

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 0697-03-03W

+N/-S 0.0 +E/-W 0.0 Northing 1639447.23 Easting 223562.33 8609.0 Latitude 39.557582 Longitude -108.218753

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC Federal 0697-03-03W
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557582
Longitude: -108.218753
Ground Level: 8609.0
well @ 8633.0usft (24'RKB)



DIRECTIONAL DRILLING



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC Federal 0697-03-03W, 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



Azimuths to True North
Magnetic North: 9.77°
Magnetic Field
Strength: 51479.5nT
Dip Angle: 66.53°
Date: 10/4/2017
Model: IGRF2015

FORMATION TOP DETAILS

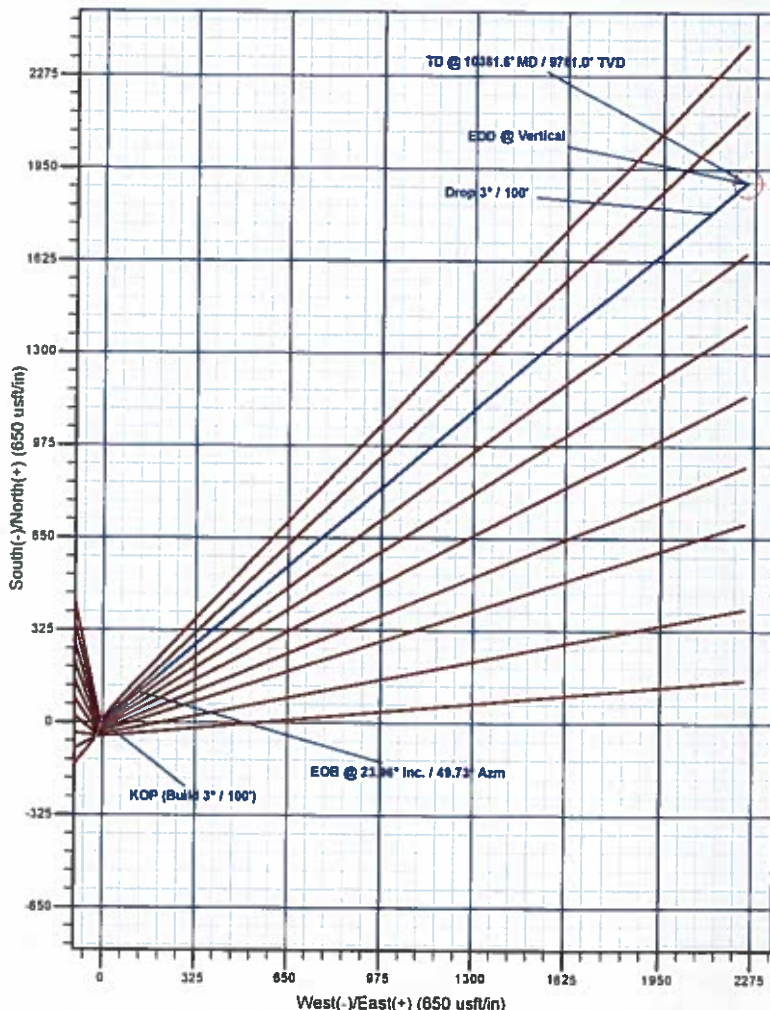
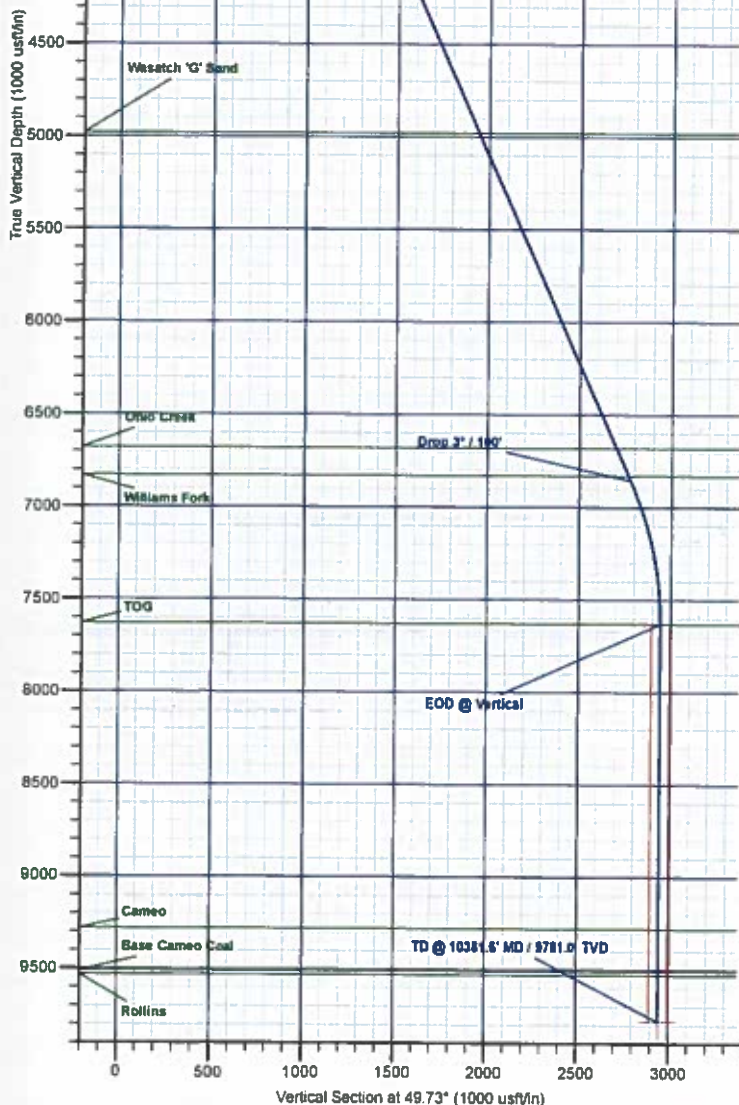
TVDPath	MDPath	Formation
4981.0	5381.8	Wasatch 'G' Sand
6881.0	7242.1	Ohio Creek
8631.0	7486.2	Williams Fork
7831.0	8231.6	TOG
9281.0	9881.6	Cameo
9511.0	10111.6	Base Cameo Coal
9531.0	10131.6	Rollins

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-03-03W	9781.0	1901.8	2244.7	1641281.05	223562.98	39.562803	-108.210791

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
998.7	23.96	49.73	975.6	106.4	126.6	3.00	49.73	164.6	KOP (Build 3° / 100')
7432.9	23.96	49.73	6855.4	1795.5	2119.2	0.00	0.00	2777.6	EOB @ 23.96° Inc. / 49.73° Azm
8231.6	0.00	0.00	7631.0	1901.8	2244.7	3.00	180.00	2942.1	Drop 3° / 100'
10381.6	0.00	0.00	9781.0	1901.8	2244.7	0.00	0.00	2942.1	EOO @ Vertical
									TD @ 10381.6' MD / 9781.0' TVD



Created By: Will Jircik Date: 14:17, October 04 2017



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC Federal 0697-03-03W

Wellbore #1

Plan: Design #1

QES Well Planning Report

04 October, 2017





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-03W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633.0usft (24'RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24'RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-03-03W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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 604-41-32 Pad			
Site Position:		Northing:	1,639,464.67 usft	Latitude: 39.557630
From:	Lat/Long	Easting:	2,233,548.14 usft	Longitude: -108.218770
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -1.71 *

Well	CC Federal 0697-03-03W			
Well Position	+N/-S	-17.3 usft	Northing: 1,639,447.23 usft	Latitude: 39.557582
	+E/-W	4.7 usft	Easting: 2,233,552.33 usft	Longitude: -108.218753
Position Uncertainty	0.0 usft	Wellhead Elevation:		Ground Level: 8,609.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/4/2017	9.77	65.59	51,479.53844161

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	49.73

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
998.7	23.96	49.73	975.6	106.4	125.6	3.00	3.00	0.00	49.73	
7,432.9	23.96	49.73	6,855.4	1,795.5	2,119.2	0.00	0.00	0.00	0.00	
8,231.6	0.00	0.00	7,631.0	1,901.8	2,244.7	3.00	-3.00	0.00	180.00	
10,381.6	0.00	0.00	9,781.0	1,901.8	2,244.7	0.00	0.00	0.00	0.00	PBHL - CC Federal 01



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-03W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633 0usft (24'RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633 0usft (24'RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-03-03W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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
KOP (Build 3° / 100')									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	3.00	49.73	300.0	1.7	2.0	2.6	3.00	3.00	0.00
400.0	6.00	49.73	399.6	6.8	8.0	10.5	3.00	3.00	0.00
500.0	9.00	49.73	498.8	15.2	17.9	23.5	3.00	3.00	0.00
600.0	12.00	49.73	597.1	27.0	31.8	41.7	3.00	3.00	0.00
700.0	15.00	49.73	694.3	42.1	49.7	65.1	3.00	3.00	0.00
800.0	18.00	49.73	790.2	60.4	71.3	93.5	3.00	3.00	0.00
900.0	21.00	49.73	884.4	82.0	96.8	126.9	3.00	3.00	0.00
EOB @ 23.96° Inc. / 49.73° Azm									
998.7	23.96	49.73	975.6	106.4	125.6	164.6	3.00	3.00	0.00
1,000.0	23.96	49.73	976.8	106.7	126.0	165.1	0.00	0.00	0.00
1,100.0	23.96	49.73	1,068.2	133.0	157.0	205.7	0.00	0.00	0.00
1,200.0	23.96	49.73	1,159.6	159.2	187.9	246.3	0.00	0.00	0.00
1,300.0	23.96	49.73	1,251.0	185.5	218.9	286.9	0.00	0.00	0.00
1,400.0	23.96	49.73	1,342.3	211.7	249.9	327.6	0.00	0.00	0.00
1,500.0	23.96	49.73	1,433.7	238.0	280.9	368.2	0.00	0.00	0.00
1,600.0	23.96	49.73	1,525.1	264.2	311.9	408.8	0.00	0.00	0.00
1,700.0	23.96	49.73	1,616.5	290.5	342.9	449.4	0.00	0.00	0.00
1,800.0	23.96	49.73	1,707.9	316.7	373.9	490.0	0.00	0.00	0.00
1,900.0	23.96	49.73	1,799.3	343.0	404.8	530.6	0.00	0.00	0.00
2,000.0	23.96	49.73	1,890.6	369.2	435.6	571.2	0.00	0.00	0.00
2,100.0	23.96	49.73	1,982.0	395.5	466.8	611.8	0.00	0.00	0.00
2,200.0	23.96	49.73	2,073.4	421.7	497.8	652.4	0.00	0.00	0.00
2,300.0	23.96	49.73	2,164.8	448.0	528.8	693.0	0.00	0.00	0.00
2,400.0	23.96	49.73	2,256.2	474.3	559.8	733.7	0.00	0.00	0.00
2,500.0	23.96	49.73	2,347.6	500.5	590.7	774.3	0.00	0.00	0.00
9 5/8"									
2,524.0	23.96	49.73	2,369.5	506.8	598.2	784.0	0.00	0.00	0.00
2,600.0	23.96	49.73	2,438.9	526.8	621.7	814.9	0.00	0.00	0.00
2,700.0	23.96	49.73	2,530.3	553.0	652.7	855.5	0.00	0.00	0.00
2,800.0	23.96	49.73	2,621.7	579.3	683.7	896.1	0.00	0.00	0.00
2,900.0	23.96	49.73	2,713.1	605.5	714.7	936.7	0.00	0.00	0.00
3,000.0	23.96	49.73	2,804.5	631.8	745.7	977.3	0.00	0.00	0.00
3,100.0	23.96	49.73	2,895.9	658.0	776.7	1,017.9	0.00	0.00	0.00
3,200.0	23.96	49.73	2,987.2	684.3	807.6	1,058.5	0.00	0.00	0.00
3,300.0	23.96	49.73	3,078.6	710.5	838.6	1,099.1	0.00	0.00	0.00
3,400.0	23.96	49.73	3,170.0	736.8	869.6	1,139.7	0.00	0.00	0.00
3,500.0	23.96	49.73	3,261.4	763.0	900.6	1,180.4	0.00	0.00	0.00
3,600.0	23.96	49.73	3,352.8	789.3	931.6	1,221.0	0.00	0.00	0.00
3,700.0	23.96	49.73	3,444.2	815.5	962.6	1,261.6	0.00	0.00	0.00
3,800.0	23.96	49.73	3,535.5	841.8	993.5	1,302.2	0.00	0.00	0.00
3,900.0	23.96	49.73	3,626.9	868.0	1,024.5	1,342.8	0.00	0.00	0.00
4,000.0	23.96	49.73	3,718.3	894.3	1,055.5	1,383.4	0.00	0.00	0.00
4,100.0	23.96	49.73	3,809.7	920.5	1,086.5	1,424.0	0.00	0.00	0.00
4,200.0	23.96	49.73	3,901.1	946.8	1,117.5	1,464.6	0.00	0.00	0.00
4,300.0	23.96	49.73	3,992.4	973.0	1,148.5	1,505.2	0.00	0.00	0.00
4,400.0	23.96	49.73	4,083.8	999.3	1,179.4	1,545.8	0.00	0.00	0.00
4,500.0	23.96	49.73	4,175.2	1,025.5	1,210.4	1,586.5	0.00	0.00	0.00
4,600.0	23.96	49.73	4,266.6	1,051.8	1,241.4	1,627.1	0.00	0.00	0.00
4,700.0	23.96	49.73	4,358.0	1,078.0	1,272.4	1,667.7	0.00	0.00	0.00



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 0697-03-03W
 Wellbore: Wellbore #1
 Design: Design #1

Local Co-ordinate Reference: Well CC Federal 0697-03-03W
 TVD Reference: well @ 8633.0usft (24'RKB)
 MD Reference: well @ 8633.0usft (24'RKB)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

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	23.96	49.73	4,449.4	1,104.3	1,303.4	1,708.3	0.00	0.00	0.00
4,900.0	23.96	49.73	4,540.7	1,130.5	1,334.4	1,748.9	0.00	0.00	0.00
5,000.0	23.96	49.73	4,632.1	1,156.8	1,365.4	1,789.5	0.00	0.00	0.00
5,100.0	23.96	49.73	4,723.5	1,183.0	1,396.3	1,830.1	0.00	0.00	0.00
5,200.0	23.96	49.73	4,814.9	1,209.3	1,427.3	1,870.7	0.00	0.00	0.00
5,300.0	23.96	49.73	4,906.3	1,235.5	1,458.3	1,911.3	0.00	0.00	0.00
Wasatch 'G' Sand									
5,381.8	23.96	49.73	4,981.0	1,257.0	1,483.6	1,944.5	0.00	0.00	0.00
5,400.0	23.96	49.73	4,997.7	1,261.8	1,489.3	1,951.9	0.00	0.00	0.00
5,500.0	23.96	49.73	5,089.0	1,288.0	1,520.3	1,992.6	0.00	0.00	0.00
5,600.0	23.96	49.73	5,180.4	1,314.3	1,551.3	2,033.2	0.00	0.00	0.00
5,700.0	23.96	49.73	5,271.8	1,340.5	1,582.2	2,073.8	0.00	0.00	0.00
5,800.0	23.96	49.73	5,363.2	1,366.8	1,613.2	2,114.4	0.00	0.00	0.00
5,900.0	23.96	49.73	5,454.6	1,393.0	1,644.2	2,155.0	0.00	0.00	0.00
6,000.0	23.96	49.73	5,546.0	1,419.3	1,675.2	2,195.6	0.00	0.00	0.00
6,100.0	23.96	49.73	5,637.3	1,445.5	1,706.2	2,236.2	0.00	0.00	0.00
6,200.0	23.96	49.73	5,728.7	1,471.8	1,737.2	2,276.8	0.00	0.00	0.00
6,300.0	23.96	49.73	5,820.1	1,498.0	1,768.2	2,317.4	0.00	0.00	0.00
6,400.0	23.96	49.73	5,911.5	1,524.3	1,799.1	2,358.0	0.00	0.00	0.00
6,500.0	23.96	49.73	6,002.9	1,550.5	1,830.1	2,398.7	0.00	0.00	0.00
6,600.0	23.96	49.73	6,094.3	1,576.8	1,861.1	2,439.3	0.00	0.00	0.00
6,700.0	23.96	49.73	6,185.8	1,603.0	1,892.1	2,479.9	0.00	0.00	0.00
6,800.0	23.96	49.73	6,277.0	1,629.3	1,923.1	2,520.5	0.00	0.00	0.00
6,900.0	23.96	49.73	6,368.4	1,655.6	1,954.1	2,561.1	0.00	0.00	0.00
7,000.0	23.96	49.73	6,459.8	1,681.8	1,985.0	2,601.7	0.00	0.00	0.00
7,100.0	23.96	49.73	6,551.2	1,708.1	2,016.0	2,642.3	0.00	0.00	0.00
7,200.0	23.96	49.73	6,642.6	1,734.3	2,047.0	2,682.9	0.00	0.00	0.00
Ohio Creek									
7,242.1	23.96	49.73	6,681.0	1,745.3	2,060.0	2,700.0	0.00	0.00	0.00
7,300.0	23.96	49.73	6,733.9	1,760.6	2,078.0	2,723.5	0.00	0.00	0.00
7,400.0	23.96	49.73	6,825.3	1,786.8	2,109.0	2,764.1	0.00	0.00	0.00
Williams Fork									
7,408.2	23.96	49.73	6,831.0	1,788.4	2,110.9	2,766.7	0.00	0.00	0.00
Drop 3° / 100'									
7,432.9	23.96	49.73	6,855.4	1,795.5	2,119.2	2,777.5	0.00	0.00	0.00
7,500.0	21.95	49.73	6,917.2	1,812.4	2,139.1	2,803.7	3.00	-3.00	0.00
7,600.0	18.95	49.73	7,010.9	1,834.9	2,165.8	2,838.6	3.00	-3.00	0.00
7,700.0	15.95	49.73	7,106.2	1,854.3	2,188.7	2,868.6	3.00	-3.00	0.00
7,800.0	12.95	49.73	7,203.1	1,870.4	2,207.7	2,893.5	3.00	-3.00	0.00
7,900.0	9.95	49.73	7,301.1	1,883.3	2,222.8	2,913.4	3.00	-3.00	0.00
8,000.0	6.95	49.73	7,400.0	1,892.8	2,234.0	2,928.1	3.00	-3.00	0.00
8,100.0	3.95	49.73	7,499.5	1,898.9	2,241.3	2,937.6	3.00	-3.00	0.00
8,200.0	0.95	49.73	7,599.4	1,901.7	2,244.5	2,941.8	3.00	-3.00	0.00
EOD @ Vertical - TOG									
8,231.6	0.00	0.00	7,631.0	1,901.8	2,244.7	2,942.1	3.00	-3.00	0.00
8,300.0	0.00	0.00	7,699.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
8,400.0	0.00	0.00	7,799.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
8,500.0	0.00	0.00	7,899.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
8,600.0	0.00	0.00	7,999.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
8,700.0	0.00	0.00	8,099.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
8,800.0	0.00	0.00	8,199.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
8,900.0	0.00	0.00	8,299.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,000.0	0.00	0.00	8,399.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,100.0	0.00	0.00	8,499.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633.0usft (24 RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24 RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-03-03W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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)
9,200.0	0.00	0.00	8,599.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,300.0	0.00	0.00	8,699.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,400.0	0.00	0.00	8,799.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,500.0	0.00	0.00	8,899.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,600.0	0.00	0.00	8,999.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,700.0	0.00	0.00	9,099.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,800.0	0.00	0.00	9,199.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
Cameo									
9,881.6	0.00	0.00	9,281.0	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
9,900.0	0.00	0.00	9,299.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
10,000.0	0.00	0.00	9,399.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
10,100.0	0.00	0.00	9,499.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
Base Cameo Coal									
10,111.6	0.00	0.00	9,511.0	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
Rollins									
10,131.6	0.00	0.00	9,531.0	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
10,200.0	0.00	0.00	9,599.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
10,300.0	0.00	0.00	9,699.4	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00
TD @ 10381.6' MD / 9781.0' TVD									
10,381.6	0.00	0.00	9,781.0	1,901.8	2,244.7	2,942.1	0.00	0.00	0.00

Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N-S (usft)	+E-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
PBHL - CC Federal 069; - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,781.0	1,901.8	2,244.7	1,641,281.04	2,235,852.98	39.562803	-108.210791

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,369.5	9 5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,381.8	4,981.0	Wasatch 'G' Sand			
7,242.1	6,681.0	Ohio Creek			
7,408.2	6,831.0	Williams Fork			
8,231.6	7,631.0	TOG			
9,881.6	9,281.0	Cameo			
10,111.6	9,511.0	Base Cameo Coal			
10,131.6	9,531.0	Rollins			



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-03W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633.0usft (24'RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24'RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-03-03W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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')
998.7	975.6	106.4	125.6	EOB @ 23.96° Inc. / 49.73° Azm
7,432.9	6,855.4	1,795.5	2,119.2	Drop 3' / 100'
8,231.6	7,631.0	1,901.8	2,244.7	EOD @ Vertical
10,381.6	9,781.0	1,901.8	2,244.7	TD @ 10381.6' MD / 9781.0' TVD