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 0697-03-06W

8609.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1639425.98	2233544.64	39.557523	-108.218778

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC Federal 0697-03-06W
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557523
Longitude: -108.218778
Ground Level: 8609.0
well @ 8633.0usft (24' RKB)

QES DIRECTIONAL DRILLING

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC Federal 0697-03-06W, 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

LARAMIE ENERGY

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Azimuths to True North
Magnetic North: 9.77°

Magnetic Field
Strength: 51479.5nT
Dip Angle: 65.59°
Date: 10/4/2017
Model: IGRF2015

FORMATION TOP DETAILS

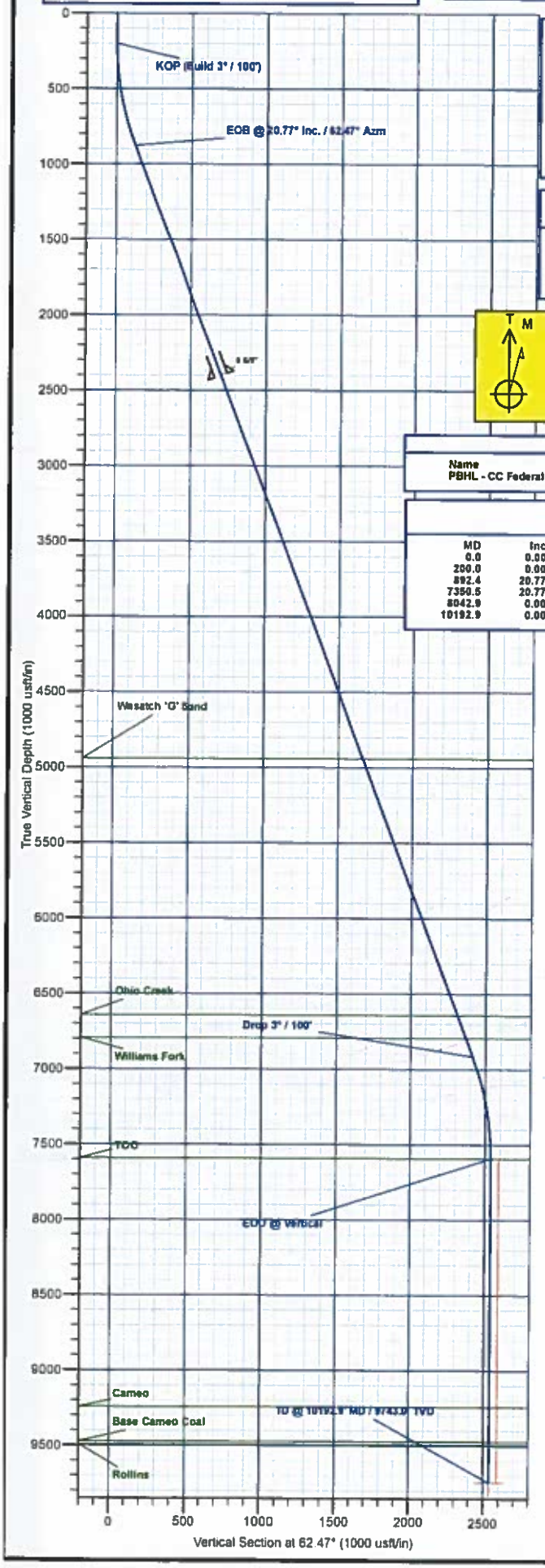
TVDPath	MDPath	Formation
4943.0	5240.7	Wasatch 'G' Sand
6643.0	7058.9	Ohio Creek
6793.0	7219.3	Williams Fork
7593.0	8042.9	TOG
9243.0	9692.9	Cameo
9473.0	9922.9	Base Cameo Coal
9493.0	9942.9	Rollins

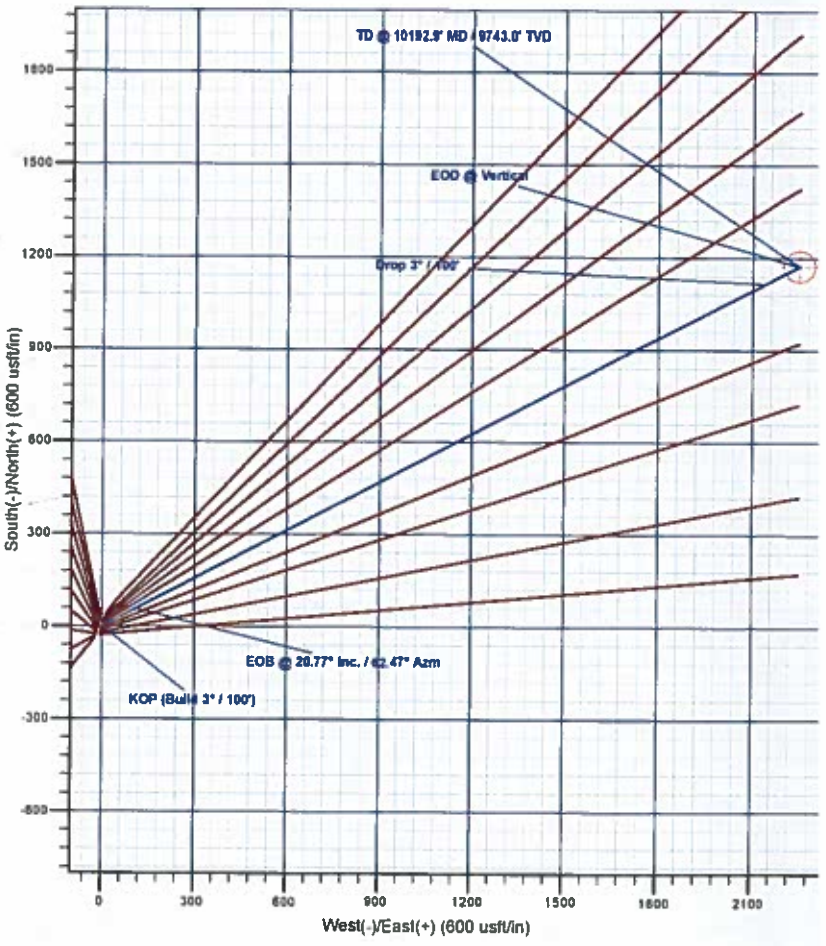
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-03-06W	9743.0	1173.3	2251.3	1640531.41	2235830.04	39.560744	-108.210793

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
892.4	20.77	62.47	877.3	57.4	110.1	3.00	62.47	124.1	EOB @ 20.77° Inc. / 62.47° Azm
7350.5	20.77	62.47	6915.7	1116.0	2141.2	0.00	0.00	2414.6	Drop 3° / 100'
8042.9	0.00	0.00	7593.0	1173.3	2251.3	3.00	180.00	2538.7	EOD @ Vertical
10192.9	0.00	0.00	9743.0	1173.3	2251.3	0.00	0.00	2538.7	TD @ 10192.9' MD / 9743.0' TVD





Plan: Design #1 (CC Federal 0697-03-06W/Wellbore #1)

Created By: Will Jircik Date: 14:33, October 04 2017

Laramie Energy, LLC

Garfield County, CO
CC 604-41-32 Pad
CC Federal 0697-03-06W

Wellbore #1

Plan: Design #1

QES Well Planning Report

04 October, 2017

QES
DIRECTIONAL DRILLING

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well CC Federal 0697-03-06W
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 0697-03-06W	**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 0697-03-06W				
Well Position	**+N/-S**	-38.8 usft	**Northing:**	1,639,425.95 usft	**Latitude:** 39.557523
	+E/-W	-2.3 usft	**Easting:**	2,233,544.84 usft	**Longitude:** -108.218778
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	51,479.50353602

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	62.47

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	
892.4	20.77	62.47	877.3	57.4	110.1	3.00	3.00	0.00	62.47	
7,350.5	20.77	62.47	6,915.7	1,116.0	2,141.2	0.00	0.00	0.00	0.00	
8,042.9	0.00	0.00	7,593.0	1,173.3	2,251.3	3.00	-3.00	0.00	180.00	
10,192.9	0.00	0.00	9,743.0	1,173.3	2,251.3	0.00	0.00	0.00	0.00	PBHL - CC Federal 0(

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well CC Federal 0697-03-06W
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 0697-03-06W	**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	62.47	300.0	1.2	2.3	2.6	3.00	3.00	0.00
400.0	6.00	62.47	399.6	4.8	9.3	10.5	3.00	3.00	0.00
500.0	9.00	62.47	498.8	10.9	20.9	23.5	3.00	3.00	0.00
600.0	12.00	62.47	597.1	19.3	37.0	41.7	3.00	3.00	0.00
700.0	15.00	62.47	694.3	30.1	57.7	65.1	3.00	3.00	0.00
800.0	18.00	62.47	790.2	43.2	82.9	93.5	3.00	3.00	0.00
EOB @ 20.77° Inc. / 62.47° Azm									
892.4	20.77	62.47	877.3	57.4	110.1	124.1	3.00	3.00	0.00
900.0	20.77	62.47	884.4	58.6	112.5	126.8	0.00	0.00	0.00
1,000.0	20.77	62.47	977.9	75.0	143.9	162.3	0.00	0.00	0.00
1,100.0	20.77	62.47	1,071.4	91.4	175.4	197.8	0.00	0.00	0.00
1,200.0	20.77	62.47	1,164.9	107.8	206.8	233.2	0.00	0.00	0.00
1,300.0	20.77	62.47	1,258.4	124.2	238.3	268.7	0.00	0.00	0.00
1,400.0	20.77	62.47	1,351.9	140.6	269.7	304.2	0.00	0.00	0.00
1,500.0	20.77	62.47	1,445.4	157.0	301.2	339.6	0.00	0.00	0.00
1,600.0	20.77	62.47	1,538.9	173.4	332.6	375.1	0.00	0.00	0.00
1,700.0	20.77	62.47	1,632.4	189.8	364.1	410.6	0.00	0.00	0.00
1,800.0	20.77	62.47	1,725.9	206.1	395.5	446.0	0.00	0.00	0.00
1,900.0	20.77	62.47	1,819.4	222.5	427.0	481.5	0.00	0.00	0.00
2,000.0	20.77	62.47	1,912.9	238.9	458.4	517.0	0.00	0.00	0.00
2,100.0	20.77	62.47	2,006.4	255.3	489.9	552.4	0.00	0.00	0.00
2,200.0	20.77	62.47	2,099.9	271.7	521.3	587.9	0.00	0.00	0.00
2,300.0	20.77	62.47	2,193.4	288.1	552.8	623.4	0.00	0.00	0.00
2,400.0	20.77	62.47	2,286.9	304.5	584.2	658.8	0.00	0.00	0.00
2,500.0	20.77	62.47	2,380.4	320.9	615.7	694.3	0.00	0.00	0.00
9 5/8"									
2,524.0	20.77	62.47	2,402.9	324.8	623.2	702.8	0.00	0.00	0.00
2,600.0	20.77	62.47	2,473.9	337.3	647.1	729.8	0.00	0.00	0.00
2,700.0	20.77	62.47	2,567.4	353.7	678.6	765.2	0.00	0.00	0.00
2,800.0	20.77	62.47	2,660.9	370.1	710.0	800.7	0.00	0.00	0.00
2,900.0	20.77	62.47	2,754.4	386.5	741.5	836.2	0.00	0.00	0.00
3,000.0	20.77	62.47	2,847.9	402.8	772.9	871.6	0.00	0.00	0.00
3,100.0	20.77	62.47	2,941.4	419.2	804.4	907.1	0.00	0.00	0.00
3,200.0	20.77	62.47	3,034.9	435.6	835.8	942.6	0.00	0.00	0.00
3,300.0	20.77	62.47	3,128.4	452.0	867.3	978.0	0.00	0.00	0.00
3,400.0	20.77	62.47	3,221.9	468.4	898.7	1,013.5	0.00	0.00	0.00
3,500.0	20.77	62.47	3,315.4	484.8	930.2	1,048.9	0.00	0.00	0.00
3,600.0	20.77	62.47	3,408.9	501.2	961.6	1,084.4	0.00	0.00	0.00
3,700.0	20.77	62.47	3,502.4	517.6	993.1	1,119.9	0.00	0.00	0.00
3,800.0	20.77	62.47	3,595.9	534.0	1,024.5	1,155.3	0.00	0.00	0.00
3,900.0	20.77	62.47	3,689.4	550.4	1,056.0	1,190.8	0.00	0.00	0.00
4,000.0	20.77	62.47	3,782.9	566.8	1,087.4	1,226.3	0.00	0.00	0.00
4,100.0	20.77	62.47	3,876.4	583.2	1,118.9	1,261.7	0.00	0.00	0.00
4,200.0	20.77	62.47	3,969.9	599.5	1,150.3	1,297.2	0.00	0.00	0.00
4,300.0	20.77	62.47	4,063.4	615.9	1,181.8	1,332.7	0.00	0.00	0.00
4,400.0	20.77	62.47	4,156.9	632.3	1,213.2	1,368.1	0.00	0.00	0.00
4,500.0	20.77	62.47	4,250.4	648.7	1,244.7	1,403.6	0.00	0.00	0.00
4,600.0	20.77	62.47	4,343.9	665.1	1,276.1	1,439.1	0.00	0.00	0.00
4,700.0	20.77	62.47	4,437.4	681.5	1,307.6	1,474.5	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well CC Federal 0697-03-06W
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 0697-03-06W	**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	20.77	62.47	4,530.9	697.9	1,339.1	1,510.0	0.00	0.00	0.00
4,900.0	20.77	62.47	4,624.4	714.3	1,370.5	1,545.5	0.00	0.00	0.00
5,000.0	20.77	62.47	4,717.9	730.7	1,402.0	1,580.9	0.00	0.00	0.00
5,100.0	20.77	62.47	4,811.4	747.1	1,433.4	1,616.4	0.00	0.00	0.00
5,200.0	20.77	62.47	4,904.9	763.5	1,464.9	1,651.9	0.00	0.00	0.00
Wasatch 'G' Sand									
5,240.7	20.77	62.47	4,943.0	770.1	1,477.7	1,666.3	0.00	0.00	0.00
5,300.0	20.77	62.47	4,998.4	779.9	1,496.3	1,687.3	0.00	0.00	0.00
5,400.0	20.77	62.47	5,091.9	796.2	1,527.8	1,722.8	0.00	0.00	0.00
5,500.0	20.77	62.47	5,185.4	812.6	1,559.2	1,758.3	0.00	0.00	0.00
5,600.0	20.77	62.47	5,278.9	829.0	1,590.7	1,793.7	0.00	0.00	0.00
5,700.0	20.77	62.47	5,372.4	845.4	1,622.1	1,829.2	0.00	0.00	0.00
5,800.0	20.77	62.47	5,465.9	861.8	1,653.6	1,864.7	0.00	0.00	0.00
5,900.0	20.77	62.47	5,559.4	878.2	1,685.0	1,900.1	0.00	0.00	0.00
6,000.0	20.77	62.47	5,652.9	894.6	1,716.5	1,935.6	0.00	0.00	0.00
6,100.0	20.77	62.47	5,746.4	911.0	1,747.9	1,971.1	0.00	0.00	0.00
6,200.0	20.77	62.47	5,839.9	927.4	1,779.4	2,006.5	0.00	0.00	0.00
6,300.0	20.77	62.47	5,933.4	943.8	1,810.8	2,042.0	0.00	0.00	0.00
6,400.0	20.77	62.47	6,026.9	960.2	1,842.3	2,077.5	0.00	0.00	0.00
6,500.0	20.77	62.47	6,120.4	976.6	1,873.7	2,112.9	0.00	0.00	0.00
6,600.0	20.77	62.47	6,213.9	992.9	1,905.2	2,148.4	0.00	0.00	0.00
6,700.0	20.77	62.47	6,307.4	1,009.3	1,936.6	2,183.9	0.00	0.00	0.00
6,800.0	20.77	62.47	6,400.9	1,025.7	1,968.1	2,219.3	0.00	0.00	0.00
6,900.0	20.77	62.47	6,494.4	1,042.1	1,999.5	2,254.8	0.00	0.00	0.00
7,000.0	20.77	62.47	6,587.9	1,058.5	2,031.0	2,290.3	0.00	0.00	0.00
Ohio Creek									
7,058.9	20.77	62.47	6,643.0	1,068.2	2,049.5	2,311.1	0.00	0.00	0.00
7,100.0	20.77	62.47	6,681.4	1,074.9	2,062.4	2,325.7	0.00	0.00	0.00
7,200.0	20.77	62.47	6,774.9	1,091.3	2,093.9	2,361.2	0.00	0.00	0.00
Williams Fork									
7,219.3	20.77	62.47	6,793.0	1,094.5	2,099.9	2,368.0	0.00	0.00	0.00
7,300.0	20.77	62.47	6,868.4	1,107.7	2,125.3	2,396.6	0.00	0.00	0.00
Drop 3° / 100'									
7,350.5	20.77	62.47	6,915.7	1,116.0	2,141.2	2,414.6	0.00	0.00	0.00
7,400.0	19.29	62.47	6,962.1	1,123.8	2,156.2	2,431.5	3.00	-3.00	0.00
7,500.0	16.29	62.47	7,057.3	1,137.9	2,183.3	2,462.1	3.00	-3.00	0.00
7,600.0	13.29	62.47	7,154.0	1,149.7	2,206.0	2,487.6	3.00	-3.00	0.00
7,700.0	10.29	62.47	7,251.9	1,159.2	2,224.1	2,508.0	3.00	-3.00	0.00
7,800.0	7.29	62.47	7,350.7	1,166.2	2,237.6	2,523.3	3.00	-3.00	0.00
7,900.0	4.29	62.47	7,450.2	1,170.9	2,246.6	2,533.4	3.00	-3.00	0.00
8,000.0	1.29	62.47	7,550.1	1,173.1	2,250.9	2,538.2	3.00	-3.00	0.00
EOD @ Vertical - TOG									
8,042.9	0.00	0.00	7,593.0	1,173.3	2,251.3	2,538.7	3.00	-3.00	0.00
8,100.0	0.00	0.00	7,650.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,200.0	0.00	0.00	7,750.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,300.0	0.00	0.00	7,850.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,400.0	0.00	0.00	7,950.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,500.0	0.00	0.00	8,050.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,600.0	0.00	0.00	8,150.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,700.0	0.00	0.00	8,250.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,800.0	0.00	0.00	8,350.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
8,900.0	0.00	0.00	8,450.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,000.0	0.00	0.00	8,550.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,100.0	0.00	0.00	8,650.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00

Database:	EDM 5000 1 Single User Db	**Local Co-ordinate Reference:**	Well CC Federal 0697-03-06W
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 0697-03-06W	**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	8,750.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,300.0	0.00	0.00	8,850.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,400.0	0.00	0.00	8,950.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,500.0	0.00	0.00	9,050.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,600.0	0.00	0.00	9,150.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
Cameo									
9,692.9	0.00	0.00	9,243.0	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,700.0	0.00	0.00	9,250.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,800.0	0.00	0.00	9,350.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
9,900.0	0.00	0.00	9,450.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
Base Cameo Coal									
9,922.9	0.00	0.00	9,473.0	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
Rollins									
9,942.9	0.00	0.00	9,493.0	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
10,000.0	0.00	0.00	9,550.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
10,100.0	0.00	0.00	9,650.1	1,173.3	2,251.3	2,538.7	0.00	0.00	0.00
TD @ 10192.9' MD / 9743.0' TVD									
10,192.9	0.00	0.00	9,743.0	1,173.3	2,251.3	2,538.7	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 Federal 0697 - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,743.0	1,173.3	2,251.3	1,640,531.41	2,235,830.04	39.560744	-108.210793

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,402.9	9 5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,240.7	4,943.0	Wasatch 'G' Sand			
7,058.9	6,643.0	Ohio Creek			
7,219.3	6,793.0	Williams Fork			
8,042.9	7,593.0	TOG			
9,692.9	9,243.0	Cameo			
9,922.9	9,473.0	Base Cameo Coal			
9,942.9	9,493.0	Rollins			

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well CC Federal 0697-03-06W
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 0697-03-06W	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
200.0	200.0	0.0	0.0	KOP (Build 3° / 100')
892.4	877.3	57.4	110.1	EOB @ 20.77° Inc. / 62.47° Azm
7,350.5	6,915.7	1,116.0	2,141.2	Drop 3° / 100'
8,042.9	7,593.0	1,173.3	2,251.3	EOD @ Vertical
10,192.9	9,743.0	1,173.3	2,251.3	TD @ 10192.9' MD / 9743.0' TVD