

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 0697-04-01E

+N-S 0.0 +E-W 0.0 Northing 1639489.42 Easting 2233543.12 8609.0 Latitude 39.557590 Longitude -108.218786

Project: Garfield County, CO
Site: CC 604-41-J2 Pad
Well: CC Federal 0697-04-01E
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557590
Longitude: -108.218786
Ground Level: 8609.0
well @ 8633.0usft (24'RKB)



DIRECTIONAL DRILLING

REFERENCE INFORMATION

Co-ordinate (NE) Reference: Well CC Federal 0697-04-01E, True North
Vertical (TVD) Reference: well @ 8633.0usft (24'RKB)
Section (VS) Reference: Shot - (0.0K, 0.0E)
Measured Depth Reference: well @ 8633.0usft (24'RKB)
Calculation Method: Minimum Curvature

DESIGN TARGET DETAILS

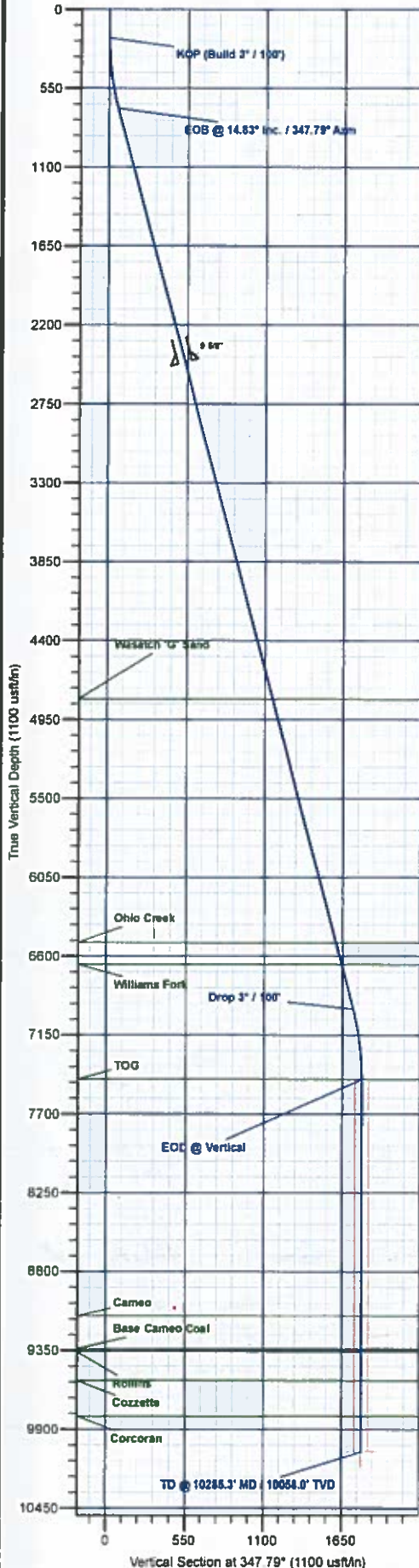
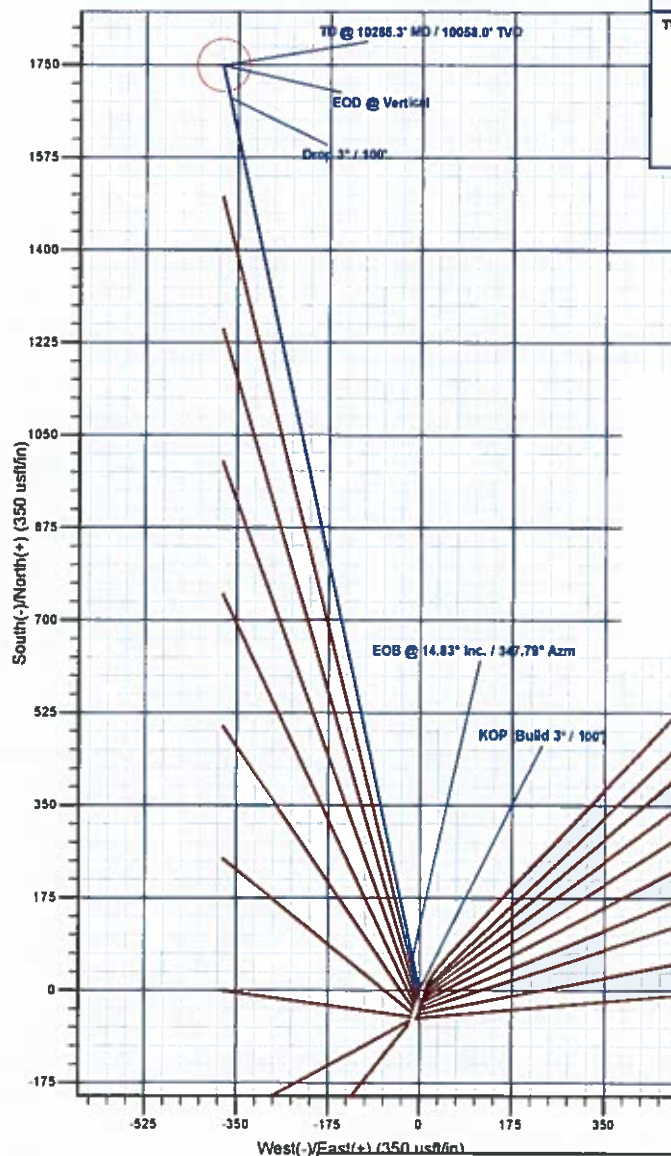
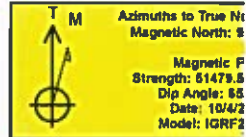
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-04-01E	10058.0	1749.1	-378.6	1641210.09	2233216.99	39.562392	-108.220129

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	KOP (Build 3" / 100')
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	EOB @ 14.83° Inc. / 347.79° Azm
694.2	14.83	347.79	688.7	62.1	-13.5	3.00	347.79	63.6	Drop 3" / 100'
7191.1	14.83	347.79	8989.3	1687.0	-365.2	0.00	0.00	1726.1	EOB @ Vertical
7885.3	0.00	0.00	7455.0	1749.1	-378.6	3.00	180.00	1789.6	TD @ 10285.3' MD / 10058.0' TVD
10285.3	0.00	0.00	10058.0	1749.1	-378.6	0.00	0.00	1789.6	

FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
4808.0	4955.4	Wasatch 'G' Sand
6508.0	6713.9	Ohio Creek
6559.0	6869.1	Williams Fork
7488.0	7685.3	TOG
9108.0	9335.3	Cameo
9338.0	9568.3	Base Cameo Coal
9368.0	9585.3	Rollins
9558.0	9785.3	Cozzette
9808.0	10035.3	Corcoran



Plan: Design #1 (CC Federal 0697-04-01E/Wellbore #1)

Created By: Will Jircik Date: 15:00, October 04 2017



Laramie Energy, LLC

**Garfield County, CO
CC 604-41-32 Pad
CC Federal 0697-04-01E**

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 0697-04-01E
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 0697-04-01E	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 0697-04-01E					
Well Position	+N/-S	-14.4 usft	Northing:	1,639,450.42 usft	Latitude:	39.557590
	+E/-W	-4.6 usft	Easting:	2,233,543.12 usft	Longitude:	-108.218786
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	51,479.53850494

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	347.79

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	
694.2	14.83	347.79	688.7	62.1	-13.5	3.00	3.00	0.00	347.79	
7,191.1	14.83	347.79	6,969.3	1,687.0	-365.2	0.00	0.00	0.00	0.00	
7,685.3	0.00	0.00	7,458.0	1,749.1	-378.6	3.00	-3.00	0.00	180.00	
10,285.3	0.00	0.00	10,058.0	1,749.1	-378.6	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 0697-04-01E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633 Ousft (24'RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633 Ousft (24'RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-04-01E	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	347.79	300.0	2.6	-0.6	2.6	3.00	3.00	0.00
400.0	6.00	347.79	399.6	10.2	-2.2	10.5	3.00	3.00	0.00
500.0	9.00	347.79	498.8	23.0	-5.0	23.5	3.00	3.00	0.00
600.0	12.00	347.79	597.1	40.8	-8.8	41.7	3.00	3.00	0.00
EOB @ 14.83° Inc. / 347.79° Azm									
694.2	14.83	347.79	688.7	62.1	-13.5	63.6	3.00	3.00	0.00
700.0	14.83	347.79	694.3	63.6	-13.8	65.1	0.00	0.00	0.00
800.0	14.83	347.79	791.0	88.6	-19.2	90.7	0.00	0.00	0.00
900.0	14.83	347.79	887.7	113.6	-24.6	116.2	0.00	0.00	0.00
1,000.0	14.83	347.79	984.3	138.6	-30.0	141.8	0.00	0.00	0.00
1,100.0	14.83	347.79	1,081.0	163.6	-35.4	167.4	0.00	0.00	0.00
1,200.0	14.83	347.79	1,177.7	188.6	-40.8	193.0	0.00	0.00	0.00
1,300.0	14.83	347.79	1,274.3	213.7	-46.2	218.6	0.00	0.00	0.00
1,400.0	14.83	347.79	1,371.0	238.7	-51.7	244.2	0.00	0.00	0.00
1,500.0	14.83	347.79	1,467.7	263.7	-57.1	269.8	0.00	0.00	0.00
1,600.0	14.83	347.79	1,564.3	288.7	-62.5	295.4	0.00	0.00	0.00
1,700.0	14.83	347.79	1,661.0	313.7	-67.9	321.0	0.00	0.00	0.00
1,800.0	14.83	347.79	1,757.7	338.7	-73.3	346.5	0.00	0.00	0.00
1,900.0	14.83	347.79	1,854.4	363.7	-78.7	372.1	0.00	0.00	0.00
2,000.0	14.83	347.79	1,951.0	388.7	-84.1	397.7	0.00	0.00	0.00
2,100.0	14.83	347.79	2,047.7	413.7	-89.6	423.3	0.00	0.00	0.00
2,200.0	14.83	347.79	2,144.4	438.7	-95.0	448.9	0.00	0.00	0.00
2,300.0	14.83	347.79	2,241.0	463.7	-100.4	474.5	0.00	0.00	0.00
2,400.0	14.83	347.79	2,337.7	488.8	-105.8	500.1	0.00	0.00	0.00
2,500.0	14.83	347.79	2,434.4	513.8	-111.2	525.7	0.00	0.00	0.00
9 5/8"									
2,524.0	14.83	347.79	2,457.6	519.8	-112.5	531.8	0.00	0.00	0.00
2,600.0	14.83	347.79	2,531.1	538.8	-116.6	551.3	0.00	0.00	0.00
2,700.0	14.83	347.79	2,627.7	563.8	-122.0	576.8	0.00	0.00	0.00
2,800.0	14.83	347.79	2,724.4	588.8	-127.5	602.4	0.00	0.00	0.00
2,900.0	14.83	347.79	2,821.1	613.8	-132.9	628.0	0.00	0.00	0.00
3,000.0	14.83	347.79	2,917.7	638.8	-138.3	653.6	0.00	0.00	0.00
3,100.0	14.83	347.79	3,014.4	663.8	-143.7	679.2	0.00	0.00	0.00
3,200.0	14.83	347.79	3,111.1	688.8	-149.1	704.8	0.00	0.00	0.00
3,300.0	14.83	347.79	3,207.7	713.8	-154.5	730.4	0.00	0.00	0.00
3,400.0	14.83	347.79	3,304.4	738.8	-159.9	756.0	0.00	0.00	0.00
3,500.0	14.83	347.79	3,401.1	763.9	-165.4	781.6	0.00	0.00	0.00
3,600.0	14.83	347.79	3,497.8	788.9	-170.8	807.1	0.00	0.00	0.00
3,700.0	14.83	347.79	3,594.4	813.9	-176.2	832.7	0.00	0.00	0.00
3,800.0	14.83	347.79	3,691.1	838.9	-181.6	858.3	0.00	0.00	0.00
3,900.0	14.83	347.79	3,787.8	863.9	-187.0	883.9	0.00	0.00	0.00
4,000.0	14.83	347.79	3,884.4	888.9	-192.4	909.5	0.00	0.00	0.00
4,100.0	14.83	347.79	3,981.1	913.9	-197.8	935.1	0.00	0.00	0.00
4,200.0	14.83	347.79	4,077.8	938.9	-203.3	960.7	0.00	0.00	0.00
4,300.0	14.83	347.79	4,174.5	963.9	-208.7	986.3	0.00	0.00	0.00
4,400.0	14.83	347.79	4,271.1	988.9	-214.1	1,011.8	0.00	0.00	0.00
4,500.0	14.83	347.79	4,367.8	1,014.0	-219.5	1,037.4	0.00	0.00	0.00
4,600.0	14.83	347.79	4,464.5	1,039.0	-224.9	1,063.0	0.00	0.00	0.00
4,700.0	14.83	347.79	4,561.1	1,064.0	-230.3	1,088.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-01E
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 0697-04-01E	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	14.83	347.79	4,657.8	1,089.0	-235.7	1,114.2	0.00	0.00	0.00
4,900.0	14.83	347.79	4,754.5	1,114.0	-241.1	1,139.8	0.00	0.00	0.00
Wasatch 'G' Sand									
4,955.4	14.83	347.79	4,808.0	1,127.8	-244.1	1,154.0	0.00	0.00	0.00
5,000.0	14.83	347.79	4,851.1	1,139.0	-246.6	1,165.4	0.00	0.00	0.00
5,100.0	14.83	347.79	4,947.8	1,164.0	-252.0	1,191.0	0.00	0.00	0.00
5,200.0	14.83	347.79	5,044.5	1,189.0	-257.4	1,216.6	0.00	0.00	0.00
5,300.0	14.83	347.79	5,141.2	1,214.0	-262.8	1,242.1	0.00	0.00	0.00
5,400.0	14.83	347.79	5,237.8	1,239.0	-268.2	1,267.7	0.00	0.00	0.00
5,500.0	14.83	347.79	5,334.5	1,264.0	-273.6	1,293.3	0.00	0.00	0.00
5,600.0	14.83	347.79	5,431.2	1,289.1	-279.0	1,318.9	0.00	0.00	0.00
5,700.0	14.83	347.79	5,527.8	1,314.1	-284.5	1,344.5	0.00	0.00	0.00
5,800.0	14.83	347.79	5,624.5	1,339.1	-289.9	1,370.1	0.00	0.00	0.00
5,900.0	14.83	347.79	5,721.2	1,364.1	-295.3	1,395.7	0.00	0.00	0.00
6,000.0	14.83	347.79	5,817.9	1,389.1	-300.7	1,421.3	0.00	0.00	0.00
6,100.0	14.83	347.79	5,914.5	1,414.1	-306.1	1,446.9	0.00	0.00	0.00
6,200.0	14.83	347.79	6,011.2	1,439.1	-311.5	1,472.4	0.00	0.00	0.00
6,300.0	14.83	347.79	6,107.9	1,464.1	-316.9	1,498.0	0.00	0.00	0.00
6,400.0	14.83	347.79	6,204.5	1,489.1	-322.4	1,523.6	0.00	0.00	0.00
6,500.0	14.83	347.79	6,301.2	1,514.1	-327.8	1,549.2	0.00	0.00	0.00
6,600.0	14.83	347.79	6,397.9	1,539.1	-333.2	1,574.8	0.00	0.00	0.00
6,700.0	14.83	347.79	6,494.6	1,564.2	-338.6	1,600.4	0.00	0.00	0.00
Ohio Creek									
6,713.9	14.83	347.79	6,508.0	1,567.6	-339.4	1,603.9	0.00	0.00	0.00
6,800.0	14.83	347.79	6,591.2	1,589.2	-344.0	1,626.0	0.00	0.00	0.00
Williams Fork									
6,869.1	14.83	347.79	6,658.0	1,606.4	-347.8	1,643.7	0.00	0.00	0.00
6,900.0	14.83	347.79	6,687.9	1,614.2	-349.4	1,651.6	0.00	0.00	0.00
7,000.0	14.83	347.79	6,784.6	1,639.2	-354.8	1,677.2	0.00	0.00	0.00
7,100.0	14.83	347.79	6,881.2	1,664.2	-360.3	1,702.7	0.00	0.00	0.00
Drop 3° / 100'									
7,191.1	14.83	347.79	6,969.3	1,687.0	-365.2	1,726.1	0.00	0.00	0.00
7,200.0	14.56	347.79	6,977.9	1,689.2	-365.7	1,728.3	3.00	-3.00	0.00
7,300.0	11.56	347.79	7,075.3	1,711.3	-370.4	1,750.9	3.00	-3.00	0.00
7,400.0	8.56	347.79	7,173.8	1,728.3	-374.1	1,768.4	3.00	-3.00	0.00
7,500.0	5.56	347.79	7,273.0	1,740.3	-376.7	1,780.7	3.00	-3.00	0.00
7,600.0	2.56	347.79	7,372.7	1,747.3	-378.2	1,787.7	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,685.3	0.00	0.00	7,458.0	1,749.1	-378.6	1,789.6	3.00	-3.00	0.00
7,700.0	0.00	0.00	7,472.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,572.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,672.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,772.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,100.0	0.00	0.00	7,872.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,200.0	0.00	0.00	7,972.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,300.0	0.00	0.00	8,072.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,400.0	0.00	0.00	8,172.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,500.0	0.00	0.00	8,272.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,600.0	0.00	0.00	8,372.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,700.0	0.00	0.00	8,472.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,800.0	0.00	0.00	8,572.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
8,900.0	0.00	0.00	8,672.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,000.0	0.00	0.00	8,772.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,100.0	0.00	0.00	8,872.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-01E
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 0697-04-01E	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	8,972.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,300.0	0.00	0.00	9,072.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
Cameo									
9,335.3	0.00	0.00	9,108.0	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,400.0	0.00	0.00	9,172.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,500.0	0.00	0.00	9,272.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
Base Cameo Coal									
9,565.3	0.00	0.00	9,338.0	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
Rollins									
9,585.3	0.00	0.00	9,358.0	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,600.0	0.00	0.00	9,372.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,700.0	0.00	0.00	9,472.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
Cozzette									
9,785.3	0.00	0.00	9,558.0	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,800.0	0.00	0.00	9,572.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
9,900.0	0.00	0.00	9,672.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
10,000.0	0.00	0.00	9,772.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
Corcoran									
10,035.3	0.00	0.00	9,808.0	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
10,100.0	0.00	0.00	9,872.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
10,200.0	0.00	0.00	9,972.7	1,749.1	-378.6	1,789.6	0.00	0.00	0.00
TD @ 10285.3' MD / 10058.0' TVD									
10,285.3	0.00	0.00	10,058.0	1,749.1	-378.6	1,789.6	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	10,058.0	1,749.1	-378.6	1,641,210.09	2,233,216.99	39.562392	-106.220129
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,457.6	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 Federal 0697-04-01E
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 0697-04-01E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (")	Dip Direction (")
4,955.4	4,808.0	Wasatch 'G' Sand			
6,713.9	6,508.0	Ohio Creek			
6,869.1	6,658.0	Williams Fork			
7,685.3	7,458.0	TOG			
9,335.3	9,108.0	Cameo			
9,565.3	9,338.0	Base Cameo Coal			
9,585.3	9,358.0	Rollins			
9,785.3	9,558.0	Cozzette			
10,035.3	9,808.0	Corcoran			

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')
694.2	688.7	62.1	-13.5	EOB @ 14.83° Inc. / 347.79° Azm
7,191.1	6,969.3	1,687.0	-385.2	Drop 3" / 100'
7,685.3	7,458.0	1,749.1	-378.6	EOD @ Vertical
10,285.3	10,058.0	1,749.1	-378.6	TD @ 10285.3' MD / 10058.0' TVD