

## 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

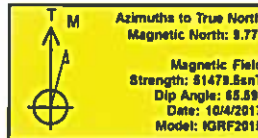
## WELL DETAILS: CC Federal 0697-04-05E

+N/-S 0.0 +E/-W 0.0 Northing 1639422.31 Easting 2233532.68 8609.0  
 Latitude 39.557512 Longitude -108.218820

Project: Garfield County, CO  
 Site: CC 604-41-32 Pad  
 Well: CC Federal 0697-04-05E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.557512  
 Longitude: -108.218820  
 Ground Level: 8609.0  
 well @ 8633.0usft (24' RKB)

## FORMATION TOP DETAILS

TVDPATH	MDPATH	FORMATION
4771.0	4804.3	Wasatch 'G' Sand
6471.0	6517.1	Ohio Creek
6621.0	6668.2	Williams Fork
7421.0	7473.1	TOG
8071.0	8123.1	Cameo
8301.0	8353.1	Base Cameo Coal
8321.0	8373.1	Rollins



## REFERENCE INFORMATION

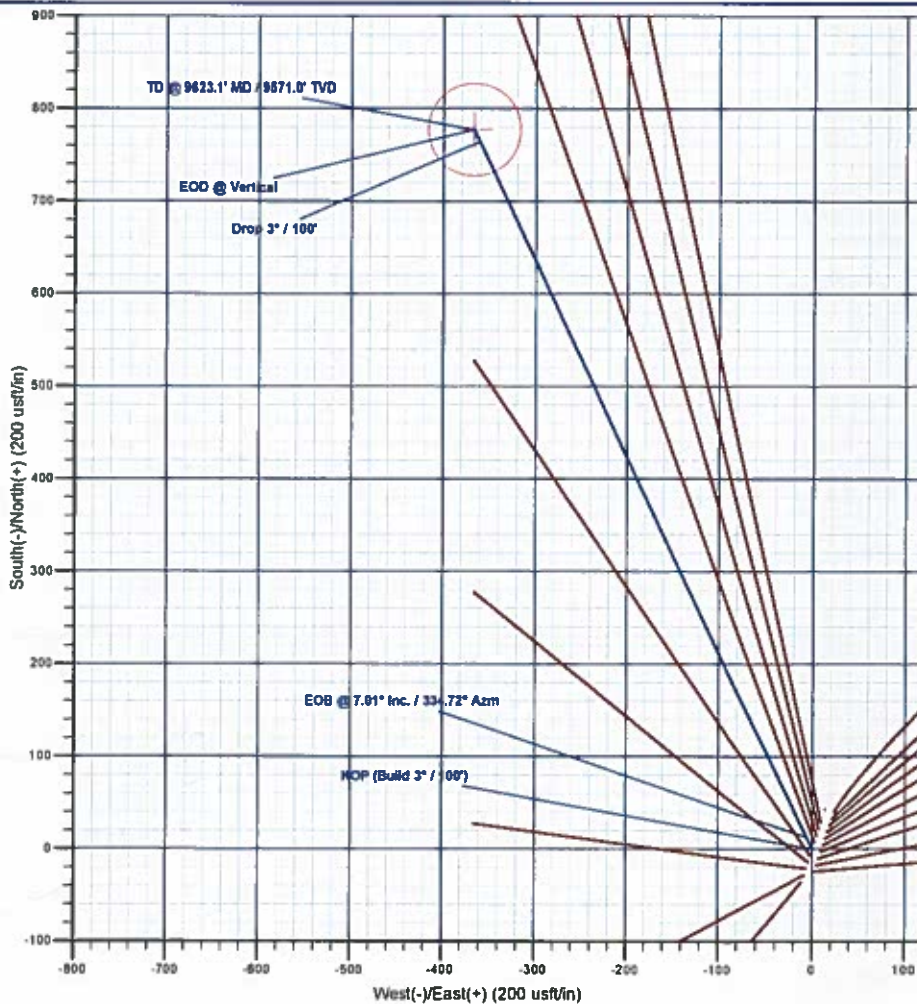
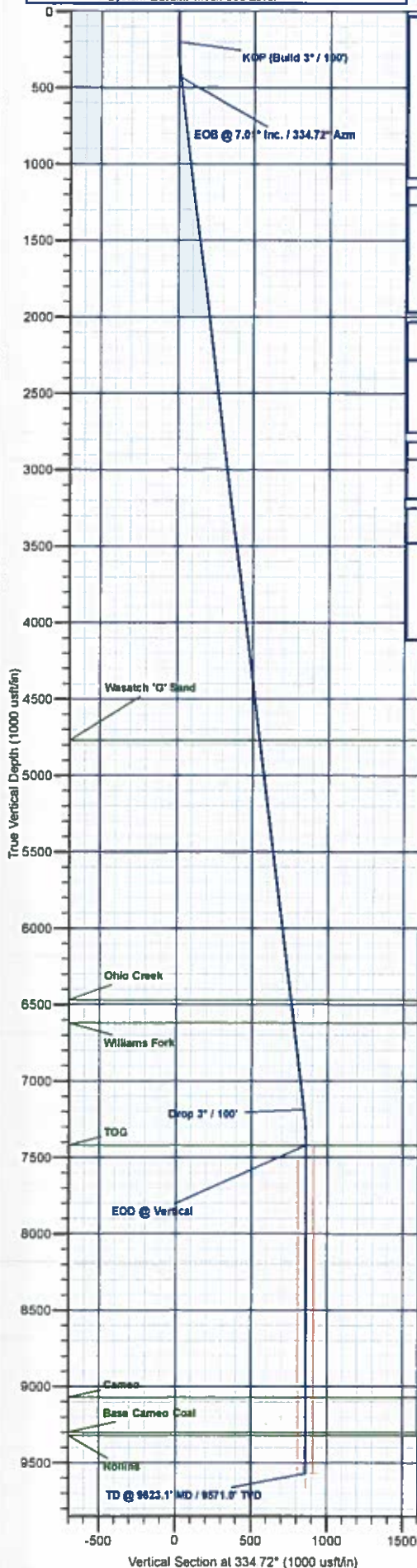
Co-ordinate (N/E) Reference: Well CC Federal 0697-04-05E, True North  
 Vertical (TVD) Reference: well @ 8633.0usft (24' RKB)  
 Section (VS) Reference: Slot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 8633.0usft (24' RKB)  
 Calculation Method: Minimum Curvature

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-04-05E	9571.0	777.3	-367.1	1640210.26	2233189.01	39.559646	-108.220122

## SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V/Sect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3" / 100')
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	EOB @ 7.01° Inc. / 334.72° Azm
433.0	7.01	334.72	433.2	12.9	-6.1	3.00	334.72	14.3	Drop 3" / 100'
7239.3	7.01	334.72	7187.8	764.4	-361.0	0.00	0.00	845.3	EOB @ Vertical
7473.1	0.00	0.00	7421.0	777.3	-367.1	3.00	180.00	859.8	TD @ Vertical
9623.1	0.00	0.00	9571.0	777.3	-367.1	0.00	0.00	859.8	TD @ 9623.1' MD / 9571.0' TVD



Plan: Design #1 (CC Federal 0697-04-05E/Wellbore #1)

Created By: Will Jircik

Date: 15:16, October 04 2017



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 604-41-32 Pad**

**CC Federal 0697-04-05E**

**Wellbore #1**

**Plan: Design #1**

## **QES Well Planning Report**

**04 October, 2017**





# Well Planning Report



<b>Database:</b>	EDM 5000 1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC Federal 0697-04-05E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 8633 0usft (24' RKB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	well @ 8633 0usft (24' RKB)
<b>Site:</b>	CC 604-41-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-04-05E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #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		

<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 0697-04-05E			
<b>Well Position</b>	+N/-S	-42.8 usft	<b>Northing:</b>	1,639,422.30 usft
	+E/-W	-14.2 usft	<b>Easting:</b>	2,233,532.68 usft
<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	51,479.49224548

<b>Design</b>	Design #1			
<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	334.72

<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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
433.8	7.01	334.72	433.2	12.9	-6.1	3.00	3.00	0.00	334.72	
7,239.3	7.01	334.72	7,187.8	764.4	-361.0	0.00	0.00	0.00	0.00	
7,473.1	0.00	0.00	7,421.0	777.3	-367.1	3.00	-3.00	0.00	180.00	
9,623.1	0.00	0.00	9,571.0	777.3	-367.1	0.00	0.00	0.00	0.00	PBHL - CC Federal 0697-04-05E





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC Federal 0697-04-05E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 8633.0usft (24' RKB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	well @ 8633.0usft (24' RKB)
<b>Site:</b>	CC 604-41-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-04-05E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #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
<b>KOP (Build 3° / 100')</b>									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	3.00	334.72	300.0	2.4	-1.1	2.6	3.00	3.00	0.00
400.0	6.00	334.72	399.6	9.5	-4.5	10.5	3.00	3.00	0.00
<b>EOB @ 7.01° Inc. / 334.72° Azm</b>									
433.8	7.01	334.72	433.2	12.9	-6.1	14.3	3.00	3.00	0.00
500.0	7.01	334.72	498.9	20.2	-9.6	22.4	0.00	0.00	0.00
600.0	7.01	334.72	598.2	31.3	-14.8	34.6	0.00	0.00	0.00
700.0	7.01	334.72	697.4	42.3	-20.0	46.8	0.00	0.00	0.00
800.0	7.01	334.72	796.7	53.4	-25.2	59.0	0.00	0.00	0.00
900.0	7.01	334.72	895.9	64.4	-30.4	71.2	0.00	0.00	0.00
1,000.0	7.01	334.72	995.2	75.4	-35.6	83.4	0.00	0.00	0.00
1,100.0	7.01	334.72	1,094.4	86.5	-40.8	95.6	0.00	0.00	0.00
1,200.0	7.01	334.72	1,193.7	97.5	-46.1	107.9	0.00	0.00	0.00
1,300.0	7.01	334.72	1,292.9	108.6	-51.3	120.1	0.00	0.00	0.00
1,400.0	7.01	334.72	1,392.2	119.6	-56.5	132.3	0.00	0.00	0.00
1,500.0	7.01	334.72	1,491.4	130.7	-61.7	144.5	0.00	0.00	0.00
1,600.0	7.01	334.72	1,590.7	141.7	-66.9	156.7	0.00	0.00	0.00
1,700.0	7.01	334.72	1,689.9	152.7	-72.1	168.9	0.00	0.00	0.00
1,800.0	7.01	334.72	1,789.2	163.8	-77.3	181.1	0.00	0.00	0.00
1,900.0	7.01	334.72	1,888.4	174.8	-82.6	193.3	0.00	0.00	0.00
2,000.0	7.01	334.72	1,987.7	185.9	-87.8	205.5	0.00	0.00	0.00
2,100.0	7.01	334.72	2,086.9	196.9	-93.0	217.8	0.00	0.00	0.00
2,200.0	7.01	334.72	2,186.2	207.9	-98.2	230.0	0.00	0.00	0.00
2,300.0	7.01	334.72	2,285.4	219.0	-103.4	242.2	0.00	0.00	0.00
2,400.0	7.01	334.72	2,384.7	230.0	-108.6	254.4	0.00	0.00	0.00
2,500.0	7.01	334.72	2,484.0	241.1	-113.8	266.6	0.00	0.00	0.00
<b>9 5/8"</b>									
2,524.0	7.01	334.72	2,507.8	243.7	-115.1	269.5	0.00	0.00	0.00
2,600.0	7.01	334.72	2,583.2	252.1	-119.1	278.8	0.00	0.00	0.00
2,700.0	7.01	334.72	2,682.5	263.2	-124.3	291.0	0.00	0.00	0.00
2,800.0	7.01	334.72	2,781.7	274.2	-129.5	303.2	0.00	0.00	0.00
2,900.0	7.01	334.72	2,881.0	285.2	-134.7	315.5	0.00	0.00	0.00
3,000.0	7.01	334.72	2,980.2	296.3	-139.9	327.7	0.00	0.00	0.00
3,100.0	7.01	334.72	3,079.5	307.3	-145.1	339.9	0.00	0.00	0.00
3,200.0	7.01	334.72	3,178.7	318.4	-150.4	352.1	0.00	0.00	0.00
3,300.0	7.01	334.72	3,278.0	329.4	-155.6	364.3	0.00	0.00	0.00
3,400.0	7.01	334.72	3,377.2	340.5	-160.8	376.5	0.00	0.00	0.00
3,500.0	7.01	334.72	3,476.5	351.5	-166.0	388.7	0.00	0.00	0.00
3,600.0	7.01	334.72	3,575.7	362.5	-171.2	400.9	0.00	0.00	0.00
3,700.0	7.01	334.72	3,675.0	373.6	-176.4	413.1	0.00	0.00	0.00
3,800.0	7.01	334.72	3,774.2	384.6	-181.6	425.4	0.00	0.00	0.00
3,900.0	7.01	334.72	3,873.5	395.7	-186.8	437.6	0.00	0.00	0.00
4,000.0	7.01	334.72	3,972.7	406.7	-192.1	449.8	0.00	0.00	0.00
4,100.0	7.01	334.72	4,072.0	417.7	-197.3	462.0	0.00	0.00	0.00
4,200.0	7.01	334.72	4,171.2	428.8	-202.5	474.2	0.00	0.00	0.00
4,300.0	7.01	334.72	4,270.5	439.8	-207.7	486.4	0.00	0.00	0.00
4,400.0	7.01	334.72	4,369.7	450.9	-212.9	498.6	0.00	0.00	0.00
4,500.0	7.01	334.72	4,469.0	461.9	-218.1	510.8	0.00	0.00	0.00
4,600.0	7.01	334.72	4,568.2	473.0	-223.4	523.0	0.00	0.00	0.00
4,700.0	7.01	334.72	4,667.5	484.0	-228.6	535.3	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 0697-04-05E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 8633.0usft (24' RKB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	well @ 8633.0usft (24' RKB)
<b>Site:</b>	CC 604-41-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0697-04-05E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #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)
4,800.0	7.01	334.72	4,766.7	495.0	-233.8	547.5	0.00	0.00	0.00
<b>Wasatch 'G' Sand</b>									
4,804.3	7.01	334.72	4,771.0	495.5	-234.0	548.0	0.00	0.00	0.00
4,900.0	7.01	334.72	4,866.0	506.1	-239.0	559.7	0.00	0.00	0.00
5,000.0	7.01	334.72	4,965.2	517.1	-244.2	571.9	0.00	0.00	0.00
5,100.0	7.01	334.72	5,064.5	528.2	-249.4	584.1	0.00	0.00	0.00
5,200.0	7.01	334.72	5,163.7	539.2	-254.6	596.3	0.00	0.00	0.00
5,300.0	7.01	334.72	5,263.0	550.3	-259.9	608.5	0.00	0.00	0.00
5,400.0	7.01	334.72	5,362.2	561.3	-265.1	620.7	0.00	0.00	0.00
5,500.0	7.01	334.72	5,461.5	572.3	-270.3	632.9	0.00	0.00	0.00
5,600.0	7.01	334.72	5,560.8	583.4	-275.5	645.2	0.00	0.00	0.00
5,700.0	7.01	334.72	5,660.0	594.4	-280.7	657.4	0.00	0.00	0.00
5,800.0	7.01	334.72	5,759.3	605.5	-285.9	669.6	0.00	0.00	0.00
5,900.0	7.01	334.72	5,858.5	616.5	-291.1	681.8	0.00	0.00	0.00
6,000.0	7.01	334.72	5,957.8	627.5	-296.4	694.0	0.00	0.00	0.00
6,100.0	7.01	334.72	6,057.0	638.6	-301.6	706.2	0.00	0.00	0.00
6,200.0	7.01	334.72	6,156.3	649.6	-306.8	718.4	0.00	0.00	0.00
6,300.0	7.01	334.72	6,255.5	660.7	-312.0	730.6	0.00	0.00	0.00
6,400.0	7.01	334.72	6,354.8	671.7	-317.2	742.9	0.00	0.00	0.00
6,500.0	7.01	334.72	6,454.0	682.8	-322.4	755.1	0.00	0.00	0.00
<b>Ohio Creek</b>									
6,517.1	7.01	334.72	6,471.0	684.6	-323.3	757.2	0.00	0.00	0.00
6,600.0	7.01	334.72	6,553.3	693.8	-327.7	767.3	0.00	0.00	0.00
<b>Williams Fork</b>									
6,668.2	7.01	334.72	6,621.0	701.3	-331.2	775.6	0.00	0.00	0.00
6,700.0	7.01	334.72	6,652.5	704.8	-332.9	779.5	0.00	0.00	0.00
6,800.0	7.01	334.72	6,751.8	715.9	-338.1	791.7	0.00	0.00	0.00
6,900.0	7.01	334.72	6,851.0	726.9	-343.3	803.9	0.00	0.00	0.00
7,000.0	7.01	334.72	6,950.3	738.0	-348.5	816.1	0.00	0.00	0.00
7,100.0	7.01	334.72	7,049.5	749.0	-353.7	828.3	0.00	0.00	0.00
7,200.0	7.01	334.72	7,148.8	760.1	-358.9	840.5	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
7,239.3	7.01	334.72	7,187.8	764.4	-361.0	845.3	0.00	0.00	0.00
7,300.0	5.19	334.72	7,248.1	770.2	-363.7	851.8	3.00	-3.00	0.00
7,400.0	2.19	334.72	7,347.9	776.0	-366.5	858.2	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
7,473.1	0.00	0.00	7,421.0	777.3	-367.1	859.6	3.00	-3.00	0.00
7,500.0	0.00	0.00	7,447.9	777.3	-367.1	859.6	0.00	0.00	0.00
7,600.0	0.00	0.00	7,547.9	777.3	-367.1	859.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,647.9	777.3	-367.1	859.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,747.9	777.3	-367.1	859.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,847.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,947.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,100.0	0.00	0.00	8,047.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,200.0	0.00	0.00	8,147.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,300.0	0.00	0.00	8,247.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,400.0	0.00	0.00	8,347.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,500.0	0.00	0.00	8,447.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,600.0	0.00	0.00	8,547.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,700.0	0.00	0.00	8,647.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,800.0	0.00	0.00	8,747.9	777.3	-367.1	859.6	0.00	0.00	0.00
8,900.0	0.00	0.00	8,847.9	777.3	-367.1	859.6	0.00	0.00	0.00
9,000.0	0.00	0.00	8,947.9	777.3	-367.1	859.6	0.00	0.00	0.00
9,100.0	0.00	0.00	9,047.9	777.3	-367.1	859.6	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 0897-04-05E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 8633 0usft (24' RKB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	well @ 8633 0usft (24' RKB)
<b>Site:</b>	CC 604-41-32 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC Federal 0897-04-05E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #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)
<b>Cameo</b>									
9,123.1	0.00	0.00	9,071.0	777.3	-367.1	859.6	0.00	0.00	0.00
9,200.0	0.00	0.00	9,147.9	777.3	-367.1	859.6	0.00	0.00	0.00
9,300.0	0.00	0.00	9,247.9	777.3	-367.1	859.6	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,353.1	0.00	0.00	9,301.0	777.3	-367.1	859.6	0.00	0.00	0.00
<b>Rollins</b>									
9,373.1	0.00	0.00	9,321.0	777.3	-367.1	859.6	0.00	0.00	0.00
9,400.0	0.00	0.00	9,347.9	777.3	-367.1	859.6	0.00	0.00	0.00
9,500.0	0.00	0.00	9,447.9	777.3	-367.1	859.6	0.00	0.00	0.00
9,600.0	0.00	0.00	9,547.9	777.3	-367.1	859.6	0.00	0.00	0.00
<b>TD @ 9623.1' MD / 9571.0' TVD</b>									
9,623.1	0.00	0.00	9,571.0	777.3	-367.1	859.6	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 069;	0.00	0.00	9,571.0	777.3	-367.1	1,840,210.25	2,233,189.01	39.559646	-108.220122
- plan hits target center									
- Circle (radius 50.0)									

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,507.8	9 5/8"	9-5/8	14-3/4

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,804.3	4,771.0	Wasatch 'G' Sand			
6,517.1	6,471.0	Ohio Creek			
6,668.2	6,621.0	Williams Fork			
7,473.1	7,421.0	TOG			
9,123.1	9,071.0	Cameo			
9,353.1	9,301.0	Base Cameo Coal			
9,373.1	9,321.0	Rollins			



## 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 0697-04-05E  
**Wellbore:** Wellbore #1  
**Design:** Design #1

**Local Co-ordinate Reference:** Well CC Federal 0697-04-05E  
**TVD Reference:** well @ 8633.0usft (24' RKB)  
**MD Reference:** well @ 8633.0usft (24' RKB)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature

### 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" / 100')
433.8	433.2	12.9	-6.1	EOB @ 7.01" Inc. / 334.72' Azm
7,239.3	7,167.8	764.4	-361.0	Drop 3" / 100'
7,473.1	7,421.0	777.3	-367.1	EOD @ Vertical
9,623.1	9,571.0	777.3	-367.1	TD @ 9623.1' MD / 9571.0' TVD