

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



Project: Garfield County, CO
Site: CC 604-12-13 Pad
Well: CC Federal 0697-04-01W
Wellbore: A-11
Design: Design #1
Latitude: 39.553356
Longitude: -108.233285
Ground Level: 8529.0
WELL @ 8559.0ust (H&P #522)



SECTION DETAILS									
MD	Inc	Azi	TVD	+N-S	+E-W	Diag	TFace	VSec	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	
1201.4	30.04	17.99	1156.1	244.0	79.3	3.00	17.99	255.6	Build 3" / 100'
7089.1	30.04	17.99	6252.9	3047.4	989.8	0.00	0.00	3204.1	EOB @ 30.04" Inc. / 17.99" Azm
8090.4	0.00	0.00	7209.0	3291.4	1069.1	3.00	180.00	3460.6	Drop 3" / 100'
10340.4	0.00	0.00	9459.0	3291.4	1069.1	6.00	0.00	3460.6	EOD @ Vertical
TD @ 10340.4' MD / 9459.0' TVD									

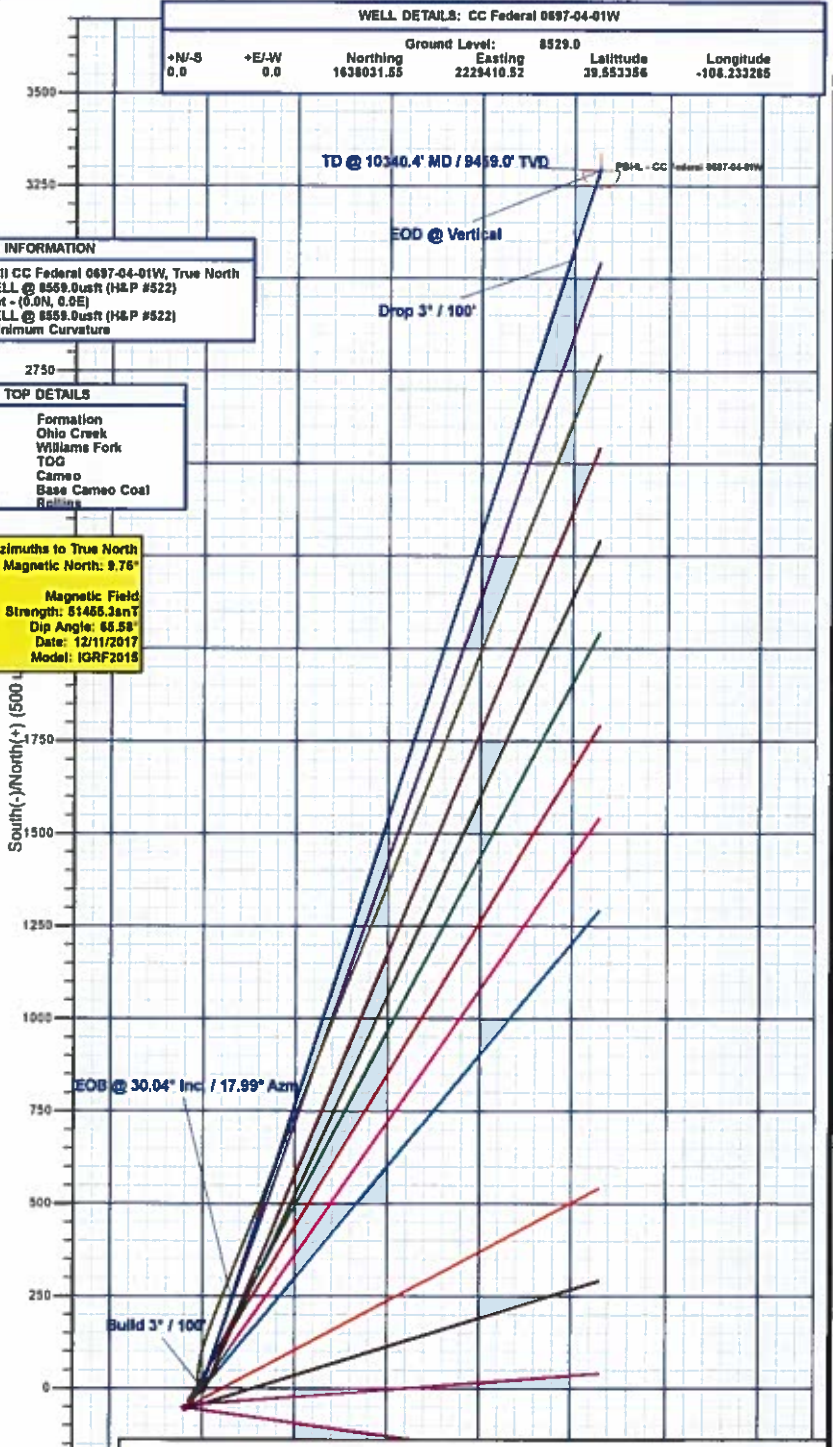
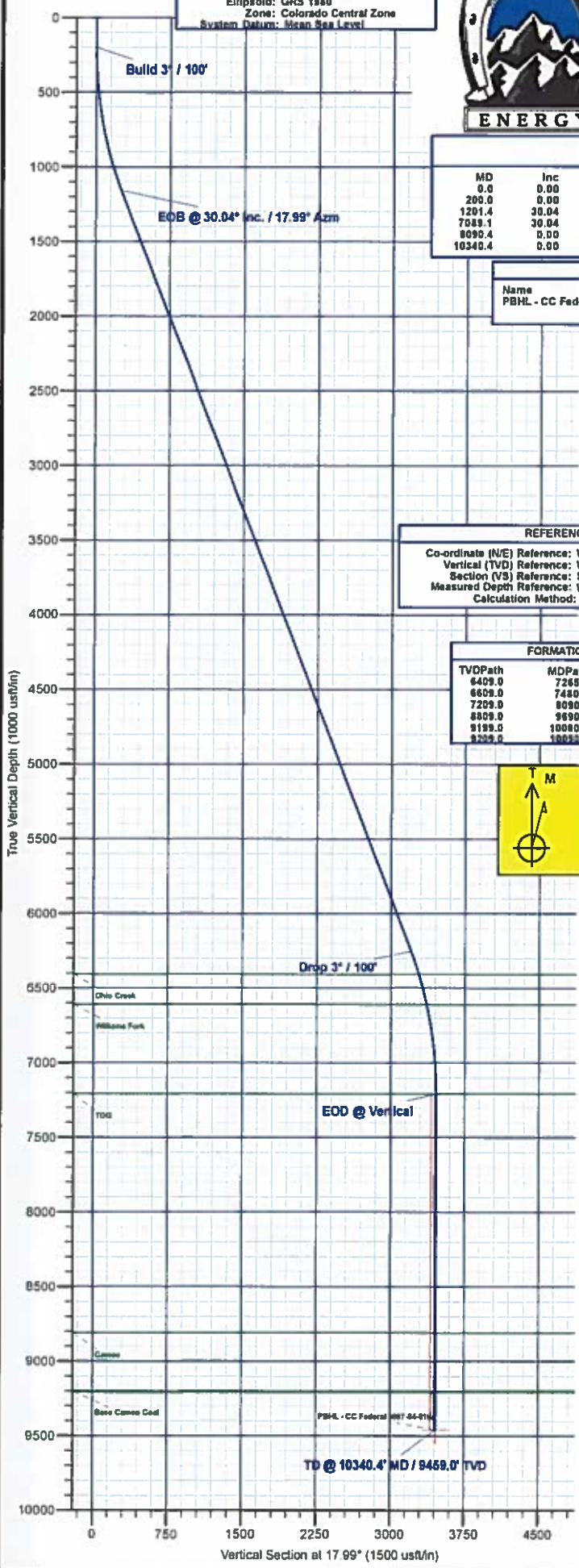
DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-04-01W	9459.0	3291.4	1069.1	1641269.26	2230579.14	39.562392	-108.229493

WELL DETAILS: CC Federal 0697-04-01W				
+N-S	+E-W	Northing	Easting	Ground Level: 8529.0
0.0	0.0	1638031.55	2229410.52	Latitude 39.553356
				Longitude -108.233285

REFERENCE INFORMATION
 Co-ordinate (N/E) Reference: Well CC Federal 0697-04-01W, True North
 Vertical (TVD) Reference: WELL @ 8559.0ust (H&P #522)
 Section (VS) Reference: Slot - (0.0N, 0.5E)
 Measured Depth Reference: WELL @ 8559.0ust (H&P #522)
 Calculation Method: Minimum Curvature

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
6409.0	7265.0	Ohio Creek
6609.0	7480.1	Williams Fork
7209.0	8090.4	TOG
8090.0	9090.4	Cameo
9199.5	10090.4	Base Cameo Coal
9229.0	10092.4	Rollins

Azimuths to True North
 Magnetic North: 9.76°
 Magnetic Field
 Strength: 51455.3anT
 Dip Angle: 65.58°
 Date: 12/11/2017
 Model: IGRF2015





Laramie Energy, LLC

Garfield County, CO

CC 604-12-13 Pad

CC Federal 0697-04-01W

A-11

Plan: Design #1

QES Well Planning Report

14 December, 2017





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-01W
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8559.0usft (H&P #522)
Project:	Garfield County, CO	MD Reference:	WELL @ 8559.0usft (H&P #522)
Site:	CC 604-12-13 Pad	North Reference:	True
Well:	CC Federal 0697-04-01W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-11		
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 604-12-13 Pad			
Site Position:		Northing:	1,638,031.56 usft	Latitude: 39 553356
From:	Lat/Long	Easting:	2,229,410.52 usft	Longitude: -108 233285
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -1.72 "

Well	CC Federal 0697-04-01W			
Well Position	+N/-S	0.0 usft	Northing: 1,638,031.54 usft	Latitude: 39 553356
	+E/-W	0.0 usft	Easting: 2,229,410.52 usft	Longitude: -108 233285
Position Uncertainty	0.0 usft	Wellhead Elevation:		Ground Level: 8,529.0 usft

Wellbore	A-11				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/11/2017	9.76	65.58	51,455.26712861

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	17.99

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	
1,201.4	30.04	17.99	1,156.1	244.0	79.3	3.00	3.00	0.00	17.99	
7,089.1	30.04	17.99	6,252.9	3,047.4	989.8	0.00	0.00	0.00	0.00	
8,090.4	0.00	0.00	7,209.0	3,291.4	1,069.1	3.00	-3.00	0.00	180.00	
10,340.4	0.00	0.00	9,459.0	3,291.4	1,069.1	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 0887-04-01W
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8559.0usft (H&P #522)
Project:	Garfield County, CO	MD Reference:	WELL @ 8559.0usft (H&P #522)
Site:	CC 604-12-13 Pad	North Reference:	True
Well:	CC Federal 0897-04-01W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-11		
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
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	17.99	300.0	2.5	0.8	2.6	3.00	3.00	0.00
400.0	6.00	17.99	399.6	10.0	3.2	10.5	3.00	3.00	0.00
500.0	9.00	17.99	498.8	22.4	7.3	23.5	3.00	3.00	0.00
600.0	12.00	17.99	597.1	39.7	12.9	41.7	3.00	3.00	0.00
700.0	15.00	17.99	694.3	61.9	20.1	65.1	3.00	3.00	0.00
800.0	18.00	17.99	790.2	88.9	28.9	93.5	3.00	3.00	0.00
900.0	21.00	17.99	884.4	120.6	39.2	126.9	3.00	3.00	0.00
1,000.0	24.00	17.99	976.8	157.0	51.0	165.1	3.00	3.00	0.00
1,100.0	27.00	17.99	1,067.1	198.0	64.3	208.2	3.00	3.00	0.00
1,200.0	30.00	17.99	1,154.9	243.4	79.0	255.9	3.00	3.00	0.00
EOB @ 30.04° Inc. / 17.99° Azm									
1,201.4	30.04	17.99	1,156.1	244.0	79.3	256.6	3.00	3.00	0.00
1,300.0	30.04	17.99	1,241.5	291.0	94.5	305.9	0.00	0.00	0.00
1,400.0	30.04	17.99	1,328.1	338.6	110.0	356.0	0.00	0.00	0.00
1,500.0	30.04	17.99	1,414.6	386.2	125.4	406.1	0.00	0.00	0.00
1,600.0	30.04	17.99	1,501.2	433.8	140.9	456.1	0.00	0.00	0.00
1,700.0	30.04	17.99	1,587.8	481.4	156.4	506.2	0.00	0.00	0.00
1,800.0	30.04	17.99	1,674.3	529.0	171.8	556.2	0.00	0.00	0.00
1,900.0	30.04	17.99	1,760.9	576.7	187.3	606.3	0.00	0.00	0.00
2,000.0	30.04	17.99	1,847.5	624.3	202.8	656.4	0.00	0.00	0.00
2,100.0	30.04	17.99	1,934.0	671.9	218.2	706.4	0.00	0.00	0.00
2,200.0	30.04	17.99	2,020.6	719.5	233.7	756.5	0.00	0.00	0.00
2,300.0	30.04	17.99	2,107.2	767.1	249.2	806.6	0.00	0.00	0.00
2,400.0	30.04	17.99	2,193.7	814.7	264.6	856.6	0.00	0.00	0.00
2,500.0	30.04	17.99	2,280.3	862.3	280.1	906.7	0.00	0.00	0.00
9-5/8"									
2,530.0	30.04	17.99	2,306.3	876.6	284.7	921.7	0.00	0.00	0.00
2,600.0	30.04	17.99	2,366.9	909.9	295.6	956.7	0.00	0.00	0.00
2,700.0	30.04	17.99	2,453.4	957.6	311.0	1,006.8	0.00	0.00	0.00
2,800.0	30.04	17.99	2,540.0	1,005.2	326.5	1,056.9	0.00	0.00	0.00
2,900.0	30.04	17.99	2,626.6	1,052.8	342.0	1,106.9	0.00	0.00	0.00
3,000.0	30.04	17.99	2,713.1	1,100.4	357.4	1,157.0	0.00	0.00	0.00
3,100.0	30.04	17.99	2,799.7	1,148.0	372.9	1,207.1	0.00	0.00	0.00
3,200.0	30.04	17.99	2,886.3	1,195.6	388.4	1,257.1	0.00	0.00	0.00
3,300.0	30.04	17.99	2,972.8	1,243.2	403.8	1,307.2	0.00	0.00	0.00
3,400.0	30.04	17.99	3,059.4	1,290.9	419.3	1,357.2	0.00	0.00	0.00
3,500.0	30.04	17.99	3,146.0	1,338.5	434.8	1,407.3	0.00	0.00	0.00
3,600.0	30.04	17.99	3,232.5	1,386.1	450.2	1,457.4	0.00	0.00	0.00
3,700.0	30.04	17.99	3,319.1	1,433.7	465.7	1,507.4	0.00	0.00	0.00
3,800.0	30.04	17.99	3,405.7	1,481.3	481.2	1,557.5	0.00	0.00	0.00
3,900.0	30.04	17.99	3,492.2	1,528.9	496.6	1,607.6	0.00	0.00	0.00
4,000.0	30.04	17.99	3,578.8	1,576.5	512.1	1,657.6	0.00	0.00	0.00
4,100.0	30.04	17.99	3,665.4	1,624.2	527.6	1,707.7	0.00	0.00	0.00
4,200.0	30.04	17.99	3,751.9	1,671.8	543.0	1,757.7	0.00	0.00	0.00
4,300.0	30.04	17.99	3,838.5	1,719.4	558.5	1,807.8	0.00	0.00	0.00
4,400.0	30.04	17.99	3,925.1	1,767.0	574.0	1,857.9	0.00	0.00	0.00
4,500.0	30.04	17.99	4,011.6	1,814.6	589.4	1,907.9	0.00	0.00	0.00
4,600.0	30.04	17.99	4,098.2	1,862.2	604.9	1,958.0	0.00	0.00	0.00
4,700.0	30.04	17.99	4,184.8	1,909.8	620.3	2,008.1	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-01W
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8559 0usft (H&P #522)
Project:	Garfield County, CO	MD Reference:	WELL @ 8559 0usft (H&P #522)
Site:	CC 604-12-13 Pad	North Reference:	True
Well:	CC Federal 0697-04-01W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-11		
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	30.04	17.99	4,271.3	1,957.4	635.8	2,058.1	0.00	0.00	0.00
4,900.0	30.04	17.99	4,357.9	2,005.1	651.3	2,108.2	0.00	0.00	0.00
5,000.0	30.04	17.99	4,444.5	2,052.7	666.7	2,158.2	0.00	0.00	0.00
5,100.0	30.04	17.99	4,531.0	2,100.3	682.2	2,208.3	0.00	0.00	0.00
5,200.0	30.04	17.99	4,617.6	2,147.9	697.7	2,258.4	0.00	0.00	0.00
5,300.0	30.04	17.99	4,704.2	2,195.5	713.1	2,308.4	0.00	0.00	0.00
5,400.0	30.04	17.99	4,790.7	2,243.1	728.6	2,358.5	0.00	0.00	0.00
5,500.0	30.04	17.99	4,877.3	2,290.7	744.1	2,408.6	0.00	0.00	0.00
5,600.0	30.04	17.99	4,963.9	2,338.4	759.5	2,458.6	0.00	0.00	0.00
5,700.0	30.04	17.99	5,050.4	2,386.0	775.0	2,508.7	0.00	0.00	0.00
5,800.0	30.04	17.99	5,137.0	2,433.6	790.5	2,558.7	0.00	0.00	0.00
5,900.0	30.04	17.99	5,223.6	2,481.2	805.9	2,608.8	0.00	0.00	0.00
6,000.0	30.04	17.99	5,310.1	2,528.8	821.4	2,658.9	0.00	0.00	0.00
6,100.0	30.04	17.99	5,396.7	2,576.4	836.9	2,708.9	0.00	0.00	0.00
6,200.0	30.04	17.99	5,483.3	2,624.0	852.3	2,759.0	0.00	0.00	0.00
6,300.0	30.04	17.99	5,569.8	2,671.7	867.8	2,809.1	0.00	0.00	0.00
6,400.0	30.04	17.99	5,656.4	2,719.3	883.3	2,859.1	0.00	0.00	0.00
6,500.0	30.04	17.99	5,743.0	2,766.9	898.7	2,909.2	0.00	0.00	0.00
6,600.0	30.04	17.99	5,829.5	2,814.5	914.2	2,959.2	0.00	0.00	0.00
6,700.0	30.04	17.99	5,916.1	2,862.1	929.7	3,009.3	0.00	0.00	0.00
6,800.0	30.04	17.99	6,002.6	2,909.7	945.1	3,059.4	0.00	0.00	0.00
6,900.0	30.04	17.99	6,089.2	2,957.3	960.6	3,109.4	0.00	0.00	0.00
7,000.0	30.04	17.99	6,175.8	3,005.0	976.1	3,159.5	0.00	0.00	0.00
Drop 3° / 100'									
7,089.1	30.04	17.99	6,252.9	3,047.4	989.8	3,204.1	0.00	0.00	0.00
7,100.0	29.71	17.99	6,262.4	3,052.5	991.5	3,209.5	3.00	-3.00	0.00
7,200.0	26.71	17.99	6,350.5	3,097.5	1,006.1	3,256.8	3.00	-3.00	0.00
Ohio Creek									
7,265.0	24.76	17.99	6,409.0	3,124.3	1,014.8	3,285.0	3.00	-3.00	0.00
7,300.0	23.71	17.99	6,440.9	3,138.0	1,019.3	3,299.4	3.00	-3.00	0.00
7,400.0	20.71	17.99	6,533.5	3,174.0	1,031.0	3,337.2	3.00	-3.00	0.00
Williams Fork									
7,480.1	18.31	17.99	6,609.0	3,199.4	1,039.2	3,363.9	3.00	-3.00	0.00
7,500.0	17.71	17.99	6,627.9	3,205.3	1,041.1	3,370.1	3.00	-3.00	0.00
7,600.0	14.71	17.99	6,723.9	3,231.8	1,049.7	3,398.0	3.00	-3.00	0.00
7,700.0	11.71	17.99	6,821.3	3,253.5	1,056.8	3,420.9	3.00	-3.00	0.00
7,800.0	8.71	17.99	6,919.7	3,270.4	1,062.3	3,438.6	3.00	-3.00	0.00
7,900.0	5.71	17.99	7,018.9	3,282.3	1,066.2	3,451.2	3.00	-3.00	0.00
8,000.0	2.71	17.99	7,118.6	3,289.3	1,068.4	3,458.5	3.00	-3.00	0.00
EOD @ Vertical - TOG									
8,090.4	0.00	0.00	7,209.0	3,291.4	1,069.1	3,460.6	3.00	-3.00	0.00
8,100.0	0.00	0.00	7,218.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,200.0	0.00	0.00	7,318.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,300.0	0.00	0.00	7,418.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,400.0	0.00	0.00	7,518.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,500.0	0.00	0.00	7,618.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,600.0	0.00	0.00	7,718.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,700.0	0.00	0.00	7,818.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,800.0	0.00	0.00	7,918.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
8,900.0	0.00	0.00	8,018.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,000.0	0.00	0.00	8,118.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,100.0	0.00	0.00	8,218.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,200.0	0.00	0.00	8,318.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,300.0	0.00	0.00	8,418.6	3,291.4	1,069.1	3,460.6	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 604-12-13 Pad
 Well: CC Federal 0897-04-01W
 Wellbore: A-11
 Design: Design #1

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

Well CC Federal 0897-04-01W
 WELL @ 8559.0usft (H&P #522)
 WELL @ 8559.0usft (H&P #522)
 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)
9,400.0	0.00	0.00	8,518.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,500.0	0.00	0.00	8,618.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,600.0	0.00	0.00	8,718.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
Cameo									
9,690.4	0.00	0.00	8,809.0	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,700.0	0.00	0.00	8,818.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,800.0	0.00	0.00	8,918.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
9,900.0	0.00	0.00	9,018.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
10,000.0	0.00	0.00	9,118.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
Base Cameo Coal									
10,080.4	0.00	0.00	9,199.0	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
Rollins									
10,090.4	0.00	0.00	9,209.0	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
10,100.0	0.00	0.00	9,218.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
10,200.0	0.00	0.00	9,318.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
10,300.0	0.00	0.00	9,418.6	3,291.4	1,069.1	3,460.6	0.00	0.00	0.00
TD @ 10340.4' MD / 9459.0' TVD									
10,340.4	0.00	0.00	9,459.0	3,291.4	1,069.1	3,460.6	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 0897 - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,459.0	3,291.4	1,069.1	1,641,289.26	2,230,578.14	39.562392	-108.229493

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,306.3	9-5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
7,265.0	6,409.0	Ohio Creek			
7,480.1	6,609.0	Williams Fork			
8,090.4	7,209.0	TOG			
9,690.4	8,809.0	Cameo			
10,080.4	9,199.0	Base Cameo Coal			
10,090.4	9,209.0	Rollins			



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-01W
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8559.0usft (H&P #522)
Project:	Garfield County, CO	MD Reference:	WELL @ 8559.0usft (H&P #522)
Site:	CC 604-12-13 Pad	North Reference:	True
Well:	CC Federal 0697-04-01W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-11		
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	Build 3" / 100'
1,201.4	1,156.1	244.0	79.3	EOB @ 30.04° Inc. / 17.99° Azm
7,089.1	6,252.9	3,047.4	989.8	Drop 3" / 100'
8,090.4	7,209.0	3,291.4	1,069.1	EOD @ Vertical
10,340.4	9,459.0	3,291.4	1,069.1	TD @ 10340.4' MD / 9459.0' TVD