

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 0697-03-10W

+N-S 0.0 +E-W 0.0 Northing 1639402.91 Ground Level: 8609.0 Easting 223536.04 Latitude 39.557458 Longitude -108.218806

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC 0697-03-10W
Wellbore: Wellbore #1
Design: Design #3
Latitude: 39.557458
Longitude: -108.218806
Ground Level: 8609.0
Well @ 8639.0usft (RKB 30')



DIRECTIONAL DRILLING

REFERENCE INFORMATION

Co-ordinate (NE) Reference: Well CC 0697-03-10W, True North
Vertical (TVD) Reference: Well @ 8639.0usft (RKB 30')
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: Well @ 8639.0usft (RKB 30')
Calculation Method: Minimum Curvature

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
606.0	606.4	Mahogany
4904.0	5144.4	Wasatch 'G' Sand
6604.0	6944.5	Ohio Creek
6754.0	7103.4	Williams Fork
7554.0	7825.4	TOG
9254.0	9375.4	Cameo
9434.0	9805.4	Base Cameo Coal
9454.0	9825.4	Rollins
9592.0	10063.4	Cozzette
9965.0	10336.4	Corcoran

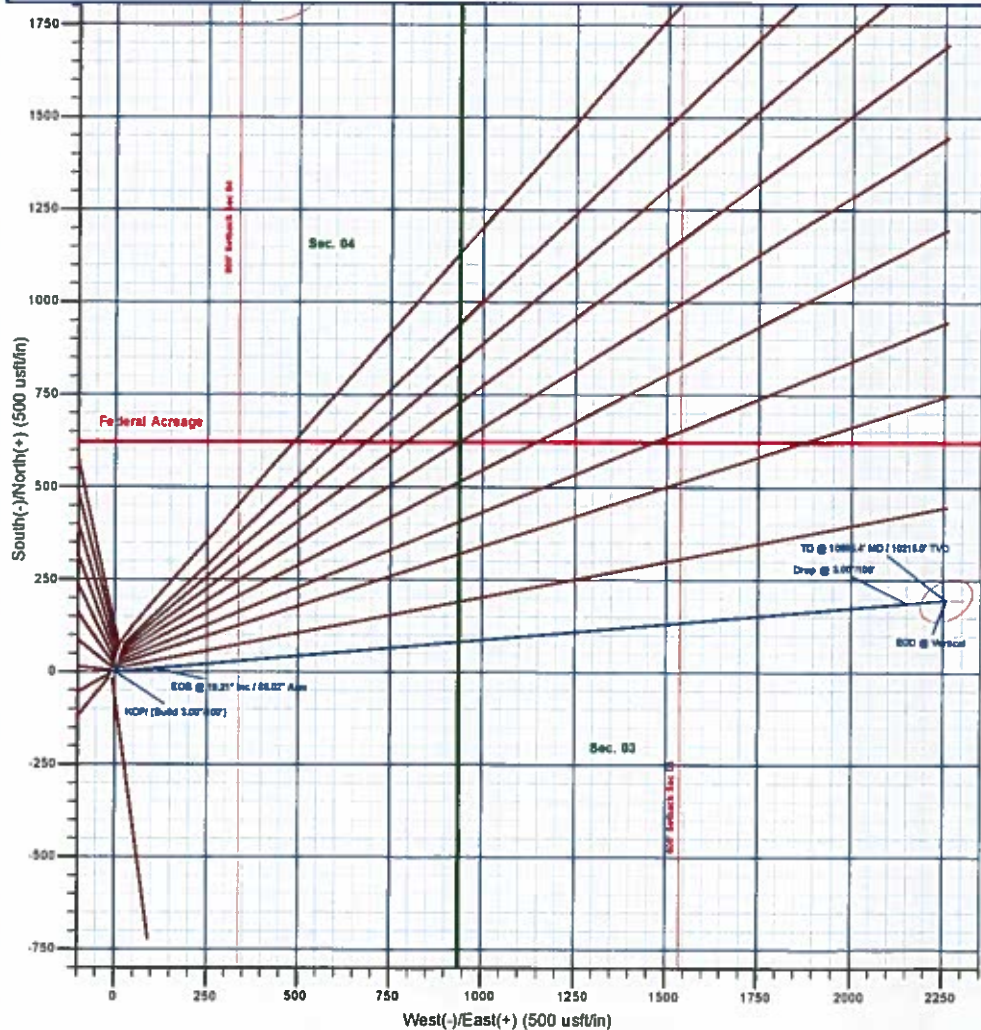
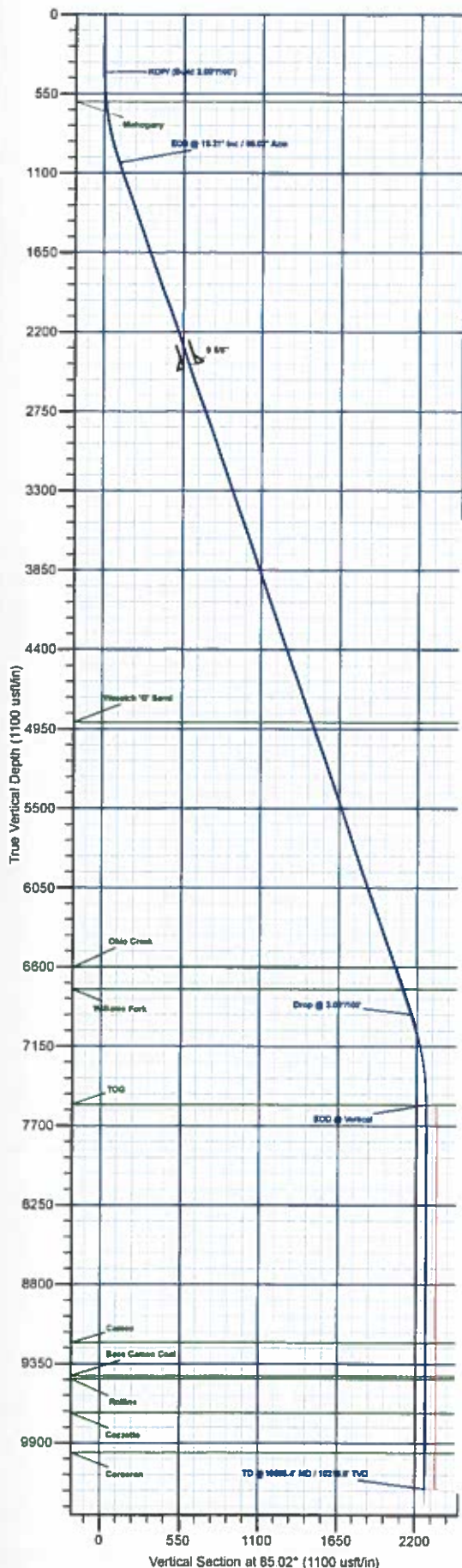


DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-03-10W	10215.0	196.8	2258.4	1639531.66	2235799.35	39.557998	-108.210796

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	KOP/ (Build 3.00°/100')
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	EOB @ 19.21° Inc / 85.02° Azm
1040.2	19.21	85.02	1028.3	9.2	105.9	3.00	85.02	106.3	Drop @ 3.00°/100'
7285.2	19.21	85.02	6925.7	187.6	2182.5	0.00	0.00	2160.7	EOB @ Vertical
7825.4	0.00	0.00	7554.0	196.8	2258.4	3.00	180.00	2267.0	TD @ 10586.4' MD / 10215.0' TVD
10586.4	0.00	0.00	10215.0	196.8	2258.4	0.00	0.00	2267.0	



Plan: Design #3 (CC 0697-03-10W/Wellbore #1)

Created By: Will Jircik Date: 14:12, February 04 2019



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC 0697-03-10W

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 0697-03-10W
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 0697-03-10W	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	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 0697-03-10W				
Well Position	+N/-S	-62.5 usft	Northing:	1,639,402.51 usft	Latitude: 39.557458
	+E/-W	-10.2 usft	Easting:	2,233,536.04 usft	Longitude: -108.218805
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	51,479.48503559

Design	Design #3			
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	85.02

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,040.2	19.21	85.02	1,028.3	9.2	105.9	3.00	3.00	0.00	85.02	
7,285.2	19.21	85.02	6,925.7	187.6	2,152.5	0.00	0.00	0.00	0.00	
7,925.4	0.00	0.00	7,554.0	196.8	2,258.4	3.00	-3.00	0.00	180.00	
10,586.4	0.00	0.00	10,215.0	196.8	2,258.4	0.00	0.00	0.00	0.00	PBHL - CC 0697-03-1



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10W
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 0697-03-10W	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	85.02	500.0	0.2	2.6	2.6	3.00	3.00	0.00
600.0	6.00	85.02	599.6	0.9	10.4	10.5	3.00	3.00	0.00
Mahogany									
606.4	6.19	85.02	606.0	1.0	11.1	11.1	3.00	3.00	0.00
700.0	9.00	85.02	698.8	2.0	23.4	23.5	3.00	3.00	0.00
800.0	12.00	85.02	797.1	3.6	41.6	41.7	3.00	3.00	0.00
900.0	15.00	85.02	894.3	5.6	64.8	65.1	3.00	3.00	0.00
1,000.0	18.00	85.02	990.2	8.1	93.1	93.5	3.00	3.00	0.00
EOB @ 19.21° Inc / 85.02° Azm									
1,040.2	19.21	85.02	1,028.3	9.2	105.9	106.3	3.00	3.00	0.00
1,100.0	19.21	85.02	1,084.7	10.9	125.5	126.0	0.00	0.00	0.00
1,200.0	19.21	85.02	1,179.2	13.8	158.3	158.9	0.00	0.00	0.00
1,300.0	19.21	85.02	1,273.6	16.6	191.0	191.8	0.00	0.00	0.00
1,400.0	19.21	85.02	1,368.1	19.5	223.8	224.7	0.00	0.00	0.00
1,500.0	19.21	85.02	1,462.5	22.4	256.6	257.6	0.00	0.00	0.00
1,600.0	19.21	85.02	1,556.9	25.2	289.4	290.5	0.00	0.00	0.00
1,700.0	19.21	85.02	1,651.4	28.1	322.1	323.4	0.00	0.00	0.00
1,800.0	19.21	85.02	1,745.8	30.9	354.9	356.2	0.00	0.00	0.00
1,900.0	19.21	85.02	1,840.2	33.8	387.7	389.1	0.00	0.00	0.00
2,000.0	19.21	85.02	1,934.7	36.6	420.4	422.0	0.00	0.00	0.00
2,100.0	19.21	85.02	2,029.1	39.5	453.2	454.9	0.00	0.00	0.00
2,200.0	19.21	85.02	2,123.5	42.4	486.0	487.8	0.00	0.00	0.00
2,300.0	19.21	85.02	2,218.0	45.2	518.8	520.7	0.00	0.00	0.00
2,400.0	19.21	85.02	2,312.4	48.1	551.5	553.6	0.00	0.00	0.00
2,500.0	19.21	85.02	2,406.8	50.9	584.3	586.5	0.00	0.00	0.00
2,600.0	19.21	85.02	2,501.3	53.8	617.1	619.4	0.00	0.00	0.00
2,700.0	19.21	85.02	2,595.7	56.6	649.9	652.3	0.00	0.00	0.00
2,800.0	19.21	85.02	2,690.1	59.5	682.6	685.2	0.00	0.00	0.00
2,900.0	19.21	85.02	2,784.6	62.3	715.4	718.1	0.00	0.00	0.00
3,000.0	19.21	85.02	2,879.0	65.2	748.2	751.0	0.00	0.00	0.00
3,100.0	19.21	85.02	2,973.4	68.1	780.9	783.9	0.00	0.00	0.00
3,200.0	19.21	85.02	3,067.9	70.9	813.7	816.8	0.00	0.00	0.00
3,300.0	19.21	85.02	3,162.3	73.8	846.5	849.7	0.00	0.00	0.00
3,400.0	19.21	85.02	3,256.7	76.6	879.3	882.6	0.00	0.00	0.00
3,500.0	19.21	85.02	3,351.2	79.5	912.0	915.5	0.00	0.00	0.00
3,600.0	19.21	85.02	3,445.6	82.3	944.8	948.4	0.00	0.00	0.00
3,700.0	19.21	85.02	3,540.0	85.2	977.6	981.3	0.00	0.00	0.00
3,800.0	19.21	85.02	3,634.5	88.1	1,010.3	1,014.2	0.00	0.00	0.00
3,900.0	19.21	85.02	3,728.9	90.9	1,043.1	1,047.1	0.00	0.00	0.00
4,000.0	19.21	85.02	3,823.3	93.8	1,075.9	1,080.0	0.00	0.00	0.00
4,100.0	19.21	85.02	3,917.8	96.6	1,108.7	1,112.9	0.00	0.00	0.00
4,200.0	19.21	85.02	4,012.2	99.5	1,141.4	1,145.8	0.00	0.00	0.00
4,300.0	19.21	85.02	4,106.6	102.3	1,174.2	1,178.7	0.00	0.00	0.00
4,400.0	19.21	85.02	4,201.1	105.2	1,207.0	1,211.6	0.00	0.00	0.00
4,500.0	19.21	85.02	4,295.5	108.0	1,239.8	1,244.5	0.00	0.00	0.00
4,600.0	19.21	85.02	4,389.9	110.9	1,272.5	1,277.3	0.00	0.00	0.00
4,700.0	19.21	85.02	4,484.4	113.8	1,305.3	1,310.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-10W
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 0697-03-10W	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)
4,800.0	19.21	85.02	4,578.8	116.6	1,338.1	1,343.1	0.00	0.00	0.00
4,900.0	19.21	85.02	4,673.2	119.5	1,370.8	1,376.0	0.00	0.00	0.00
5,000.0	19.21	85.02	4,767.7	122.3	1,403.6	1,408.9	0.00	0.00	0.00
5,100.0	19.21	85.02	4,862.1	125.2	1,436.4	1,441.8	0.00	0.00	0.00
Wasatch 'G' Sand									
5,144.4	19.21	85.02	4,904.0	126.4	1,450.9	1,456.4	0.00	0.00	0.00
5,200.0	19.21	85.02	4,958.6	128.0	1,469.2	1,474.7	0.00	0.00	0.00
5,300.0	19.21	85.02	5,051.0	130.9	1,501.9	1,507.6	0.00	0.00	0.00
5,400.0	19.21	85.02	5,145.4	133.7	1,534.7	1,540.5	0.00	0.00	0.00
5,500.0	19.21	85.02	5,239.9	136.6	1,567.5	1,573.4	0.00	0.00	0.00
5,600.0	19.21	85.02	5,334.3	139.5	1,600.2	1,606.3	0.00	0.00	0.00
5,700.0	19.21	85.02	5,428.7	142.3	1,633.0	1,639.2	0.00	0.00	0.00
5,800.0	19.21	85.02	5,523.2	145.2	1,665.8	1,672.1	0.00	0.00	0.00
5,900.0	19.21	85.02	5,617.6	148.0	1,698.6	1,705.0	0.00	0.00	0.00
6,000.0	19.21	85.02	5,712.0	150.9	1,731.3	1,737.9	0.00	0.00	0.00
6,100.0	19.21	85.02	5,806.5	153.7	1,764.1	1,770.8	0.00	0.00	0.00
6,200.0	19.21	85.02	5,900.9	156.6	1,796.9	1,803.7	0.00	0.00	0.00
6,300.0	19.21	85.02	5,995.3	159.5	1,829.7	1,836.6	0.00	0.00	0.00
6,400.0	19.21	85.02	6,089.8	162.3	1,862.4	1,869.5	0.00	0.00	0.00
6,500.0	19.21	85.02	6,184.2	165.2	1,895.2	1,902.4	0.00	0.00	0.00
6,600.0	19.21	85.02	6,278.6	168.0	1,928.0	1,935.3	0.00	0.00	0.00
6,700.0	19.21	85.02	6,373.1	170.9	1,960.7	1,968.2	0.00	0.00	0.00
6,800.0	19.21	85.02	6,467.5	173.7	1,993.5	2,001.1	0.00	0.00	0.00
6,900.0	19.21	85.02	6,561.9	176.6	2,026.3	2,034.0	0.00	0.00	0.00
Ohio Creek									
6,944.5	19.21	85.02	6,604.0	177.9	2,040.9	2,048.6	0.00	0.00	0.00
7,000.0	19.21	85.02	6,656.4	179.4	2,059.1	2,066.9	0.00	0.00	0.00
7,100.0	19.21	85.02	6,750.8	182.3	2,091.8	2,099.8	0.00	0.00	0.00
Williams Fork									
7,103.4	19.21	85.02	6,754.0	182.4	2,092.9	2,100.9	0.00	0.00	0.00
7,200.0	19.21	85.02	6,845.2	185.2	2,124.6	2,132.7	0.00	0.00	0.00
Drop @ 3.00°/100'									
7,285.2	19.21	85.02	6,925.7	187.6	2,152.5	2,160.7	0.00	0.00	0.00
7,300.0	18.76	85.02	6,939.7	188.0	2,157.3	2,165.5	3.00	-3.00	0.00
7,400.0	15.76	85.02	7,035.2	190.6	2,186.9	2,195.2	3.00	-3.00	0.00
7,500.0	12.76	85.02	7,132.1	192.7	2,211.4	2,219.8	3.00	-3.00	0.00
7,600.0	9.76	85.02	7,230.1	194.4	2,230.9	2,239.3	3.00	-3.00	0.00
7,700.0	6.76	85.02	7,329.1	195.7	2,245.2	2,253.7	3.00	-3.00	0.00
7,800.0	3.76	85.02	7,428.7	196.5	2,254.3	2,262.9	3.00	-3.00	0.00
7,900.0	0.76	85.02	7,528.6	196.8	2,258.3	2,266.8	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,925.4	0.00	0.00	7,554.0	196.8	2,258.4	2,267.0	3.00	-3.00	0.00
8,000.0	0.00	0.00	7,628.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,100.0	0.00	0.00	7,728.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,200.0	0.00	0.00	7,828.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,300.0	0.00	0.00	7,928.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,028.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,128.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,228.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,328.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,428.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,528.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,000.0	0.00	0.00	8,628.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,100.0	0.00	0.00	8,728.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00



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 0697-03-10W	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	8,828.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,300.0	0.00	0.00	8,928.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,400.0	0.00	0.00	9,028.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,500.0	0.00	0.00	9,128.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
Cameo									
9,575.4	0.00	0.00	9,204.0	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,600.0	0.00	0.00	9,228.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,700.0	0.00	0.00	9,328.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,428.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
Base Cameo Coal									
9,805.4	0.00	0.00	9,434.0	196.8	2,258.4	2,267.0	0.00	0.00	0.00
Rollins									
9,825.4	0.00	0.00	9,454.0	196.8	2,258.4	2,267.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,528.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
10,000.0	0.00	0.00	9,628.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
Cozzette									
10,063.4	0.00	0.00	9,692.0	196.8	2,258.4	2,267.0	0.00	0.00	0.00
10,100.0	0.00	0.00	9,728.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
10,200.0	0.00	0.00	9,828.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
10,300.0	0.00	0.00	9,928.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
Corcoran									
10,336.4	0.00	0.00	9,965.0	196.8	2,258.4	2,267.0	0.00	0.00	0.00
10,400.0	0.00	0.00	10,028.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
10,500.0	0.00	0.00	10,128.6	196.8	2,258.4	2,267.0	0.00	0.00	0.00
TD @ 10586.4' MD / 10216.0' TVD									
10,586.4	0.00	0.00	10,215.0	196.8	2,258.4	2,267.0	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 0697-03-10V	0.00	0.00	10,215.0	196.8	2,258.4	1,639,531.66	2,235,799.35	39.557998	-108.210796
- plan hits target center									
- Ellipse (rad) L50.0 W75.0 on 150.00 azi)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,435.2	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 0697-03-10W
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 0697-03-10W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
606.4	606.0	Mahogany			
5,144.4	4,904.0	Wasatch 'G' Sand			
6,944.5	6,604.0	Ohio Creek			
7,103.4	6,754.0	Williams Fork			
7,925.4	7,554.0	TOG			
8,575.4	8,204.0	Cameo			
9,805.4	9,434.0	Base Cameo Coal			
9,825.4	9,454.0	Rollins			
10,083.4	9,692.0	Cozzette			
10,336.4	9,965.0	Corcoran			

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')
1,040.2	1,028.3	9.2	105.9	EOB @ 19.21° Inc / 85.02° Azm
7,285.2	6,925.7	187.6	2,152.5	Drop @ 3.00°/100'
7,925.4	7,554.0	196.8	2,258.4	EOD @ Vertical
10,586.4	10,215.0	196.8	2,258.4	TD @ 10586.4' MD / 10215.0' TVD