

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 0697-03-10W

+N/-S 0.0 +E/-W 0.0 Northing 1639397.84 Easting 2233534.49 Elevation 8609.0
Latitude 39.557445 Longitude -108.218811

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC 0697-03-10W
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557445
Longitude: -108.218811
Ground Level: 8609.0
well @ 8633.0usft (24' RKB)

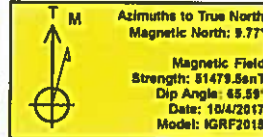


DIRECTIONAL DRILLING



REFERENCE INFORMATION

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



FORMATION TOP DETAILS

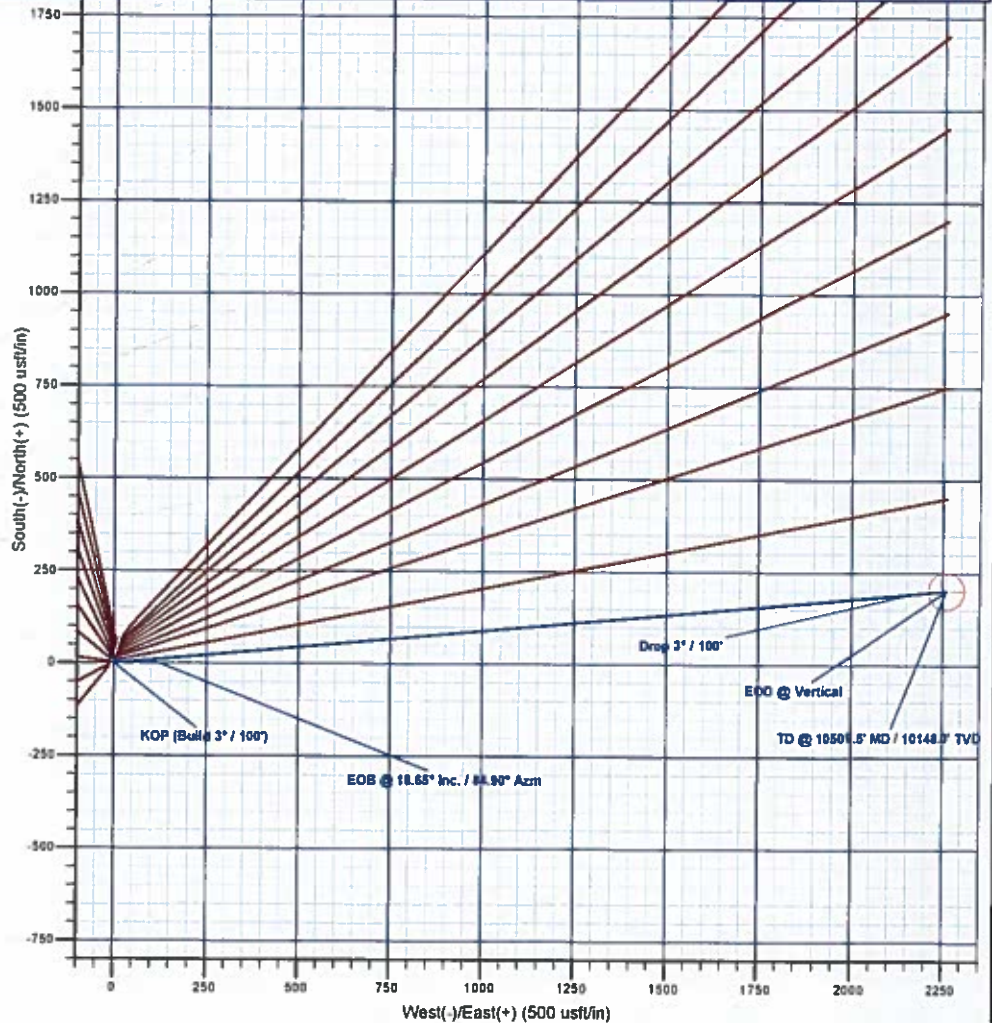
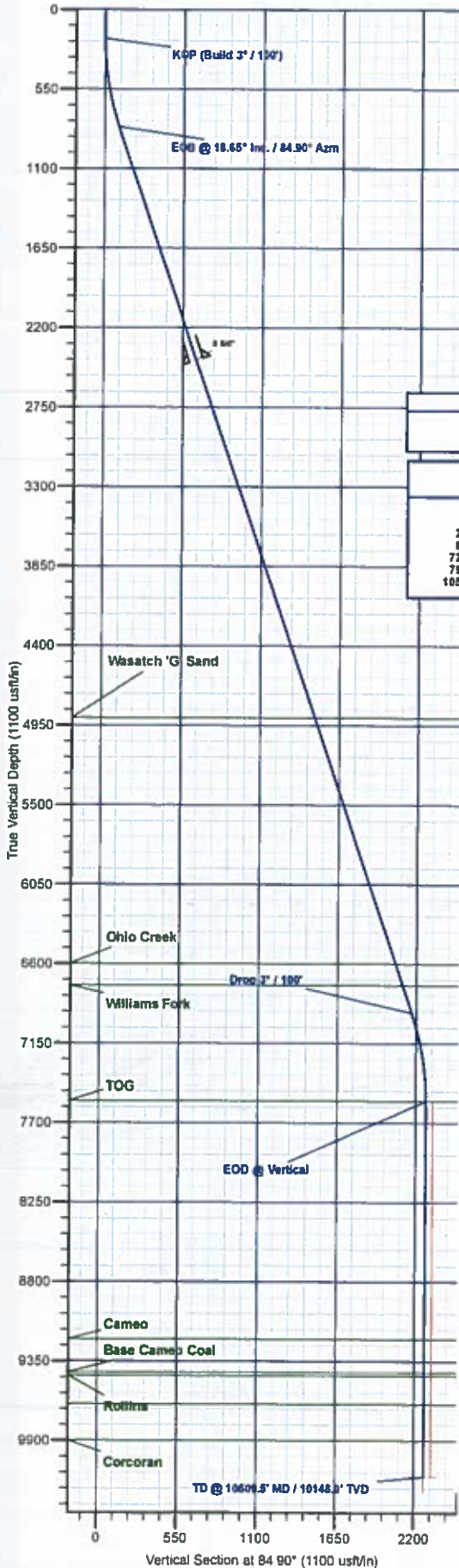
TVDPath	MDPath	Formation
4888.0	5135.5	Wasatch 'G' Sand
6598.0	6929.5	Ohio Creek
6748.0	7088.1	Williams Fork
7848.0	7909.5	TOG
9198.0	9559.5	Cameo
9428.0	9789.5	Base Cameo Coal
9448.0	9809.5	Rollins
9648.0	10009.5	Cozzette
9888.0	10239.5	Corcoran

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-03-10W	10148.0	201.5	2259.8	1639531.66	2235799.35	39.557998	-108.210796

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	0.0
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3' / 100')
821.8	18.65	84.90	810.9	8.9	99.9	3.00	84.90	100.3	EOD @ 18.65° Inc. / 84.90° Azm
7287.7	18.65	84.90	6937.1	192.6	2169.9	0.00	0.00	2169.5	Drop 3' / 100'
7909.5	0.00	0.00	7848.0	201.5	2259.8	3.00	180.00	2268.6	EOD @ Vertical
10509.5	0.00	0.00	10148.0	201.5	2259.8	0.00	0.00	2268.6	TD @ 10509.5' MD / 10148.0' TVD



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

Created By: Will Jircik

Date: 14:50, October 04 2017



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC 0697-03-10W

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 0697-03-10W
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 0697-03-10W	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
From:	Lat/Long	Easting:	2,233,548.14 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	39.557630
		Longitude:	-108.218770
		Grid Convergence:	-1.71°

Well	CC 0697-03-10W		
Well Position	+N/-S	-67.2 usft	Northing:
	+E/-W	-11.6 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	
		Latitude:	39.557445
		Longitude:	-108.218811
		Ground Level:	8,609.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	10/4/2017	9.77
			Dip Angle (°)
			65.59
			Field Strength (nT)
			51,478.45740463

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)
	0.0	0.0	0.0
			Direction (°)
			84.90

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	
821.8	18.65	84.90	810.9	8.9	99.9	3.00	3.00	0.00	84.90	
7,287.7	18.65	84.90	6,937.1	192.6	2,159.9	0.00	0.00	0.00	0.00	
7,909.5	0.00	0.00	7,548.0	201.5	2,259.8	3.00	-3.00	0.00	180.00	
10,509.5	0.00	0.00	10,148.0	201.5	2,259.8	0.00	0.00	0.00	0.00	PBHL - CC 0697-03-1



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 0697-03-10W
 Wellbore: Wellbore #1
 Design: Design #1

Local Co-ordinate Reference: Well CC 0697-03-10W
 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)
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	84.90	300.0	0.2	2.6	2.6	3.00	3.00	0.00
400.0	6.00	84.90	399.6	0.9	10.4	10.5	3.00	3.00	0.00
500.0	9.00	84.90	498.8	2.1	23.4	23.5	3.00	3.00	0.00
600.0	12.00	84.90	597.1	3.7	41.6	41.7	3.00	3.00	0.00
700.0	15.00	84.90	694.3	5.8	64.8	65.1	3.00	3.00	0.00
800.0	18.00	84.90	790.2	8.3	93.1	93.5	3.00	3.00	0.00
EOB @ 18.65° Inc. / 84.90° Azm									
821.8	18.65	84.90	810.9	8.9	99.9	100.3	3.00	3.00	0.00
900.0	18.65	84.90	885.0	11.1	124.8	125.3	0.00	0.00	0.00
1,000.0	18.65	84.90	979.7	14.0	156.7	157.3	0.00	0.00	0.00
1,100.0	18.65	84.90	1,074.5	16.8	188.6	189.3	0.00	0.00	0.00
1,200.0	18.65	84.90	1,169.2	19.7	220.4	221.3	0.00	0.00	0.00
1,300.0	18.65	84.90	1,264.0	22.5	252.3	253.3	0.00	0.00	0.00
1,400.0	18.65	84.90	1,358.7	25.3	284.1	285.3	0.00	0.00	0.00
1,500.0	18.65	84.90	1,453.4	28.2	316.0	317.3	0.00	0.00	0.00
1,600.0	18.65	84.90	1,548.2	31.0	347.9	349.2	0.00	0.00	0.00
1,700.0	18.65	84.90	1,642.9	33.9	379.7	381.2	0.00	0.00	0.00
1,800.0	18.65	84.90	1,737.7	36.7	411.6	413.2	0.00	0.00	0.00
1,900.0	18.65	84.90	1,832.4	39.5	443.4	445.2	0.00	0.00	0.00
2,000.0	18.65	84.90	1,927.2	42.4	475.3	477.2	0.00	0.00	0.00
2,100.0	18.65	84.90	2,021.9	45.2	507.2	509.2	0.00	0.00	0.00
2,200.0	18.65	84.90	2,116.7	48.1	539.0	541.2	0.00	0.00	0.00
2,300.0	18.65	84.90	2,211.4	50.9	570.9	573.1	0.00	0.00	0.00
2,400.0	18.65	84.90	2,306.2	53.8	602.7	605.1	0.00	0.00	0.00
2,500.0	18.65	84.90	2,400.9	56.6	634.6	637.1	0.00	0.00	0.00
9 5/8"									
2,524.0	18.65	84.90	2,423.7	57.3	642.2	644.8	0.00	0.00	0.00
2,600.0	18.65	84.90	2,495.7	59.4	666.4	669.1	0.00	0.00	0.00
2,700.0	18.65	84.90	2,590.4	62.3	698.3	701.1	0.00	0.00	0.00
2,800.0	18.65	84.90	2,685.2	65.1	730.2	733.1	0.00	0.00	0.00
2,900.0	18.65	84.90	2,779.9	68.0	762.0	765.1	0.00	0.00	0.00
3,000.0	18.65	84.90	2,874.6	70.8	793.9	797.0	0.00	0.00	0.00
3,100.0	18.65	84.90	2,969.4	73.6	825.7	829.0	0.00	0.00	0.00
3,200.0	18.65	84.90	3,064.1	76.5	857.6	861.0	0.00	0.00	0.00
3,300.0	18.65	84.90	3,158.9	79.3	889.5	893.0	0.00	0.00	0.00
3,400.0	18.65	84.90	3,253.6	82.2	921.3	925.0	0.00	0.00	0.00
3,500.0	18.65	84.90	3,348.4	85.0	953.2	957.0	0.00	0.00	0.00
3,600.0	18.65	84.90	3,443.1	87.8	985.0	988.9	0.00	0.00	0.00
3,700.0	18.65	84.90	3,537.9	90.7	1,016.9	1,020.9	0.00	0.00	0.00
3,800.0	18.65	84.90	3,632.6	93.5	1,048.8	1,052.9	0.00	0.00	0.00
3,900.0	18.65	84.90	3,727.4	96.4	1,080.6	1,084.9	0.00	0.00	0.00
4,000.0	18.65	84.90	3,822.1	99.2	1,112.5	1,116.9	0.00	0.00	0.00
4,100.0	18.65	84.90	3,916.9	102.1	1,144.3	1,148.9	0.00	0.00	0.00
4,200.0	18.65	84.90	4,011.6	104.9	1,176.2	1,180.9	0.00	0.00	0.00
4,300.0	18.65	84.90	4,106.4	107.7	1,208.1	1,212.8	0.00	0.00	0.00
4,400.0	18.65	84.90	4,201.1	110.6	1,239.9	1,244.8	0.00	0.00	0.00
4,500.0	18.65	84.90	4,295.8	113.4	1,271.8	1,276.8	0.00	0.00	0.00
4,600.0	18.65	84.90	4,390.6	116.3	1,303.6	1,308.8	0.00	0.00	0.00
4,700.0	18.65	84.90	4,485.3	119.1	1,335.5	1,340.8	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8833.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8833.0usft (24' RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC 0697-03-10W	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)
4,800.0	18.65	84.90	4,580.1	121.9	1,367.3	1,372.8	0.00	0.00	0.00
4,900.0	18.65	84.90	4,674.8	124.8	1,399.2	1,404.8	0.00	0.00	0.00
5,000.0	18.65	84.90	4,769.6	127.6	1,431.1	1,436.7	0.00	0.00	0.00
5,100.0	18.65	84.90	4,864.3	130.5	1,462.9	1,468.7	0.00	0.00	0.00
Wasatch 'G' Sand									
5,135.5	18.65	84.90	4,898.0	131.5	1,474.2	1,480.1	0.00	0.00	0.00
5,200.0	18.65	84.90	4,959.1	133.3	1,494.8	1,500.7	0.00	0.00	0.00
5,300.0	18.65	84.90	5,053.8	136.1	1,526.6	1,532.7	0.00	0.00	0.00
5,400.0	18.65	84.90	5,148.6	139.0	1,558.5	1,564.7	0.00	0.00	0.00
5,500.0	18.65	84.90	5,243.3	141.8	1,590.4	1,596.7	0.00	0.00	0.00
5,600.0	18.65	84.90	5,338.1	144.7	1,622.2	1,628.7	0.00	0.00	0.00
5,700.0	18.65	84.90	5,432.8	147.5	1,654.1	1,660.6	0.00	0.00	0.00
5,800.0	18.65	84.90	5,527.6	150.4	1,685.9	1,692.6	0.00	0.00	0.00
5,900.0	18.65	84.90	5,622.3	153.2	1,717.8	1,724.6	0.00	0.00	0.00
6,000.0	18.65	84.90	5,717.0	156.0	1,749.7	1,756.6	0.00	0.00	0.00
6,100.0	18.65	84.90	5,811.8	158.9	1,781.5	1,788.6	0.00	0.00	0.00
6,200.0	18.65	84.90	5,906.5	161.7	1,813.4	1,820.6	0.00	0.00	0.00
6,300.0	18.65	84.90	6,001.3	164.6	1,845.2	1,852.6	0.00	0.00	0.00
6,400.0	18.65	84.90	6,096.0	167.4	1,877.1	1,884.5	0.00	0.00	0.00
6,500.0	18.65	84.90	6,190.8	170.2	1,908.9	1,916.5	0.00	0.00	0.00
6,600.0	18.65	84.90	6,285.5	173.1	1,940.8	1,948.5	0.00	0.00	0.00
6,700.0	18.65	84.90	6,380.3	175.9	1,972.7	1,980.5	0.00	0.00	0.00
6,800.0	18.65	84.90	6,475.0	178.8	2,004.5	2,012.5	0.00	0.00	0.00
6,900.0	18.65	84.90	6,569.8	181.6	2,036.4	2,044.5	0.00	0.00	0.00
Ohio Creek									
6,929.8	18.65	84.90	6,598.0	182.5	2,045.9	2,054.0	0.00	0.00	0.00
7,000.0	18.65	84.90	6,664.5	184.4	2,068.2	2,076.5	0.00	0.00	0.00
Williams Fork									
7,088.1	18.65	84.90	6,748.0	187.0	2,096.3	2,104.6	0.00	0.00	0.00
7,100.0	18.65	84.90	6,759.3	187.3	2,100.1	2,108.4	0.00	0.00	0.00
7,200.0	18.65	84.90	6,854.0	190.1	2,132.0	2,140.4	0.00	0.00	0.00
Drop 3° / 100'									
7,287.7	18.65	84.90	6,937.1	192.6	2,159.9	2,168.5	0.00	0.00	0.00
7,300.0	18.29	84.90	6,948.8	193.0	2,163.8	2,172.4	3.00	-3.00	0.00
7,400.0	15.29	84.90	7,044.5	195.5	2,192.5	2,201.2	3.00	-3.00	0.00
7,500.0	12.29	84.90	7,141.6	197.7	2,216.3	2,225.1	3.00	-3.00	0.00
7,600.0	9.29	84.90	7,239.8	199.3	2,234.9	2,243.8	3.00	-3.00	0.00
7,700.0	6.29	84.90	7,338.9	200.5	2,248.4	2,257.3	3.00	-3.00	0.00
7,800.0	3.29	84.90	7,438.5	201.3	2,256.7	2,265.7	3.00	-3.00	0.00
7,900.0	0.29	84.90	7,538.5	201.5	2,259.8	2,268.8	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,909.5	0.00	0.00	7,548.0	201.5	2,259.8	2,268.8	3.00	-3.00	0.00
8,000.0	0.00	0.00	7,638.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,100.0	0.00	0.00	7,738.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,200.0	0.00	0.00	7,838.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,300.0	0.00	0.00	7,938.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,400.0	0.00	0.00	8,038.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,500.0	0.00	0.00	8,138.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,600.0	0.00	0.00	8,238.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,700.0	0.00	0.00	8,338.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,800.0	0.00	0.00	8,438.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
8,900.0	0.00	0.00	8,538.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,000.0	0.00	0.00	8,638.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,100.0	0.00	0.00	8,738.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10W
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 0697-03-10W	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	8,838.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,300.0	0.00	0.00	8,938.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,400.0	0.00	0.00	9,038.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,500.0	0.00	0.00	9,138.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
Cameo									
9,559.5	0.00	0.00	9,198.0	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,600.0	0.00	0.00	9,238.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,700.0	0.00	0.00	9,338.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
Base Cameo Coal									
9,789.5	0.00	0.00	9,428.0	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,800.0	0.00	0.00	9,438.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
Rollins									
9,809.5	0.00	0.00	9,448.0	201.5	2,259.8	2,268.8	0.00	0.00	0.00
9,900.0	0.00	0.00	9,538.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
10,000.0	0.00	0.00	9,638.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
Cozzette									
10,009.5	0.00	0.00	9,648.0	201.5	2,259.8	2,268.8	0.00	0.00	0.00
10,100.0	0.00	0.00	9,738.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
10,200.0	0.00	0.00	9,838.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
Corcoran									
10,259.5	0.00	0.00	9,898.0	201.5	2,259.8	2,268.8	0.00	0.00	0.00
10,300.0	0.00	0.00	9,938.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
10,400.0	0.00	0.00	10,038.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
10,500.0	0.00	0.00	10,138.5	201.5	2,259.8	2,268.8	0.00	0.00	0.00
TD @ 10509.5' MD / 10148.0' TVD									
10,509.5	0.00	0.00	10,148.0	201.5	2,259.8	2,268.8	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
PBHL - CC 0697-03-10V - hit/miss target - Shape	0.00	0.00	10,148.0	201.5	2,259.8	1,639,531.66	2,235,799.35	39 557998	-108 210796

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,423.7	9 5/8"	9-5/8	14-3/4



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10W
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 0697-03-10W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
5,135.5	4,898.0	Wasatch 'G' Sand				
6,929.8	6,598.0	Ohio Creek				
7,088.1	6,748.0	Williams Fork				
7,909.5	7,548.0	TOG				
9,559.5	9,198.0	Cameo				
9,789.5	9,428.0	Base Cameo Coal				
9,809.5	9,448.0	Rollins				
10,009.5	9,648.0	Cozzette				
10,259.5	9,898.0	Corcoran				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
200.0	200.0	0.0	0.0	KOP (Build 3" / 100')	
821.8	810.9	8.9	99.9	EOB @ 18.65° Inc. / 84.90° Azm	
7,287.7	6,937.1	192.6	2,159.9	Drop 3" / 100'	
7,909.5	7,548.0	201.5	2,259.8	EOD @ Vertical	
10,509.5	10,148.0	201.5	2,259.8	TD @ 10509.5' MD / 10148.0' TVD	