

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 0697-03-02W

+N/-S 0.0 +E/-W 0.0 Northing 1639454.07 Easting 2233655.07 Elevation 8609.0 Latitude 39.557601 Longitude -108.218744

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC Federal 0697-03-02W
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557601
Longitude: -108.218744
Ground Level: 8609.0
well @ 8633.0usft (24'RKB)



DIRECTIONAL DRILLING



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC Federal 0697-03-02W, 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 TDP DETAILS

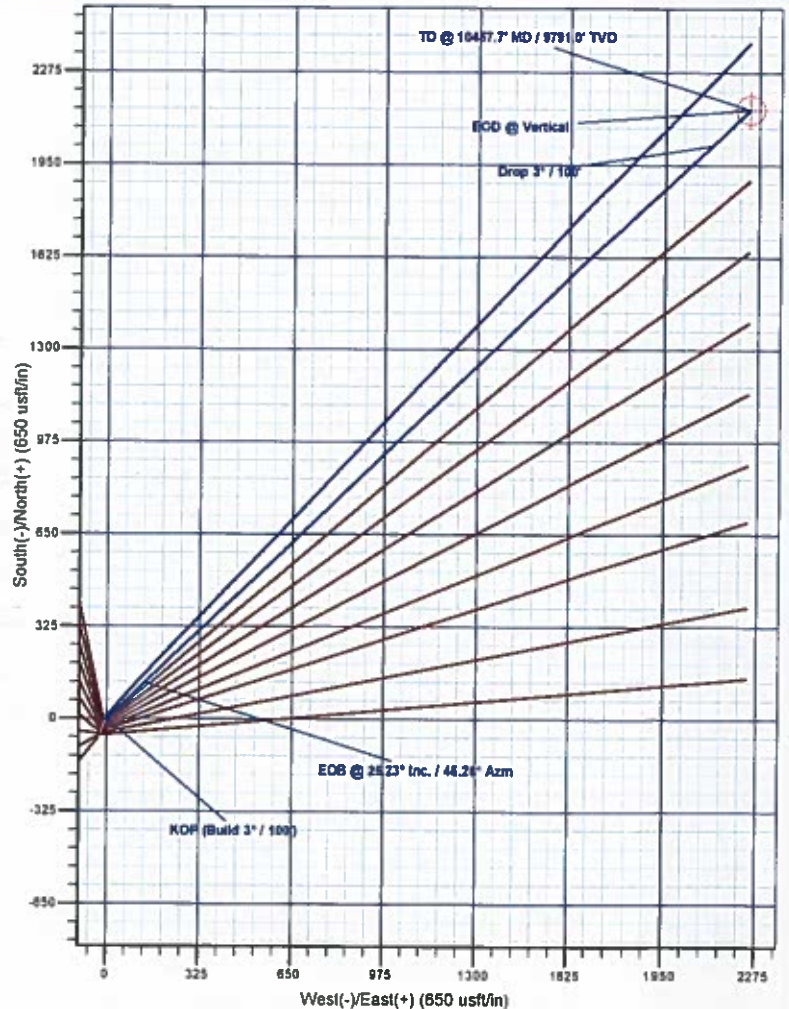
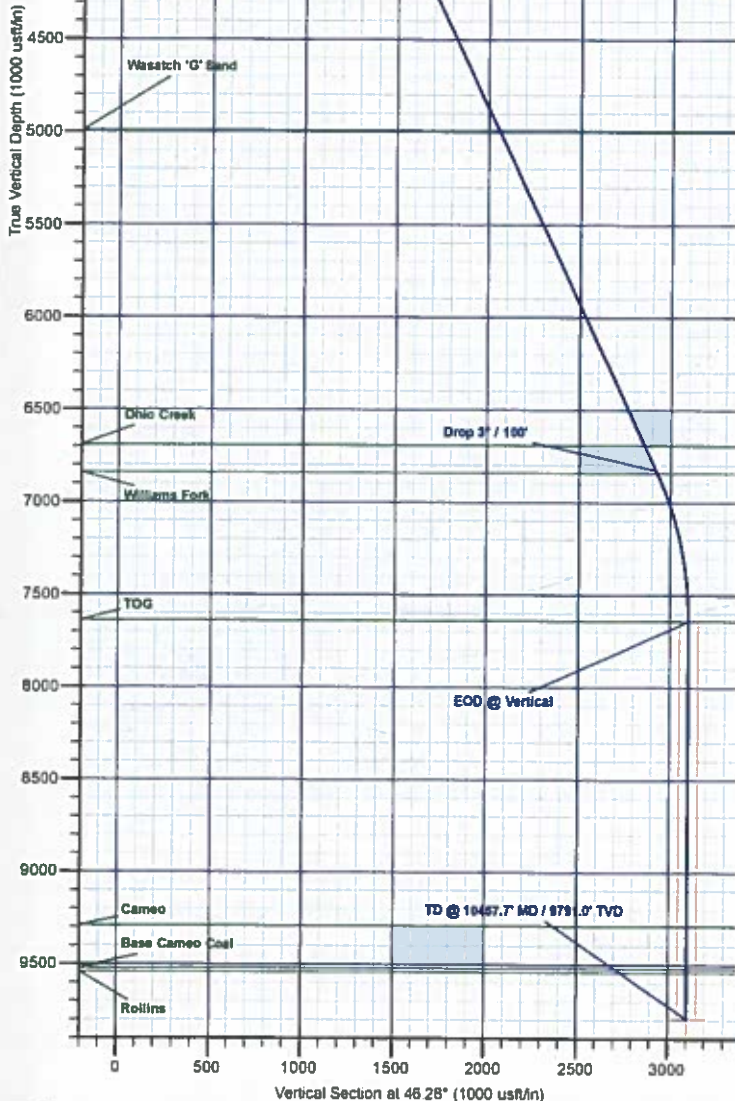
TVDPath	MDPath	Formation
4891.0	6437.2	Wasatch 'G' Sand
4891.0	7316.4	Ohio Creek
6441.0	7482.2	Williams Fork
7641.0	8307.7	TDG
9291.0	9357.7	Cameo
9521.0	10187.7	Base Cameo Coal
9541.0	10207.7	Rollins

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-03-02W 9791.0		2144.8	2242.5	1641530.80	2235860.72	39.563489	-108.210790

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Diag	TFace	VSecl	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	KOP (Build 3° / 100')
1040.9	25.23	46.28	1014.0	125.9	131.4	3.00	46.28	182.1	EOB @ 25.23° Inc. / 46.28° Azm
7486.8	25.23	46.28	6827.0	2018.9	2110.8	0.00	0.00	2920.9	Drop 3° / 100'
8307.7	0.00	0.00	7641.0	2144.8	2242.5	3.00	180.00	3103.0	EOD @ Vertical
10457.7	0.00	0.00	9791.0	2144.8	2242.5	0.00	0.00	3103.0	TD @ 10457.7' MD / 9791.0' TVD



Plan: Design #1 (CC Federal 0697-03-02W/Wellbore #1)

Created By: Will Jircik

Date: 10:39, October 19 2017



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC Federal 0697-03-02W

Wellbore #1

Plan: Design #1

QES Well Planning Report

19 October, 2017





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-02W
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 0697-03-02W	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 Federal 0697-03-02W		
Well Position	+N/-S	-10.4 usft	Northing: 1,639,454.07 usft
	+E/-W	7.3 usft	Easting: 2,233,555.07 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Latitude: 39.557801
			Longitude: -108.218744
			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	51,479.54979545

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	46.28

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	
1,040.9	25.23	46.28	1,014.0	125.9	131.6	3.00	3.00	0.00	46.28	
7,466.8	25.23	46.28	6,827.0	2,018.9	2,110.8	0.00	0.00	0.00	0.00	
8,307.7	0.00	0.00	7,641.0	2,144.8	2,242.5	3.00	-3.00	0.00	180.00	
10,457.7	0.00	0.00	8,791.0	2,144.8	2,242.5	0.00	0.00	0.00	0.00	PBHL - CC Federal 0697-03-02W



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-02W
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 0697-03-02W	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	46.28	300.0	1.8	1.9	2.6	3.00	3.00	0.00
400.0	6.00	46.28	399.6	7.2	7.6	10.5	3.00	3.00	0.00
500.0	9.00	46.28	498.8	16.3	17.0	23.5	3.00	3.00	0.00
600.0	12.00	46.28	597.1	28.8	30.2	41.7	3.00	3.00	0.00
700.0	15.00	46.28	694.3	45.0	47.0	65.1	3.00	3.00	0.00
800.0	18.00	46.28	790.2	64.6	67.6	93.5	3.00	3.00	0.00
900.0	21.00	46.28	884.4	87.7	91.7	126.9	3.00	3.00	0.00
1,000.0	24.00	46.28	976.8	114.1	119.3	165.1	3.00	3.00	0.00
EOB @ 25.23° Inc. / 46.28° Azm									
1,040.9	25.23	46.28	1,014.0	125.9	131.6	182.1	3.00	3.00	0.00
1,100.0	25.23	46.28	1,067.5	143.3	149.8	207.3	0.00	0.00	0.00
1,200.0	25.23	46.28	1,157.9	172.8	180.6	250.0	0.00	0.00	0.00
1,300.0	25.23	46.28	1,248.4	202.2	211.4	292.6	0.00	0.00	0.00
1,400.0	25.23	46.28	1,338.8	231.7	242.2	335.2	0.00	0.00	0.00
1,500.0	25.23	46.28	1,429.3	261.1	273.0	377.8	0.00	0.00	0.00
1,600.0	25.23	46.28	1,519.8	290.6	303.8	420.4	0.00	0.00	0.00
1,700.0	25.23	46.28	1,610.2	320.1	334.6	463.1	0.00	0.00	0.00
1,800.0	25.23	46.28	1,700.7	349.5	365.4	505.7	0.00	0.00	0.00
1,900.0	25.23	46.28	1,791.2	379.0	396.2	548.3	0.00	0.00	0.00
2,000.0	25.23	46.28	1,881.6	408.4	427.0	590.9	0.00	0.00	0.00
2,100.0	25.23	46.28	1,972.1	437.9	457.8	633.5	0.00	0.00	0.00
2,200.0	25.23	46.28	2,062.5	467.4	488.6	676.2	0.00	0.00	0.00
2,300.0	25.23	46.28	2,153.0	496.8	519.4	718.8	0.00	0.00	0.00
2,400.0	25.23	46.28	2,243.5	526.3	550.2	761.4	0.00	0.00	0.00
2,500.0	25.23	46.28	2,333.9	555.7	581.0	804.0	0.00	0.00	0.00
9 5/8"									
2,524.0	25.23	46.28	2,355.6	562.8	588.4	814.3	0.00	0.00	0.00
2,600.0	25.23	46.28	2,424.4	585.2	611.8	846.6	0.00	0.00	0.00
2,700.0	25.23	46.28	2,514.9	614.7	642.6	889.3	0.00	0.00	0.00
2,800.0	25.23	46.28	2,605.3	644.1	673.4	931.9	0.00	0.00	0.00
2,900.0	25.23	46.28	2,695.8	673.6	704.2	974.5	0.00	0.00	0.00
3,000.0	25.23	46.28	2,786.2	703.0	735.0	1,017.1	0.00	0.00	0.00
3,100.0	25.23	46.28	2,876.7	732.5	765.8	1,059.7	0.00	0.00	0.00
3,200.0	25.23	46.28	2,967.2	761.9	796.6	1,102.4	0.00	0.00	0.00
3,300.0	25.23	46.28	3,057.6	791.4	827.4	1,145.0	0.00	0.00	0.00
3,400.0	25.23	46.28	3,148.1	820.9	858.2	1,187.6	0.00	0.00	0.00
3,500.0	25.23	46.28	3,238.6	850.3	889.1	1,230.2	0.00	0.00	0.00
3,600.0	25.23	46.28	3,329.0	879.8	919.9	1,272.8	0.00	0.00	0.00
3,700.0	25.23	46.28	3,419.5	909.2	950.7	1,315.5	0.00	0.00	0.00
3,800.0	25.23	46.28	3,509.9	938.7	981.5	1,358.1	0.00	0.00	0.00
3,900.0	25.23	46.28	3,600.4	968.2	1,012.3	1,400.7	0.00	0.00	0.00
4,000.0	25.23	46.28	3,690.9	997.6	1,043.1	1,443.3	0.00	0.00	0.00
4,100.0	25.23	46.28	3,781.3	1,027.1	1,073.9	1,486.0	0.00	0.00	0.00
4,200.0	25.23	46.28	3,871.8	1,056.5	1,104.7	1,528.6	0.00	0.00	0.00
4,300.0	25.23	46.28	3,962.3	1,086.0	1,135.5	1,571.2	0.00	0.00	0.00
4,400.0	25.23	46.28	4,052.7	1,115.5	1,166.3	1,613.8	0.00	0.00	0.00
4,500.0	25.23	46.28	4,143.2	1,144.9	1,197.1	1,656.4	0.00	0.00	0.00
4,600.0	25.23	46.28	4,233.7	1,174.4	1,227.9	1,699.1	0.00	0.00	0.00
4,700.0	25.23	46.28	4,324.1	1,203.8	1,258.7	1,741.7	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 0697-03-02W
 Wellbore: Wellbore #1
 Design: Design #1

Local Co-ordinate Reference: Well CC Federal 0697-03-02W
 TVD Reference: well @ 8833.0usft (24'RKB)
 MD Reference: well @ 8833.0usft (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	25.23	46.28	4,414.6	1,233.3	1,289.5	1,784.3	0.00	0.00	0.00
4,900.0	25.23	46.28	4,505.0	1,262.7	1,320.3	1,826.9	0.00	0.00	0.00
5,000.0	25.23	46.28	4,595.5	1,292.2	1,351.1	1,869.5	0.00	0.00	0.00
5,100.0	25.23	46.28	4,686.0	1,321.7	1,381.9	1,912.2	0.00	0.00	0.00
5,200.0	25.23	46.28	4,776.4	1,351.1	1,412.7	1,954.8	0.00	0.00	0.00
5,300.0	25.23	46.28	4,866.9	1,380.6	1,443.5	1,997.4	0.00	0.00	0.00
5,400.0	25.23	46.28	4,957.4	1,410.0	1,474.3	2,040.0	0.00	0.00	0.00
Wasatch 'G' Sand									
5,437.2	25.23	46.28	4,991.0	1,421.0	1,485.7	2,055.9	0.00	0.00	0.00
5,500.0	25.23	46.28	5,047.8	1,439.5	1,505.1	2,082.6	0.00	0.00	0.00
5,600.0	25.23	46.28	5,138.3	1,469.0	1,535.9	2,125.3	0.00	0.00	0.00
5,700.0	25.23	46.28	5,228.7	1,498.4	1,566.7	2,167.9	0.00	0.00	0.00
5,800.0	25.23	46.28	5,319.2	1,527.9	1,597.5	2,210.5	0.00	0.00	0.00
5,900.0	25.23	46.28	5,409.7	1,557.3	1,628.3	2,253.1	0.00	0.00	0.00
6,000.0	25.23	46.28	5,500.1	1,586.8	1,659.1	2,295.7	0.00	0.00	0.00
6,100.0	25.23	46.28	5,590.6	1,616.3	1,689.9	2,338.4	0.00	0.00	0.00
6,200.0	25.23	46.28	5,681.1	1,645.7	1,720.7	2,381.0	0.00	0.00	0.00
6,300.0	25.23	46.28	5,771.5	1,675.2	1,751.5	2,423.6	0.00	0.00	0.00
6,400.0	25.23	46.28	5,862.0	1,704.6	1,782.3	2,466.2	0.00	0.00	0.00
6,500.0	25.23	46.28	5,952.4	1,734.1	1,813.1	2,508.8	0.00	0.00	0.00
6,600.0	25.23	46.28	6,042.9	1,763.6	1,843.9	2,551.5	0.00	0.00	0.00
6,700.0	25.23	46.28	6,133.4	1,793.0	1,874.7	2,594.1	0.00	0.00	0.00
6,800.0	25.23	46.28	6,223.8	1,822.5	1,905.5	2,636.7	0.00	0.00	0.00
6,900.0	25.23	46.28	6,314.3	1,851.9	1,936.3	2,679.3	0.00	0.00	0.00
7,000.0	25.23	46.28	6,404.8	1,881.4	1,967.1	2,721.9	0.00	0.00	0.00
7,100.0	25.23	46.28	6,495.2	1,910.8	1,997.9	2,764.6	0.00	0.00	0.00
7,200.0	25.23	46.28	6,585.7	1,940.3	2,028.7	2,807.2	0.00	0.00	0.00
7,300.0	25.23	46.28	6,676.1	1,969.8	2,059.5	2,849.8	0.00	0.00	0.00
Ohio Creek									
7,316.4	25.23	46.28	6,691.0	1,974.6	2,064.5	2,856.8	0.00	0.00	0.00
7,400.0	25.23	46.28	6,766.6	1,999.2	2,090.3	2,892.4	0.00	0.00	0.00
Drop 3° / 100'									
7,466.8	25.23	46.28	6,827.0	2,018.9	2,110.8	2,920.9	0.00	0.00	0.00
Williams Fork									
7,482.2	24.76	46.28	6,841.0	2,023.4	2,115.5	2,927.4	3.00	-3.00	0.00
7,500.0	24.23	46.28	6,857.2	2,028.5	2,120.9	2,934.8	3.00	-3.00	0.00
7,600.0	21.23	46.28	6,949.4	2,055.2	2,148.8	2,973.4	3.00	-3.00	0.00
7,700.0	18.23	46.28	7,043.5	2,078.5	2,173.2	3,007.2	3.00	-3.00	0.00
7,800.0	15.23	46.28	7,139.3	2,098.4	2,194.0	3,036.0	3.00	-3.00	0.00
7,900.0	12.23	46.28	7,236.4	2,114.8	2,211.1	3,059.7	3.00	-3.00	0.00
8,000.0	9.23	46.28	7,334.7	2,127.7	2,224.6	3,078.3	3.00	-3.00	0.00
8,100.0	6.23	46.28	7,433.7	2,137.0	2,234.3	3,091.8	3.00	-3.00	0.00
8,200.0	3.23	46.28	7,533.4	2,142.7	2,240.3	3,100.0	3.00	-3.00	0.00
8,300.0	0.23	46.28	7,633.3	2,144.8	2,242.5	3,103.0	3.00	-3.00	0.00
EOD @ Vertical - TOG									
8,307.7	0.00	0.00	7,641.0	2,144.8	2,242.5	3,103.0	3.00	-3.00	0.00
8,400.0	0.00	0.00	7,733.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
8,500.0	0.00	0.00	7,833.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
8,600.0	0.00	0.00	7,933.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,033.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,133.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,233.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,000.0	0.00	0.00	8,333.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,100.0	0.00	0.00	8,433.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-03-02W
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 0697-03-02W	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	8,533.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,300.0	0.00	0.00	8,633.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,400.0	0.00	0.00	8,733.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,500.0	0.00	0.00	8,833.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,600.0	0.00	0.00	8,933.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,700.0	0.00	0.00	9,033.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,133.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,233.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
Cameo									
9,957.7	0.00	0.00	9,291.0	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
10,000.0	0.00	0.00	9,333.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
10,100.0	0.00	0.00	9,433.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
Base Cameo Coal									
10,187.7	0.00	0.00	9,521.0	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
10,200.0	0.00	0.00	9,533.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
Rollins									
10,207.7	0.00	0.00	9,541.0	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
10,300.0	0.00	0.00	9,633.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
10,400.0	0.00	0.00	9,733.3	2,144.8	2,242.5	3,103.0	0.00	0.00	0.00
TD @ 10457.7' MD / 9791.0' TVD									
10,457.7	0.00	0.00	9,791.0	2,144.8	2,242.5	3,103.0	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	9,791.0	2,144.8	2,242.5	1,641,530.80	2,235,860.72	39.563489	-108.210790
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,355.6	9 5/8"	9-5/8	14-3/4



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 0897-03-02W
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well CC Federal 0897-03-02W
well @ 8633.0usft (24'RKB)
well @ 8633.0usft (24'RKB)
True
Minimum Curvature

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,437.2	4,991.0	Wasatch 'G' Sand			
7,316.4	6,891.0	Ohio Creek			
7,482.2	6,841.0	Williams Fork			
8,307.7	7,641.0	TOG			
9,957.7	9,291.0	Cameo			
10,187.7	9,521.0	Base Cameo Coal			
10,207.7	9,541.0	Rollins			

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')
1,040.9	1,014.0	125.9	131.6	EOB @ 25.23° Inc. / 46.28° Azm
7,466.8	6,827.0	2,018.9	2,110.8	Drop 3" / 100'
8,307.7	7,641.0	2,144.8	2,242.5	EOD @ Vertical
10,457.7	9,791.0	2,144.8	2,242.5	TD @ 10457.7' MD / 9791.0' TVD