

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 0697-04-03E

+N/-S 0.0 +E/-W 0.0 Northing 1639436.37 Easting 2233837.90 8609.0 Latitude 39.557551 Longitude -108.218803

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC Federal 0697-04-03E
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557551
Longitude: -108.218803
Ground Level: 8609.0
well @ 8633.0usft (24' RKB)



DIRECTIONAL DRILLING

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC Federal 0697-04-03E, 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

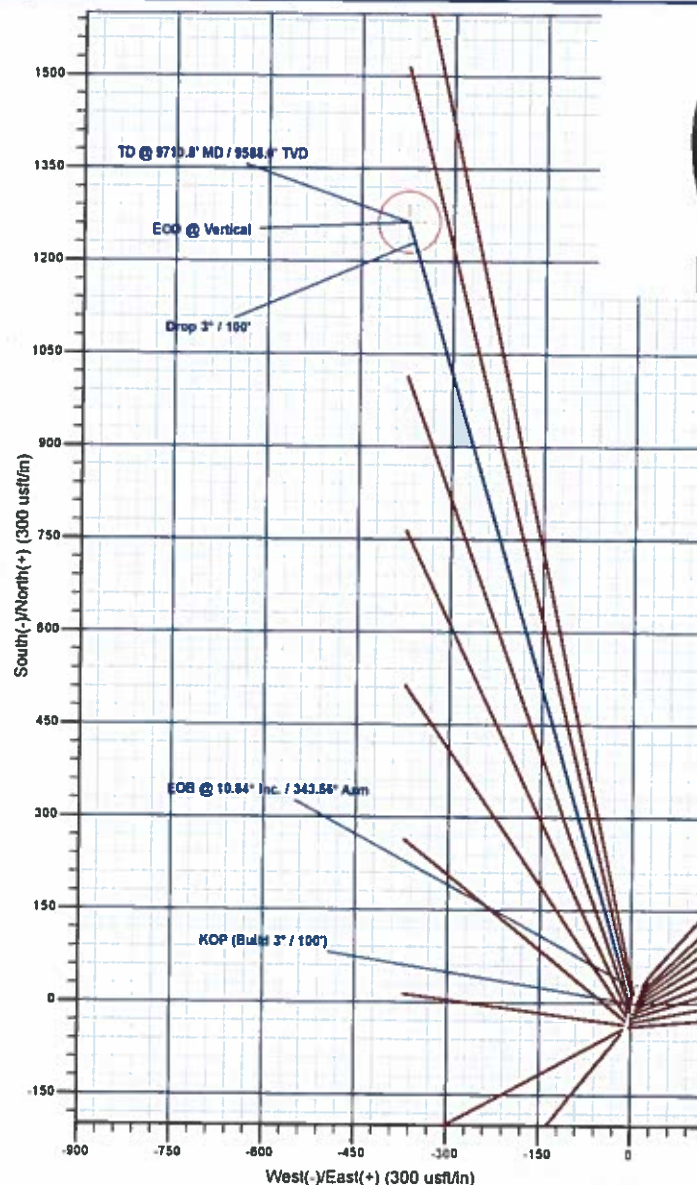
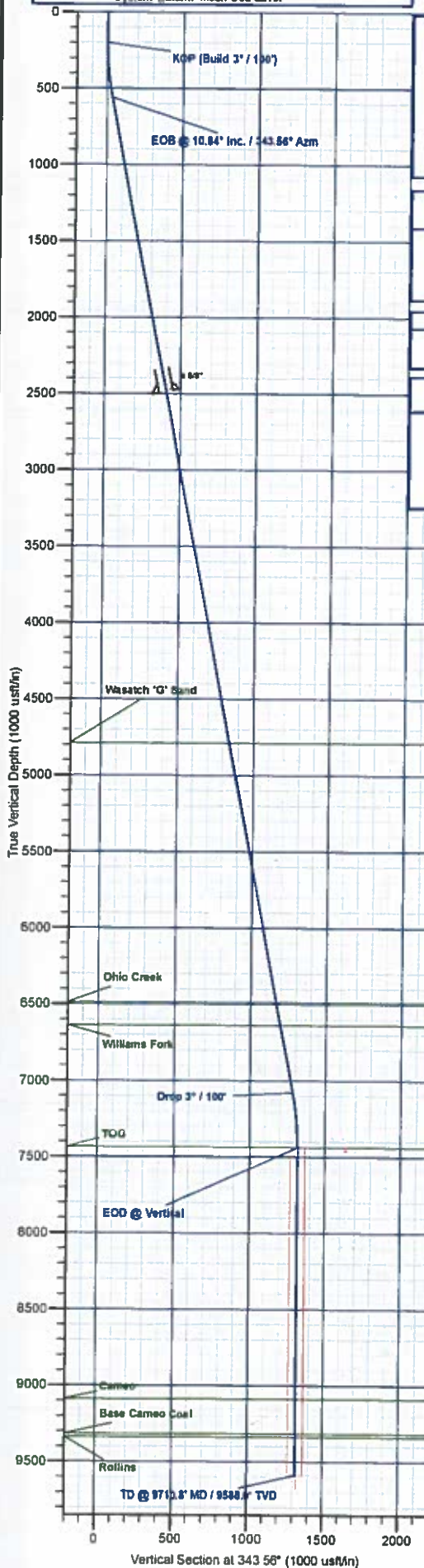
TVDPath	MDPath	Formation
4788.0	4867.0	Wasatch 'G' Sand
6488.0	6598.0	Ohio Creek
6438.0	6750.7	Williams Fork
7438.0	7668.8	TOG
9088.0	9210.8	Cameo
9318.0	9440.8	Base Cameo Coal
9338.0	9460.8	Rollins

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-04-03E	9598.0	1263.2	-372.7	1640710.17	2233203.14	39.561019	-108.220125

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	
561.5	10.84	343.56	559.3	32.7	-9.7	3.00	343.56	34.1	KOP (Build 3" / 100')
7199.4	10.84	343.56	7076.7	1230.5	-363.1	0.00	0.00	1282.9	EOB @ 10.84" Inc. / 343.56" Az
7560.8	0.00	0.00	7438.0	1263.2	-372.7	3.00	180.00	1317.1	Drop 3" / 100'
9710.8	0.00	0.00	9598.0	1263.2	-372.7	0.00	0.00	1317.1	EOD @ Vertical
									TD @ 9710.8" MD / 9598.0" TVD



Legend
T M Azimuths to True / Magnetic North:
Magnetic Strength: 61479, Dip Angle: 6
Date: 10/4
Model: IGRF

Plan: Design #1 (CC Federal 0697-04-03E/Wellbore #1)

Created By: Will Jircik Date: 15:08, October 04 2017



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC Federal 0697-04-03E

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 0697-04-03E
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 0697-04-03E	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 0697-04-03E					
Well Position	+N/-S	-28.6 usft	Northing:	1,639,436.36 usft	Latitude:	39.557551
	+E/-W	-9.4 usft	Easting:	2,233,537.90 usft	Longitude:	-108.218803
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	51,479.51538167

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	343.56

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	
561.5	10.84	343.56	559.3	32.7	-9.7	3.00	3.00	0.00	343.56	
7,199.4	10.84	343.56	7,078.7	1,230.5	-363.1	0.00	0.00	0.00	0.00	
7,560.8	0.00	0.00	7,438.0	1,263.2	-372.7	3.00	-3.00	0.00	180.00	
9,710.8	0.00	0.00	9,588.0	1,263.2	-372.7	0.00	0.00	0.00	0.00	PBHL - CC Federal 01



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 0697-04-03E	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	343.56	300.0	2.5	-0.7	2.6	3.00	3.00	0.00
400.0	6.00	343.56	399.6	10.0	-3.0	10.5	3.00	3.00	0.00
500.0	9.00	343.56	498.8	22.6	-6.7	23.5	3.00	3.00	0.00
EOB @ 10.84° Inc. / 343.56° Azm									
581.5	10.84	343.56	559.3	32.7	-9.7	34.1	3.00	3.00	0.00
600.0	10.84	343.56	597.2	39.7	-11.7	41.4	0.00	0.00	0.00
700.0	10.84	343.56	695.4	57.7	-17.0	60.2	0.00	0.00	0.00
800.0	10.84	343.56	793.6	75.8	-22.4	79.0	0.00	0.00	0.00
900.0	10.84	343.56	891.8	93.8	-27.7	97.8	0.00	0.00	0.00
1,000.0	10.84	343.56	990.0	111.8	-33.0	116.6	0.00	0.00	0.00
1,100.0	10.84	343.56	1,088.2	129.9	-38.3	135.4	0.00	0.00	0.00
1,200.0	10.84	343.56	1,186.4	147.9	-43.6	154.2	0.00	0.00	0.00
1,300.0	10.84	343.56	1,284.7	166.0	-49.0	173.1	0.00	0.00	0.00
1,400.0	10.84	343.56	1,382.9	184.0	-54.3	191.9	0.00	0.00	0.00
1,500.0	10.84	343.56	1,481.1	202.1	-59.6	210.7	0.00	0.00	0.00
1,600.0	10.84	343.56	1,579.3	220.1	-64.9	229.5	0.00	0.00	0.00
1,700.0	10.84	343.56	1,677.5	238.2	-70.3	248.3	0.00	0.00	0.00
1,800.0	10.84	343.56	1,775.7	256.2	-75.6	267.1	0.00	0.00	0.00
1,900.0	10.84	343.56	1,873.9	274.2	-80.9	285.9	0.00	0.00	0.00
2,000.0	10.84	343.56	1,972.2	292.3	-86.2	304.7	0.00	0.00	0.00
2,100.0	10.84	343.56	2,070.4	310.3	-91.6	323.6	0.00	0.00	0.00
2,200.0	10.84	343.56	2,168.6	328.4	-96.9	342.4	0.00	0.00	0.00
2,300.0	10.84	343.56	2,266.8	346.4	-102.2	361.2	0.00	0.00	0.00
2,400.0	10.84	343.56	2,365.0	364.5	-107.5	380.0	0.00	0.00	0.00
2,500.0	10.84	343.56	2,463.2	382.5	-112.9	398.8	0.00	0.00	0.00
9 5/8"									
2,524.0	10.84	343.56	2,486.8	386.8	-114.1	403.3	0.00	0.00	0.00
2,600.0	10.84	343.56	2,561.4	400.6	-118.2	417.6	0.00	0.00	0.00
2,700.0	10.84	343.56	2,659.7	418.6	-123.5	436.4	0.00	0.00	0.00
2,800.0	10.84	343.56	2,757.9	436.6	-128.8	455.3	0.00	0.00	0.00
2,900.0	10.84	343.56	2,856.1	454.7	-134.2	474.1	0.00	0.00	0.00
3,000.0	10.84	343.56	2,954.3	472.7	-139.5	492.9	0.00	0.00	0.00
3,100.0	10.84	343.56	3,052.5	490.8	-144.8	511.7	0.00	0.00	0.00
3,200.0	10.84	343.56	3,150.7	508.8	-150.1	530.5	0.00	0.00	0.00
3,300.0	10.84	343.56	3,248.9	526.9	-155.5	549.3	0.00	0.00	0.00
3,400.0	10.84	343.56	3,347.2	544.9	-160.8	568.1	0.00	0.00	0.00
3,500.0	10.84	343.56	3,445.4	563.0	-166.1	587.0	0.00	0.00	0.00
3,600.0	10.84	343.56	3,543.6	581.0	-171.4	605.8	0.00	0.00	0.00
3,700.0	10.84	343.56	3,641.8	599.1	-176.8	624.6	0.00	0.00	0.00
3,800.0	10.84	343.56	3,740.0	617.1	-182.1	643.4	0.00	0.00	0.00
3,900.0	10.84	343.56	3,838.2	635.1	-187.4	662.2	0.00	0.00	0.00
4,000.0	10.84	343.56	3,936.4	653.2	-192.7	681.0	0.00	0.00	0.00
4,100.0	10.84	343.56	4,034.7	671.2	-198.1	699.8	0.00	0.00	0.00
4,200.0	10.84	343.56	4,132.9	689.3	-203.4	718.7	0.00	0.00	0.00
4,300.0	10.84	343.56	4,231.1	707.3	-208.7	737.5	0.00	0.00	0.00
4,400.0	10.84	343.56	4,329.3	725.4	-214.0	756.3	0.00	0.00	0.00
4,500.0	10.84	343.56	4,427.5	743.4	-219.4	775.1	0.00	0.00	0.00
4,600.0	10.84	343.56	4,525.7	761.5	-224.7	793.9	0.00	0.00	0.00
4,700.0	10.84	343.56	4,623.9	779.5	-230.0	812.7	0.00	0.00	0.00



Well Planning Report



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Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24' RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-04-03E	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	10.84	343.56	4,722.2	797.5	-235.3	831.5	0.00	0.00	0.00
Wasatch 'G' Sand									
4,867.0	10.84	343.56	4,788.0	809.6	-238.9	844.1	0.00	0.00	0.00
4,900.0	10.84	343.56	4,820.4	815.6	-240.6	850.3	0.00	0.00	0.00
5,000.0	10.84	343.56	4,918.6	833.6	-246.0	869.2	0.00	0.00	0.00
5,100.0	10.84	343.56	5,016.8	851.7	-251.3	888.0	0.00	0.00	0.00
5,200.0	10.84	343.56	5,115.0	869.7	-256.6	906.8	0.00	0.00	0.00
5,300.0	10.84	343.56	5,213.2	887.8	-261.9	925.6	0.00	0.00	0.00
5,400.0	10.84	343.56	5,311.4	905.8	-267.3	944.4	0.00	0.00	0.00
5,500.0	10.84	343.56	5,409.7	923.9	-272.6	963.2	0.00	0.00	0.00
5,600.0	10.84	343.56	5,507.9	941.9	-277.9	982.0	0.00	0.00	0.00
5,700.0	10.84	343.56	5,606.1	959.9	-283.2	1,000.9	0.00	0.00	0.00
5,800.0	10.84	343.56	5,704.3	978.0	-288.6	1,019.7	0.00	0.00	0.00
5,900.0	10.84	343.56	5,802.5	996.0	-293.9	1,038.5	0.00	0.00	0.00
6,000.0	10.84	343.56	5,900.7	1,014.1	-299.2	1,057.3	0.00	0.00	0.00
6,100.0	10.84	343.56	5,998.9	1,032.1	-304.5	1,076.1	0.00	0.00	0.00
6,200.0	10.84	343.56	6,097.2	1,050.2	-309.9	1,094.9	0.00	0.00	0.00
6,300.0	10.84	343.56	6,195.4	1,068.2	-315.2	1,113.7	0.00	0.00	0.00
6,400.0	10.84	343.56	6,293.6	1,086.3	-320.5	1,132.6	0.00	0.00	0.00
6,500.0	10.84	343.56	6,391.8	1,104.3	-325.8	1,151.4	0.00	0.00	0.00
Ohio Creek									
6,598.0	10.84	343.56	6,488.0	1,122.0	-331.1	1,169.8	0.00	0.00	0.00
6,600.0	10.84	343.56	6,490.0	1,122.3	-331.2	1,170.2	0.00	0.00	0.00
6,700.0	10.84	343.56	6,588.2	1,140.4	-336.5	1,189.0	0.00	0.00	0.00
Williams Fork									
6,750.7	10.84	343.56	6,638.0	1,149.5	-339.2	1,198.5	0.00	0.00	0.00
6,800.0	10.84	343.56	6,686.4	1,158.4	-341.8	1,207.8	0.00	0.00	0.00
6,900.0	10.84	343.56	6,784.7	1,176.5	-347.1	1,226.6	0.00	0.00	0.00
7,000.0	10.84	343.56	6,882.9	1,194.5	-352.5	1,245.4	0.00	0.00	0.00
7,100.0	10.84	343.56	6,981.1	1,212.6	-357.8	1,264.3	0.00	0.00	0.00
Drop 3° / 100'									
7,199.4	10.84	343.56	7,078.7	1,230.5	-363.1	1,282.9	0.00	0.00	0.00
7,200.0	10.83	343.56	7,079.3	1,230.6	-363.1	1,283.1	3.00	-3.00	0.00
7,300.0	7.83	343.56	7,178.0	1,246.2	-367.7	1,299.3	3.00	-3.00	0.00
7,400.0	4.83	343.56	7,277.3	1,256.7	-370.8	1,310.3	3.00	-3.00	0.00
7,500.0	1.83	343.56	7,377.2	1,262.3	-372.5	1,316.1	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,560.8	0.00	0.00	7,438.0	1,263.2	-372.7	1,317.1	3.00	-3.00	0.00
7,600.0	0.00	0.00	7,477.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
7,700.0	0.00	0.00	7,577.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
7,800.0	0.00	0.00	7,677.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
7,900.0	0.00	0.00	7,777.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,000.0	0.00	0.00	7,877.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,100.0	0.00	0.00	7,977.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,200.0	0.00	0.00	8,077.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,300.0	0.00	0.00	8,177.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,400.0	0.00	0.00	8,277.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,500.0	0.00	0.00	8,377.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,600.0	0.00	0.00	8,477.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,700.0	0.00	0.00	8,577.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,800.0	0.00	0.00	8,677.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
8,900.0	0.00	0.00	8,777.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,000.0	0.00	0.00	8,877.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,100.0	0.00	0.00	8,977.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00



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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	9,077.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
Cameo									
9,210.8	0.00	0.00	9,088.0	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,300.0	0.00	0.00	9,177.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,400.0	0.00	0.00	9,277.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
Base Cameo Coal									
9,440.8	0.00	0.00	9,318.0	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
Rollins									
9,460.8	0.00	0.00	9,338.0	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,500.0	0.00	0.00	9,377.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,600.0	0.00	0.00	9,477.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
9,700.0	0.00	0.00	9,577.2	1,263.2	-372.7	1,317.1	0.00	0.00	0.00
TD @ 9710.8' MD / 9588.0' TVD									
9,710.8	0.00	0.00	9,588.0	1,263.2	-372.7	1,317.1	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 0697	0.00	0.00	9,588.0	1,263.2	-372.7	1,640,710.17	2,233,203.14	39.561019	-108.220125
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,486.8	9 5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,867.0	4,788.0	Wasatch 'G' Sand			
6,598.0	6,488.0	Ohio Creek			
6,750.7	6,638.0	Williams Fork			
7,560.8	7,438.0	TOG			
9,210.8	9,088.0	Cameo			
9,440.8	9,318.0	Base Cameo Coal			
9,460.8	9,338.0	Rollins			



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-03E
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 0697-04-03E	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')
561.5	559.3	32.7	-9.7	EOB @ 10.84" Inc. / 343.56" Azm
7,199.4	7,078.7	1,230.5	-363.1	Drop 3" / 100'
7,560.8	7,438.0	1,263.2	-372.7	EOD @ Vertical
9,710.8	9,588.0	1,263.2	-372.7	TD @ 9710.8' MD / 9588.0' TVD