

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 1639452.94 Ground Level: 8609.0 Easting 2233543.76 Latitude 39.557597 Longitude -108.218784

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC Federal 0697-04-03E
Wellbore: Wellbore #1
Design: Design #3
Latitude: 39.557597
Longitude: -108.218784
Ground Level: 8609.0
Well @ 8639.0ust (RKB 30')



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC Federal 0697-04-03E, True North
Vertical (TVD) Reference: Well @ 8639.0ust (RKB 30')
Section (VS) Reference: Well @ 8639.0ust (RKB 30')
Measured Depth Reference: Well @ 8639.0ust (RKB 30')
Calculation Method: Minimum Curvature

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-04-03E	9594.0	1246.5	-378.1	1640710.17	2233203.14	39.561019	-108.220125

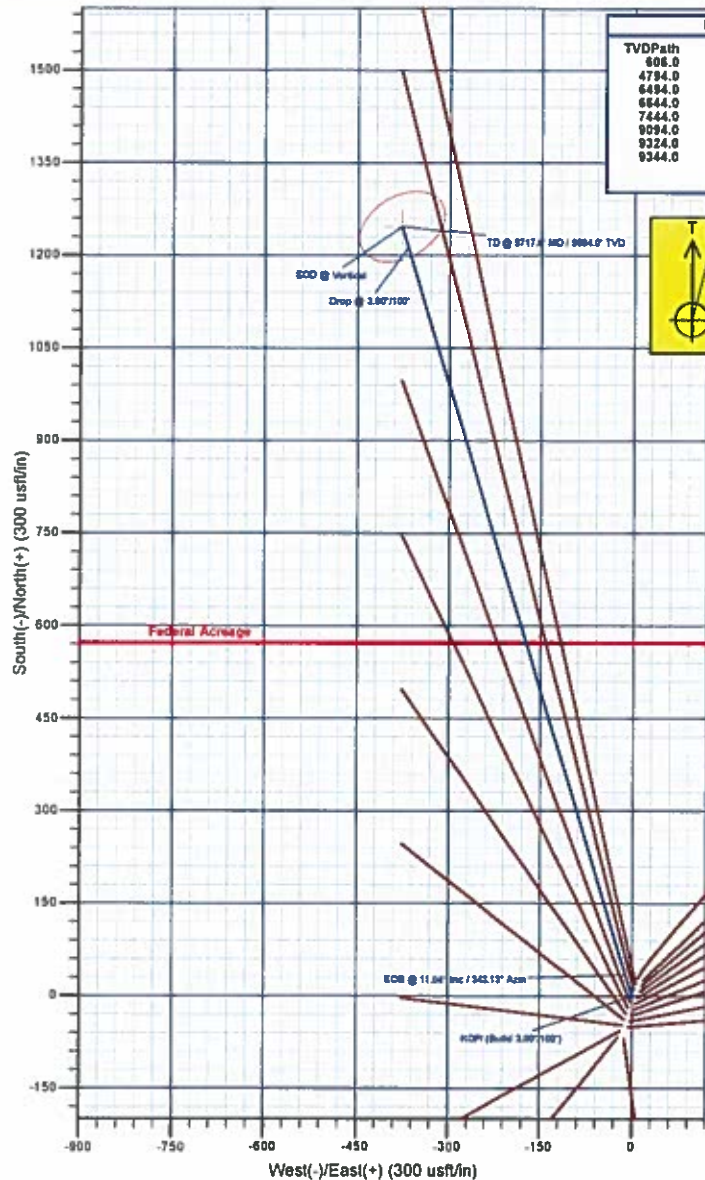
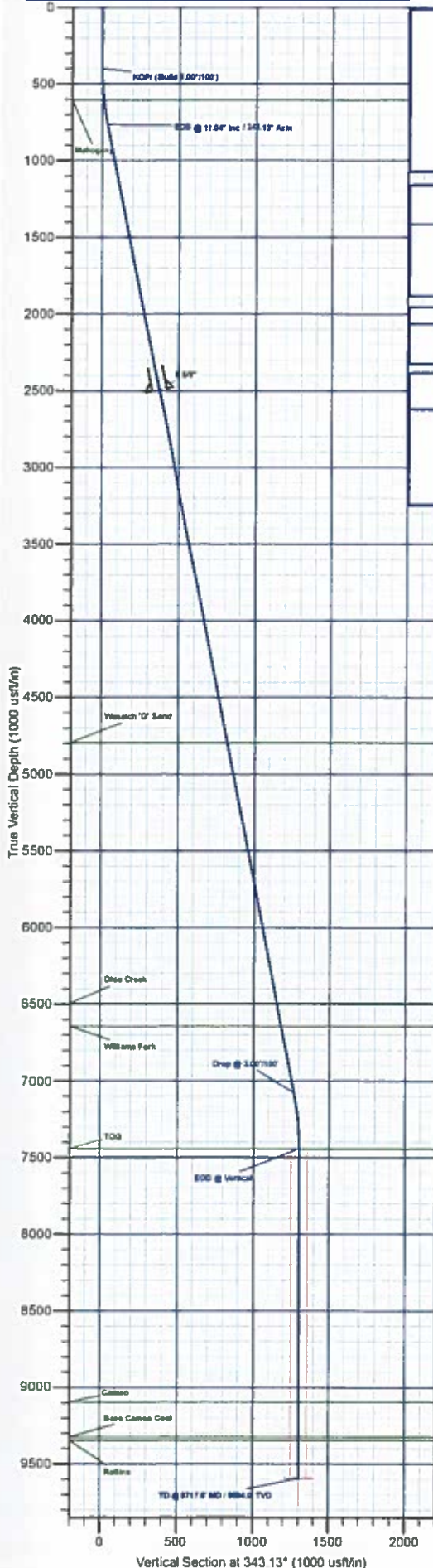
SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dieg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
409.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	KOP/ (Build 3.00"/100')
768.1	11.04	343.13	768.8	33.6	-10.3	3.00	343.13	35.4	EOB @ 11.04" Inc / 343.13" Azm
7199.5	11.04	343.13	7078.2	1212.6	-367.8	0.00	0.00	1287.2	Drop @ 3.00"/100'
7567.6	0.00	0.00	7444.0	1246.5	-378.1	3.00	180.00	1302.6	EOD @ Vertical
9717.6	0.00	0.00	9594.0	1246.5	-378.1	0.00	0.00	1302.6	TD @ 9717.6" MD / 9594.0" TVD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
606.0	606.4	Mahogany
4794.0	4872.3	Wasatch 'G' Sand
6494.0	6604.3	Ohio Creek
6844.0	6757.2	Williams Fork
7444.0	7567.6	TOG
9094.0	9217.6	Cameo
9324.0	9447.6	Base Cameo Coal
9344.0	9487.6	Rollins

Azimuths to True North
Magnetic North: 9.77'
Magnetic Field
Strength: 51479.5nT
Dip Angle: 65.59'
Date: 10/4/2017
Model: IGRF2015



Plan: Design #3 (CC Federal 0697-04-03E/Wellbore #1)

Created By: Will Jircik Date: 15:48, February 04 2019



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC Federal 0697-04-03E

Wellbore #1

Plan: Design #3

QES Well Planning Report

04 February, 2019





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 @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
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 #3		

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 0697-04-03E		
Well Position	+N/-S	-11.9 usft	Northing:
	+E/-W	-4.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	
		Latitude:	39.557597
		Longitude:	-108.218784
		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)
			51,479.54252818

Design	Design #3		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			343.13

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
768.1	11.04	343.13	765.8	33.8	-10.3	3.00	3.00	0.00	343.13	
7,199.5	11.04	343.13	7,078.2	1,212.6	-367.8	0.00	0.00	0.00	0.00	
7,567.6	0.00	0.00	7,444.0	1,246.5	-378.1	3.00	-3.00	0.00	180.00	
9,717.6	0.00	0.00	9,594.0	1,246.5	-378.1	0.00	0.00	0.00	0.00	PBHL - CC Federal 06



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639 0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639 0usft (RKB 30')
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 #3		

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
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP/ (Build 3.00°/100')									
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	3.00	343.13	500.0	2.5	-0.8	2.6	3.00	3.00	0.00
600.0	6.00	343.13	599.6	10.0	-3.0	10.5	3.00	3.00	0.00
Mahogany									
606.4	6.19	343.13	606.0	10.7	-3.2	11.1	3.00	3.00	0.00
700.0	9.00	343.13	698.8	22.5	-6.8	23.5	3.00	3.00	0.00
EOB @ 11.04° Inc / 343.13° Azm									
768.1	11.04	343.13	765.8	33.8	-10.3	35.4	3.00	3.00	0.00
800.0	11.04	343.13	797.1	39.7	-12.0	41.5	0.00	0.00	0.00
900.0	11.04	343.13	895.3	58.0	-17.6	60.6	0.00	0.00	0.00
1,000.0	11.04	343.13	993.4	76.3	-23.2	79.8	0.00	0.00	0.00
1,100.0	11.04	343.13	1,091.6	94.7	-28.7	98.9	0.00	0.00	0.00
1,200.0	11.04	343.13	1,189.7	113.0	-34.3	118.1	0.00	0.00	0.00
1,300.0	11.04	343.13	1,287.9	131.3	-39.8	137.2	0.00	0.00	0.00
1,400.0	11.04	343.13	1,386.0	149.7	-45.4	156.4	0.00	0.00	0.00
1,500.0	11.04	343.13	1,484.2	168.0	-51.0	175.5	0.00	0.00	0.00
1,600.0	11.04	343.13	1,582.3	186.3	-56.5	194.7	0.00	0.00	0.00
1,700.0	11.04	343.13	1,680.5	204.6	-62.1	213.9	0.00	0.00	0.00
1,800.0	11.04	343.13	1,778.6	223.0	-67.6	233.0	0.00	0.00	0.00
1,900.0	11.04	343.13	1,876.8	241.3	-73.2	252.2	0.00	0.00	0.00
2,000.0	11.04	343.13	1,974.9	259.6	-78.8	271.3	0.00	0.00	0.00
2,100.0	11.04	343.13	2,073.1	278.0	-84.3	290.5	0.00	0.00	0.00
2,200.0	11.04	343.13	2,171.2	296.3	-89.9	309.6	0.00	0.00	0.00
2,300.0	11.04	343.13	2,269.4	314.6	-95.4	328.8	0.00	0.00	0.00
2,400.0	11.04	343.13	2,367.5	332.9	-101.0	347.9	0.00	0.00	0.00
2,500.0	11.04	343.13	2,465.7	351.3	-106.5	367.1	0.00	0.00	0.00
2,600.0	11.04	343.13	2,563.8	369.6	-112.1	386.2	0.00	0.00	0.00
2,700.0	11.04	343.13	2,662.0	387.9	-117.7	405.4	0.00	0.00	0.00
2,800.0	11.04	343.13	2,760.1	406.3	-123.2	424.5	0.00	0.00	0.00
2,900.0	11.04	343.13	2,858.3	424.6	-128.8	443.7	0.00	0.00	0.00
3,000.0	11.04	343.13	2,956.4	442.9	-134.3	462.8	0.00	0.00	0.00
3,100.0	11.04	343.13	3,054.6	461.2	-139.9	482.0	0.00	0.00	0.00
3,200.0	11.04	343.13	3,152.7	479.6	-145.5	501.2	0.00	0.00	0.00
3,300.0	11.04	343.13	3,250.9	497.9	-151.0	520.3	0.00	0.00	0.00
3,400.0	11.04	343.13	3,349.0	516.2	-156.6	539.5	0.00	0.00	0.00
3,500.0	11.04	343.13	3,447.1	534.6	-162.1	558.6	0.00	0.00	0.00
3,600.0	11.04	343.13	3,545.3	552.9	-167.7	577.8	0.00	0.00	0.00
3,700.0	11.04	343.13	3,643.4	571.2	-173.3	596.9	0.00	0.00	0.00
3,800.0	11.04	343.13	3,741.6	589.5	-178.8	616.1	0.00	0.00	0.00
3,900.0	11.04	343.13	3,839.7	607.9	-184.4	635.2	0.00	0.00	0.00
4,000.0	11.04	343.13	3,937.9	626.2	-189.9	654.4	0.00	0.00	0.00
4,100.0	11.04	343.13	4,036.0	644.5	-195.5	673.5	0.00	0.00	0.00
4,200.0	11.04	343.13	4,134.2	662.9	-201.1	692.7	0.00	0.00	0.00
4,300.0	11.04	343.13	4,232.3	681.2	-206.6	711.8	0.00	0.00	0.00
4,400.0	11.04	343.13	4,330.5	699.5	-212.2	731.0	0.00	0.00	0.00
4,500.0	11.04	343.13	4,428.6	717.8	-217.7	750.1	0.00	0.00	0.00
4,600.0	11.04	343.13	4,526.8	736.2	-223.3	769.3	0.00	0.00	0.00
4,700.0	11.04	343.13	4,624.9	754.5	-228.9	788.4	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 0697-04-03E
 Wellbore: Wellbore #1
 Design: Design #3

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

Well CC Federal 0697-04-03E
 Well @ 8639.0usft (RKB 30')
 Well @ 8639.0usft (RKB 30')
 True
 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	11.04	343.13	4,723.1	772.8	-234.4	807.6	0.00	0.00	0.00
Wasatch 'G' Sand									
4,872.3	11.04	343.13	4,794.0	786.1	-238.4	821.4	0.00	0.00	0.00
4,900.0	11.04	343.13	4,821.2	791.2	-240.0	826.8	0.00	0.00	0.00
5,000.0	11.04	343.13	4,919.4	809.5	-245.5	845.9	0.00	0.00	0.00
5,100.0	11.04	343.13	5,017.5	827.8	-251.1	865.1	0.00	0.00	0.00
5,200.0	11.04	343.13	5,115.7	846.1	-256.7	884.2	0.00	0.00	0.00
5,300.0	11.04	343.13	5,213.8	864.5	-262.2	903.4	0.00	0.00	0.00
5,400.0	11.04	343.13	5,312.0	882.8	-267.8	922.5	0.00	0.00	0.00
5,500.0	11.04	343.13	5,410.1	901.1	-273.3	941.7	0.00	0.00	0.00
5,600.0	11.04	343.13	5,508.3	919.5	-278.9	960.8	0.00	0.00	0.00
5,700.0	11.04	343.13	5,606.4	937.8	-284.5	980.0	0.00	0.00	0.00
5,800.0	11.04	343.13	5,704.6	956.1	-290.0	999.1	0.00	0.00	0.00
5,900.0	11.04	343.13	5,802.7	974.4	-295.6	1,018.3	0.00	0.00	0.00
6,000.0	11.04	343.13	5,900.9	992.8	-301.1	1,037.4	0.00	0.00	0.00
6,100.0	11.04	343.13	5,999.0	1,011.1	-306.7	1,056.6	0.00	0.00	0.00
6,200.0	11.04	343.13	6,097.2	1,029.4	-312.2	1,075.7	0.00	0.00	0.00
6,300.0	11.04	343.13	6,195.3	1,047.8	-317.8	1,094.9	0.00	0.00	0.00
6,400.0	11.04	343.13	6,293.5	1,066.1	-323.4	1,114.1	0.00	0.00	0.00
6,500.0	11.04	343.13	6,391.6	1,084.4	-328.9	1,133.2	0.00	0.00	0.00
6,600.0	11.04	343.13	6,489.8	1,102.7	-334.5	1,152.4	0.00	0.00	0.00
Ohio Creek									
6,604.3	11.04	343.13	6,494.0	1,103.5	-334.7	1,153.2	0.00	0.00	0.00
6,700.0	11.04	343.13	6,587.9	1,121.1	-340.0	1,171.5	0.00	0.00	0.00
Williams Fork									
6,757.2	11.04	343.13	6,644.0	1,131.6	-343.2	1,182.5	0.00	0.00	0.00
6,800.0	11.04	343.13	6,686.1	1,139.4	-345.6	1,190.7	0.00	0.00	0.00
6,900.0	11.04	343.13	6,784.2	1,157.7	-351.2	1,209.8	0.00	0.00	0.00
7,000.0	11.04	343.13	6,882.3	1,176.1	-356.7	1,229.0	0.00	0.00	0.00
7,100.0	11.04	343.13	6,980.5	1,194.4	-362.3	1,248.1	0.00	0.00	0.00
Drop @ 3.00°/100'									
7,199.5	11.04	343.13	7,078.2	1,212.6	-367.8	1,267.2	0.00	0.00	0.00
7,200.0	11.03	343.13	7,078.6	1,212.7	-367.8	1,267.3	3.00	-3.00	0.00
7,300.0	8.03	343.13	7,177.3	1,228.6	-372.6	1,283.8	3.00	-3.00	0.00
7,400.0	5.03	343.13	7,276.6	1,239.4	-375.9	1,295.2	3.00	-3.00	0.00
7,500.0	2.03	343.13	7,376.4	1,245.3	-377.7	1,301.4	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,567.6	0.00	0.00	7,444.0	1,246.5	-378.1	1,302.6	3.00	-3.00	24.95
7,600.0	0.00	0.00	7,476.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,576.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,676.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,776.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,876.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,100.0	0.00	0.00	7,976.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,200.0	0.00	0.00	8,076.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,300.0	0.00	0.00	8,176.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,400.0	0.00	0.00	8,276.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,500.0	0.00	0.00	8,376.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,600.0	0.00	0.00	8,476.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,700.0	0.00	0.00	8,576.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,800.0	0.00	0.00	8,676.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
8,900.0	0.00	0.00	8,776.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,000.0	0.00	0.00	8,876.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,100.0	0.00	0.00	8,976.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-03E
Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639 0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639 0usft (RKB 30')
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 #3		

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	9,076.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
Cameo									
9,217.6	0.00	0.00	9,094.0	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,300.0	0.00	0.00	9,176.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,400.0	0.00	0.00	9,276.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
Base Cameo Coal									
9,447.6	0.00	0.00	9,324.0	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
Rollins									
9,467.6	0.00	0.00	9,344.0	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,500.0	0.00	0.00	9,376.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,600.0	0.00	0.00	9,476.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
9,700.0	0.00	0.00	9,576.4	1,246.5	-378.1	1,302.6	0.00	0.00	0.00
TD @ 9717.6' MD / 9594.0' TVD									
9,717.6	0.00	0.00	9,594.0	1,246.5	-378.1	1,302.6	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	9,594.0	1,246.5	-378.1	1,640,710.17	2,233,203.14	39.561019	-108.220125
- plan hits target center									
- Ellipse (radii L50.0 W75.0 on 150.00 azi)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,495.1	9 5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
606.4	606.0	Mahogany			
4,872.3	4,794.0	Wasatch 'G' Sand			
6,604.3	6,494.0	Ohio Creek			
6,757.2	6,644.0	Williams Fork			
7,567.6	7,444.0	TOG			
9,217.6	9,094.0	Cameo			
9,447.6	9,324.0	Base Cameo Coal			
9,467.6	9,344.0	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 @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
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 #3		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.0	400.0	0.0	0.0	KOP/ (Build 3.00"/100')
768.1	765.8	33.8	-10.3	EOB @ 11.04" inc / 343.13° Azm
7,199.5	7,078.2	1,212.6	-367.8	Drop @ 3.00"/100'
7,567.6	7,444.0	1,246.5	-378.1	EOD @ Vertical
9,717.6	9,594.0	1,246.5	-378.1	TD @ 9717.6' MD / 9594.0' TVD