	Cameo
9416.0	9510.3	Base Cameo Coal
9456.0	9550.3	Rollins

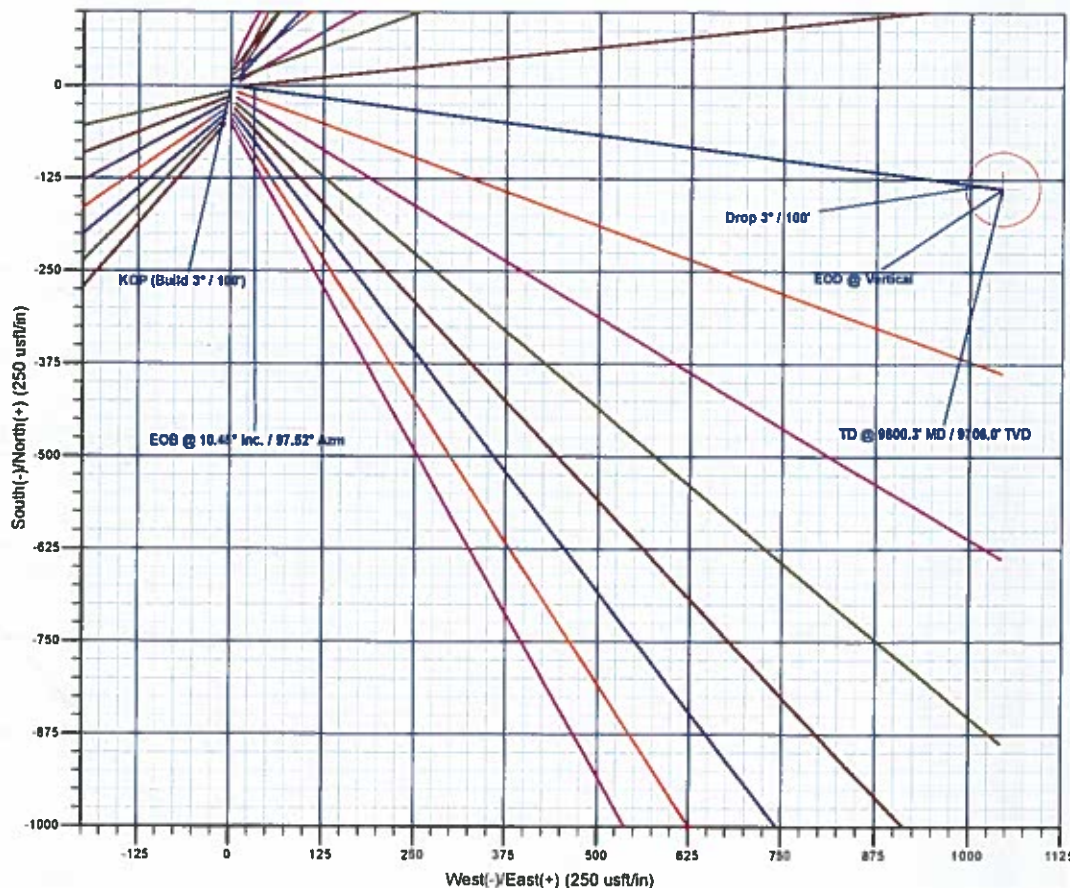
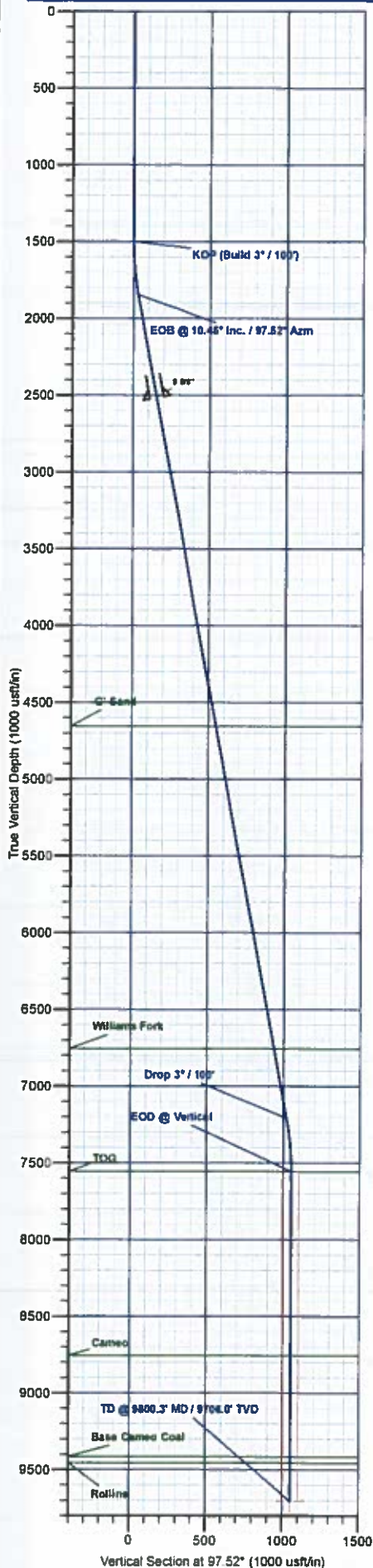


**DESIGN TARGET DETAILS**

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-03-10E	9706.0	-137.7	1043.2	1639447.94	2238437.95	39.557984	-108.201433

**SECTION DETAILS**

MD	Inc	Azi	TVD	+N-S	+E-W	Diag	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1500.0	0.00	0.00	1500.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3' / 100')
1848.2	10.45	97.52	1848.3	-4.1	31.4	3.00	97.52	31.7	EOB @ 10.45° Inc. / 97.52° Azm
7302.0	10.45	97.52	7309.7	-133.5	1011.8	0.00	0.00	1020.6	Drop 3' / 100'
7650.3	0.00	0.00	7556.0	-137.7	1043.2	3.00	180.00	1052.3	EOD @ Vertical
9800.3	0.00	0.00	9706.0	-137.7	1043.2	0.00	0.00	1052.3	TD @ 9800.3' MD / 9706.0' TVD



Plan: Design #2 (CC 0697-03-10E/Wellbore #1)

Created By: Will Jircik Date: 10/24, October 24 2017



## **Laramie Energy, LLC**

**Garfield County, CO**

**CC 0697-03-07 Pad**

**CC 0697-03-10E**

**Wellbore #1**

**Plan: Design #2**

## **QES Well Planning Report**

**24 October, 2017**





## Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-03-10E
<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 0697-03-10E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #2		

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

Well	CC 0697-03-10E					
Well Position	+N/-S	1,498.9 usft	Northing:	1,639,616.59 usft	Latitude:	39.558362
	+E/-W	479.9 usft	Easting:	2,237,399.28 usft	Longitude:	-108.205133
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,428.0 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	8/30/2017	9.78	65.60	51,493.74712818

<b>Design</b>	Design #2			
<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	97.52

<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	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,848.2	10.45	97.52	1,846.3	-4.1	31.4	3.00	3.00	0.00	97.52	
7,302.0	10.45	97.52	7,209.7	-133.5	1,011.8	0.00	0.00	0.00	0.00	
7,650.3	0.00	0.00	7,556.0	-137.7	1,043.2	3.00	-3.00	0.00	180.00	
8,800.3	0.00	0.00	8,706.0	-137.7	1,043.2	0.00	0.00	0.00	0.00	PBHL - CC 0697-03-1





## Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10E
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 0697-03-10E	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
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	3.00	97.52	1,600.0	-0.3	2.6	2.6	3.00	3.00	0.00
1,700.0	6.00	97.52	1,699.6	-1.4	10.4	10.5	3.00	3.00	0.00
1,800.0	9.00	97.52	1,798.8	-3.1	23.3	23.5	3.00	3.00	0.00
EOB @ 10.45° Inc. / 97.52° Azm									
1,848.2	10.45	97.52	1,846.3	-4.1	31.4	31.7	3.00	3.00	0.00
1,900.0	10.45	97.52	1,897.2	-5.4	40.7	41.0	0.00	0.00	0.00
2,000.0	10.45	97.52	1,995.6	-7.7	58.7	59.2	0.00	0.00	0.00
2,100.0	10.45	97.52	2,093.9	-10.1	76.6	77.3	0.00	0.00	0.00
2,200.0	10.45	97.52	2,192.2	-12.5	94.6	95.4	0.00	0.00	0.00
2,300.0	10.45	97.52	2,290.6	-14.9	112.6	113.6	0.00	0.00	0.00
2,400.0	10.45	97.52	2,388.9	-17.2	130.6	131.7	0.00	0.00	0.00
2,500.0	10.45	97.52	2,487.3	-19.6	148.6	149.8	0.00	0.00	0.00
9 5/8"									
2,530.0	10.45	97.52	2,516.8	-20.3	154.0	155.3	0.00	0.00	0.00
2,600.0	10.45	97.52	2,585.6	-22.0	166.5	168.0	0.00	0.00	0.00
2,700.0	10.45	97.52	2,684.0	-24.3	184.5	186.1	0.00	0.00	0.00
2,800.0	10.45	97.52	2,782.3	-26.7	202.5	204.2	0.00	0.00	0.00
2,900.0	10.45	97.52	2,880.6	-29.1	220.5	222.4	0.00	0.00	0.00
3,000.0	10.45	97.52	2,979.0	-31.5	238.4	240.5	0.00	0.00	0.00
3,100.0	10.45	97.52	3,077.3	-33.8	256.4	258.6	0.00	0.00	0.00
3,200.0	10.45	97.52	3,175.7	-36.2	274.4	276.8	0.00	0.00	0.00
3,300.0	10.45	97.52	3,274.0	-38.6	292.4	294.9	0.00	0.00	0.00
3,400.0	10.45	97.52	3,372.3	-41.0	310.4	313.0	0.00	0.00	0.00
3,500.0	10.45	97.52	3,470.7	-43.3	328.3	331.2	0.00	0.00	0.00
3,600.0	10.45	97.52	3,569.0	-45.7	346.3	349.3	0.00	0.00	0.00
3,700.0	10.45	97.52	3,667.4	-48.1	364.3	367.4	0.00	0.00	0.00
3,800.0	10.45	97.52	3,765.7	-50.4	382.3	385.6	0.00	0.00	0.00
3,900.0	10.45	97.52	3,864.1	-52.8	400.2	403.7	0.00	0.00	0.00
4,000.0	10.45	97.52	3,962.4	-55.2	418.2	421.8	0.00	0.00	0.00
4,100.0	10.45	97.52	4,060.7	-57.6	436.2	440.0	0.00	0.00	0.00
4,200.0	10.45	97.52	4,159.1	-59.9	454.2	458.1	0.00	0.00	0.00
4,300.0	10.45	97.52	4,257.4	-62.3	472.1	476.2	0.00	0.00	0.00
4,400.0	10.45	97.52	4,355.8	-64.7	490.1	494.4	0.00	0.00	0.00
4,500.0	10.45	97.52	4,454.1	-67.0	508.1	512.5	0.00	0.00	0.00
4,600.0	10.45	97.52	4,552.5	-69.4	526.1	530.6	0.00	0.00	0.00
4,700.0	10.45	97.52	4,650.8	-71.8	544.1	548.8	0.00	0.00	0.00



## Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10E
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 0697-03-10E	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)
<b>G' Sand</b>									
4,705.3	10.45	97.52	4,656.0	-71.9	545.0	549.7	0.00	0.00	0.00
4,800.0	10.45	97.52	4,749.1	-74.2	562.0	566.9	0.00	0.00	0.00
4,900.0	10.45	97.52	4,847.5	-76.5	580.0	585.0	0.00	0.00	0.00
5,000.0	10.45	97.52	4,945.8	-78.9	598.0	603.2	0.00	0.00	0.00
5,100.0	10.45	97.52	5,044.2	-81.3	616.0	621.3	0.00	0.00	0.00
5,200.0	10.45	97.52	5,142.5	-83.7	633.9	639.4	0.00	0.00	0.00
5,300.0	10.45	97.52	5,240.9	-86.0	651.9	657.6	0.00	0.00	0.00
5,400.0	10.45	97.52	5,339.2	-88.4	669.9	675.7	0.00	0.00	0.00
5,500.0	10.45	97.52	5,437.5	-90.8	687.9	693.8	0.00	0.00	0.00
5,600.0	10.45	97.52	5,535.9	-93.1	705.9	712.0	0.00	0.00	0.00
5,700.0	10.45	97.52	5,634.2	-95.5	723.8	730.1	0.00	0.00	0.00
5,800.0	10.45	97.52	5,732.6	-97.9	741.8	748.2	0.00	0.00	0.00
5,900.0	10.45	97.52	5,830.9	-100.3	759.8	766.4	0.00	0.00	0.00
6,000.0	10.45	97.52	5,929.2	-102.6	777.8	784.5	0.00	0.00	0.00
6,100.0	10.45	97.52	6,027.6	-105.0	795.7	802.6	0.00	0.00	0.00
6,200.0	10.45	97.52	6,125.9	-107.4	813.7	820.8	0.00	0.00	0.00
6,300.0	10.45	97.52	6,224.3	-109.7	831.7	838.9	0.00	0.00	0.00
6,400.0	10.45	97.52	6,322.6	-112.1	849.7	857.0	0.00	0.00	0.00
6,500.0	10.45	97.52	6,421.0	-114.5	867.7	875.2	0.00	0.00	0.00
6,600.0	10.45	97.52	6,519.3	-116.9	885.6	893.3	0.00	0.00	0.00
6,700.0	10.45	97.52	6,617.6	-119.2	903.6	911.4	0.00	0.00	0.00
6,800.0	10.45	97.52	6,716.0	-121.6	921.6	929.6	0.00	0.00	0.00
<b>Williams Fork</b>									
6,840.7	10.45	97.52	6,756.0	-122.6	928.9	936.9	0.00	0.00	0.00
6,900.0	10.45	97.52	6,814.3	-124.0	939.6	947.7	0.00	0.00	0.00
7,000.0	10.45	97.52	6,912.7	-126.3	957.5	965.8	0.00	0.00	0.00
7,100.0	10.45	97.52	7,011.0	-128.7	975.5	984.0	0.00	0.00	0.00
7,200.0	10.45	97.52	7,109.4	-131.1	993.5	1,002.1	0.00	0.00	0.00
7,300.0	10.45	97.52	7,207.7	-133.5	1,011.5	1,020.2	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
7,302.0	10.45	97.52	7,209.7	-133.5	1,011.8	1,020.6	0.00	0.00	0.00
7,400.0	7.51	97.52	7,306.4	-135.5	1,027.0	1,035.9	3.00	-3.00	0.00
7,500.0	4.51	97.52	7,405.9	-136.9	1,037.4	1,046.4	3.00	-3.00	0.00
7,600.0	1.51	97.52	7,505.7	-137.6	1,042.6	1,051.6	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
7,650.3	0.00	0.00	7,556.0	-137.7	1,043.2	1,052.3	3.00	-3.00	0.00
7,700.0	0.00	0.00	7,605.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
7,800.0	0.00	0.00	7,705.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,805.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,905.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,100.0	0.00	0.00	8,005.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,200.0	0.00	0.00	8,105.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,300.0	0.00	0.00	8,205.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,400.0	0.00	0.00	8,305.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,500.0	0.00	0.00	8,405.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,600.0	0.00	0.00	8,505.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,700.0	0.00	0.00	8,605.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,800.0	0.00	0.00	8,705.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
<b>Cameo</b>									
8,850.3	0.00	0.00	8,756.0	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
8,900.0	0.00	0.00	8,805.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,000.0	0.00	0.00	8,905.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,100.0	0.00	0.00	9,005.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00



## Well Planning Report



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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 0697-03-10E	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)
9,200.0	0.00	0.00	9,105.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,300.0	0.00	0.00	9,205.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,400.0	0.00	0.00	9,305.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,500.0	0.00	0.00	9,405.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,510.3	0.00	0.00	9,416.0	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
<b>Rollins</b>									
9,550.3	0.00	0.00	9,456.0	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,600.0	0.00	0.00	9,505.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,700.0	0.00	0.00	9,605.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
9,800.0	0.00	0.00	9,705.7	-137.7	1,043.2	1,052.3	0.00	0.00	0.00
<b>TD @ 9800.3' MD / 9706.0' TVD</b>									
9,800.3	0.00	0.00	9,706.0	-137.7	1,043.2	1,052.3	0.00	0.00	0.00

## Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL - CC 0697-03-10E - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,706.0	-137.7	1,043.2	1,639,447.94	2,238,437.95	39.557984	-108.201433

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,516.8	9 5/8"	9-5/8	12-1/4

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,705.3	4,656.0	G' Sand			
6,840.7	6,756.0	Williams Fork			
7,650.3	7,556.0	TOG			
8,850.3	8,756.0	Cameo			
9,510.3	9,416.0	Base Cameo Coal			
9,550.3	9,456.0	Rollins			



# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-03-10E
<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 0697-03-10E	<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)	
1,500.0	1,500.0	0.0	0.0	KOP (Build 3" / 100')
1,848.2	1,846.3	-4.1	31.4	EOB @ 10.45° Inc. / 97.52° Azm
7,302.0	7,209.7	-133.5	1,011.8	Drop 3" / 100'
7,650.3	7,556.0	-137.7	1,043.2	EOD @ Vertical
9,800.3	9,706.0	-137.7	1,043.2	TD @ 9800.3' MD / 9706.0' TVD