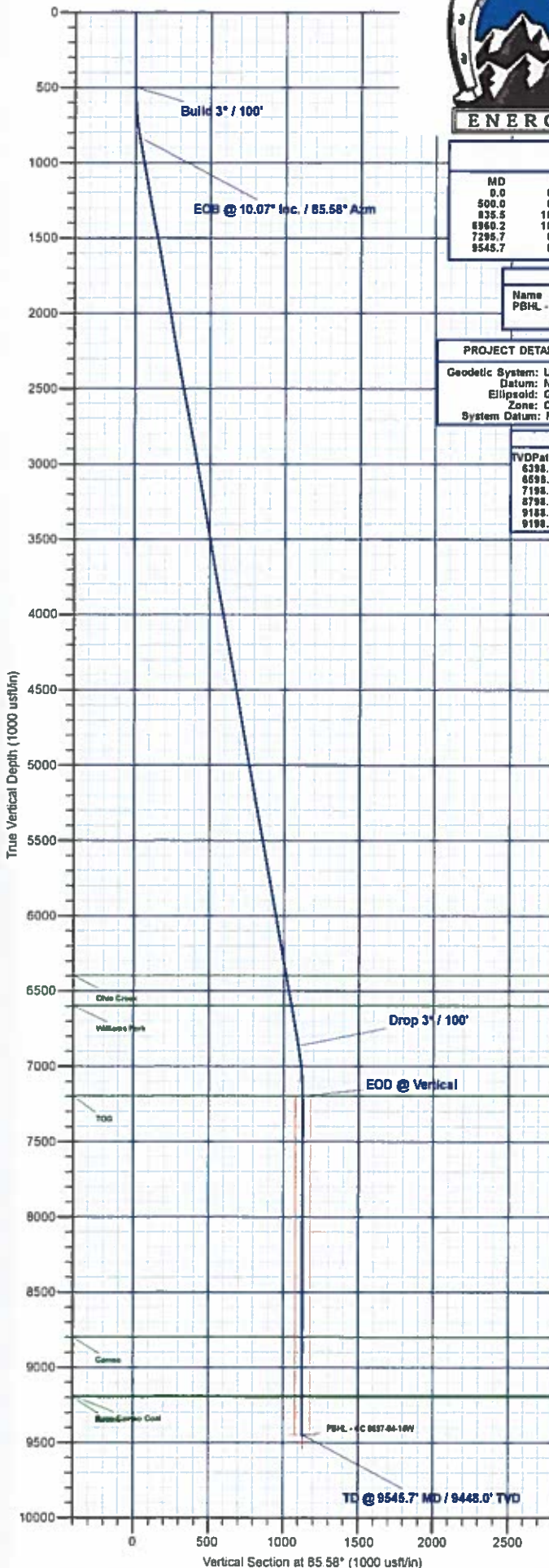




Project: Garfield County, CO  
 Site: CC 604-12-13 Pad  
 Well: CC 0697-04-14W  
 Wellbore: A-2  
 Design: Design #1  
 Latitude: 39.553230  
 Longitude: -108.233461  
 Ground Level: 8529.0  
 WELL @ 8559.0usft (H&P #522)



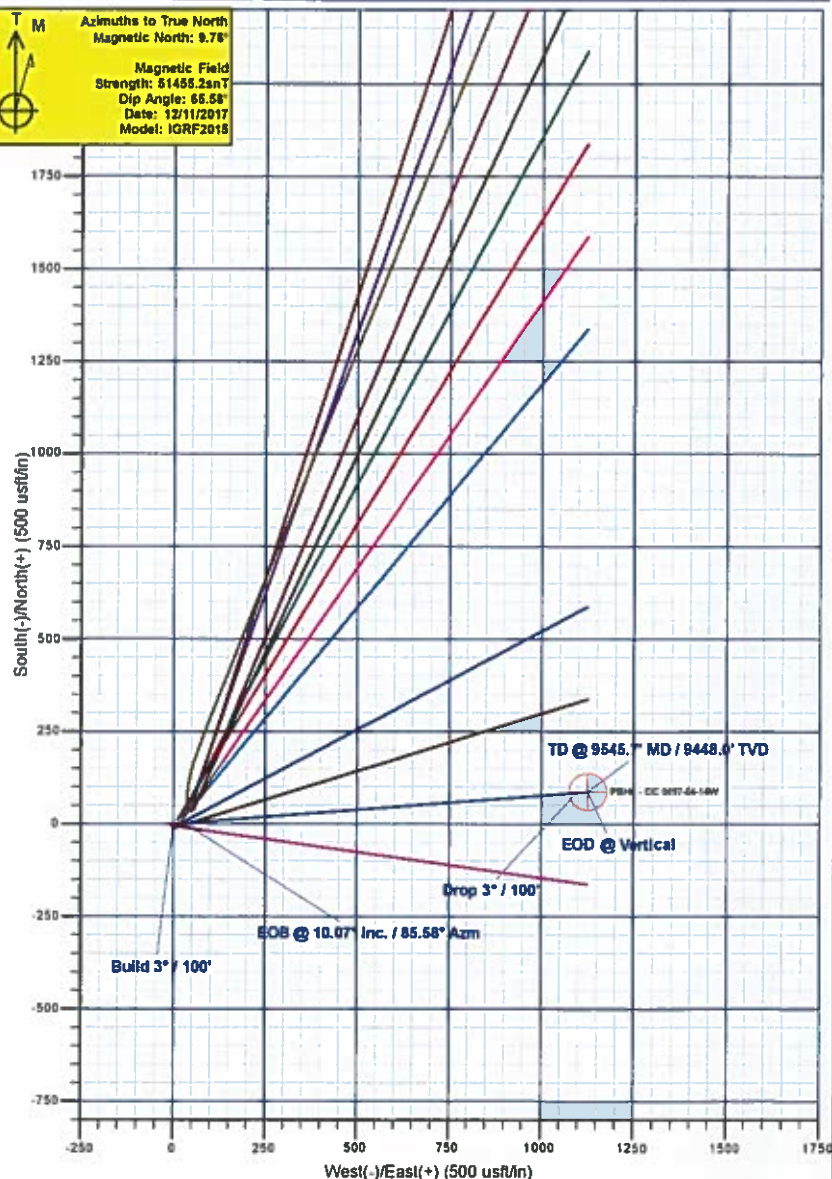
SECTION DETAILS										
MD	Inc	Azi	TVD	+N-S	+E-W	Dlog	TFace	Vsect	Annotation	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	Build 3° / 100°	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	EOB @ 10.07° Inc. / 85.58° Azm	
835.5	10.07	85.58	833.8	2.3	29.3	3.00	85.58	29.4	Drop 3° / 100°	
8960.2	10.07	85.58	8864.2	84.8	1098.6	0.00	0.00	1099.9	EOD @ Vertical	
7295.7	0.00	0.00	7198.0	87.1	1125.9	3.00	180.00	1129.3	TD @ 9545.7' MD / 9448.0' TVD	
8545.7	0.00	0.00	8448.0	87.1	1125.9	0.00	0.00	1129.3		

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-04-14W	9448.0	87.1	1125.9	1638040.35	2230487.55	39.553469	-108.229468

PROJECT DETAILS: Garfield County, CO				WELL DETAILS: CC 0697-04-14W			
Geodetic System: US State Plane 1983 Datum: North American Datum 1983 Ellipsoid: GRS 1980 Zone: Colorado Central Zone System Datum: Mean Sea Level				+N-S	+E-W	Northing	Easting
				0.0	0.0	1637987.17	2229359.83
				8529.0 Latitude 39.553230 Longitude -108.233461			

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
6398.0	6485.7	Ohio Creek
6698.0	6689.8	Williams Fork
7198.0	7295.7	TOG
8798.0	8895.7	Cameo
9188.0	9285.7	Base Cameo Coal
9198.0	9295.7	Rollins

REFERENCE INFORMATION	
Co-ordinate (NE) Reference: Well CC 0697-04-14W, True North	
Vertical (TVD) Reference: WELL @ 8559.0usft (H&P #522)	
Section (VS) Reference: Slot - (0.0N, 0.0E)	
Measured Depth Reference: WELL @ 8559.0usft (H&P #522)	
Calculation Method: Minimum Curvature	



Plan: Design #1 (CC 0697-04-14W/A-2)

Created By: Will Jircik Date: 14:05, December 13 2017



# **Laramie Energy, LLC**

**Garfield County, CO**

**CC 604-12-13 Pad**

**CC 0697-04-14W**

**A-2**

**Plan: Design #1**

## **QES Well Planning Report**

**13 December, 2017**





## Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-04-14W
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	WELL @ 8559.0usft (H&P #522)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	WELL @ 8559.0usft (H&P #522)
<b>Site:</b>	CC 604-12-13 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-04-14W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-2		
<b>Design:</b>	Design #1		

<b>Project</b>	Garfield County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		

<b>Site</b>	CC 604-12-13 Pad			
<b>Site Position:</b>		<b>Northing:</b>	1,638,031.56 usft	<b>Latitude:</b> 39.553356
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,229,410.52 usft	<b>Longitude:</b> -108.233285
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b> -1.72 "

<b>Well</b>	CC 0697-04-14W			
<b>Well Position</b>	+N/-S	-45.9 usft	<b>Northing:</b>	1,637,987.17 usft
	+E/-W	-49.6 usft	<b>Easting:</b>	2,229,359.53 usft
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>		<b>Latitude:</b> 39.553230
				<b>Longitude:</b> -108.233461
				<b>Ground Level:</b> 8,529.0 usft

<b>Wellbore</b>	A-2				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	12/11/2017	9.76	65.58	51,455.17690503

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	85.58

<b>Plan Sections</b>										
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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
835.5	10.07	85.58	833.8	2.3	29.3	3.00	3.00	0.00	85.58	
6,960.2	10.07	85.58	6,864.2	84.8	1,096.6	0.00	0.00	0.00	0.00	
7,295.7	0.00	0.00	7,198.0	87.1	1,125.9	3.00	-3.00	0.00	180.00	
9,545.7	0.00	0.00	9,448.0	87.1	1,125.9	0.00	0.00	0.00	0.00	PBHL - CC 0697-04-1





## 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 0697-04-14W  
 Wellbore: A-2  
 Design: Design #1

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

Well CC 0697-04-14W  
 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)
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
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Build 3° / 100'</b>									
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	3.00	85.58	600.0	0.2	2.6	2.6	3.00	3.00	0.00
700.0	6.00	85.58	699.6	0.8	10.4	10.5	3.00	3.00	0.00
800.0	9.00	85.58	798.8	1.8	23.4	23.5	3.00	3.00	0.00
<b>EOB @ 10.07° Inc. / 85.58° Azm</b>									
835.5	10.07	85.58	833.8	2.3	29.3	29.4	3.00	3.00	0.00
900.0	10.07	85.58	897.3	3.1	40.5	40.7	0.00	0.00	0.00
1,000.0	10.07	85.58	995.7	4.5	58.0	58.1	0.00	0.00	0.00
1,100.0	10.07	85.58	1,094.2	5.8	75.4	75.6	0.00	0.00	0.00
1,200.0	10.07	85.58	1,192.7	7.2	92.8	93.1	0.00	0.00	0.00
1,300.0	10.07	85.58	1,291.1	8.5	110.2	110.6	0.00	0.00	0.00
1,400.0	10.07	85.58	1,389.6	9.9	127.7	128.1	0.00	0.00	0.00
1,500.0	10.07	85.58	1,488.0	11.2	145.1	145.5	0.00	0.00	0.00
1,600.0	10.07	85.58	1,586.5	12.6	162.5	163.0	0.00	0.00	0.00
1,700.0	10.07	85.58	1,685.0	13.9	180.0	180.5	0.00	0.00	0.00
1,800.0	10.07	85.58	1,783.4	15.3	197.4	198.0	0.00	0.00	0.00
1,900.0	10.07	85.58	1,881.9	16.6	214.8	215.4	0.00	0.00	0.00
2,000.0	10.07	85.58	1,980.4	18.0	232.2	232.9	0.00	0.00	0.00
2,100.0	10.07	85.58	2,078.8	19.3	249.7	250.4	0.00	0.00	0.00
2,200.0	10.07	85.58	2,177.3	20.7	267.1	267.9	0.00	0.00	0.00
2,300.0	10.07	85.58	2,275.7	22.0	284.5	285.4	0.00	0.00	0.00
2,400.0	10.07	85.58	2,374.2	23.4	301.9	302.8	0.00	0.00	0.00
2,500.0	10.07	85.58	2,472.7	24.7	319.4	320.3	0.00	0.00	0.00
<b>9 5/8"</b>									
2,530.0	10.07	85.58	2,502.2	25.1	324.6	325.6	0.00	0.00	0.00
2,600.0	10.07	85.58	2,571.1	26.1	336.8	337.8	0.00	0.00	0.00
2,700.0	10.07	85.58	2,669.6	27.4	354.2	355.3	0.00	0.00	0.00
2,800.0	10.07	85.58	2,768.0	28.7	371.6	372.7	0.00	0.00	0.00
2,900.0	10.07	85.58	2,866.5	30.1	389.1	390.2	0.00	0.00	0.00
3,000.0	10.07	85.58	2,965.0	31.4	406.5	407.7	0.00	0.00	0.00
3,100.0	10.07	85.58	3,063.4	32.8	423.9	425.2	0.00	0.00	0.00
3,200.0	10.07	85.58	3,161.9	34.1	441.3	442.7	0.00	0.00	0.00
3,300.0	10.07	85.58	3,260.3	35.5	458.8	460.1	0.00	0.00	0.00
3,400.0	10.07	85.58	3,358.8	36.8	476.2	477.6	0.00	0.00	0.00
3,500.0	10.07	85.58	3,457.3	38.2	493.6	495.1	0.00	0.00	0.00
3,600.0	10.07	85.58	3,555.7	39.5	511.0	512.6	0.00	0.00	0.00
3,700.0	10.07	85.58	3,654.2	40.9	528.5	530.1	0.00	0.00	0.00
3,800.0	10.07	85.58	3,752.6	42.2	545.9	547.5	0.00	0.00	0.00
3,900.0	10.07	85.58	3,851.1	43.6	563.3	565.0	0.00	0.00	0.00
4,000.0	10.07	85.58	3,949.6	44.9	580.8	582.5	0.00	0.00	0.00
4,100.0	10.07	85.58	4,048.0	46.3	598.2	600.0	0.00	0.00	0.00
4,200.0	10.07	85.58	4,146.5	47.6	615.6	617.4	0.00	0.00	0.00
4,300.0	10.07	85.58	4,244.9	49.0	633.0	634.9	0.00	0.00	0.00
4,400.0	10.07	85.58	4,343.4	50.3	650.5	652.4	0.00	0.00	0.00
4,500.0	10.07	85.58	4,441.9	51.7	667.9	669.9	0.00	0.00	0.00
4,600.0	10.07	85.58	4,540.3	53.0	685.3	687.4	0.00	0.00	0.00
4,700.0	10.07	85.58	4,638.8	54.4	702.7	704.8	0.00	0.00	0.00



# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-04-14W
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	WELL @ 8559.0usft (H&P #522)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	WELL @ 8559.0usft (H&P #522)
<b>Site:</b>	CC 604-12-13 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-04-14W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-2		
<b>Design:</b>	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	10.07	85.58	4,737.3	55.7	720.2	722.3	0.00	0.00	0.00
4,900.0	10.07	85.58	4,835.7	57.1	737.6	739.8	0.00	0.00	0.00
5,000.0	10.07	85.58	4,934.2	58.4	755.0	757.3	0.00	0.00	0.00
5,100.0	10.07	85.58	5,032.6	59.7	772.4	774.7	0.00	0.00	0.00
5,200.0	10.07	85.58	5,131.1	61.1	789.9	792.2	0.00	0.00	0.00
5,300.0	10.07	85.58	5,229.6	62.4	807.3	809.7	0.00	0.00	0.00
5,400.0	10.07	85.58	5,328.0	63.8	824.7	827.2	0.00	0.00	0.00
5,500.0	10.07	85.58	5,426.5	65.1	842.1	844.7	0.00	0.00	0.00
5,600.0	10.07	85.58	5,524.9	66.5	859.6	862.1	0.00	0.00	0.00
5,700.0	10.07	85.58	5,623.4	67.8	877.0	879.6	0.00	0.00	0.00
5,800.0	10.07	85.58	5,721.9	69.2	894.4	897.1	0.00	0.00	0.00
5,900.0	10.07	85.58	5,820.3	70.5	911.8	914.6	0.00	0.00	0.00
6,000.0	10.07	85.58	5,918.8	71.9	929.3	932.0	0.00	0.00	0.00
6,100.0	10.07	85.58	6,017.2	73.2	946.7	949.5	0.00	0.00	0.00
6,200.0	10.07	85.58	6,115.7	74.6	964.1	967.0	0.00	0.00	0.00
6,300.0	10.07	85.58	6,214.2	75.9	981.6	984.5	0.00	0.00	0.00
6,400.0	10.07	85.58	6,312.6	77.3	999.0	1,002.0	0.00	0.00	0.00
Ohio Creek									
6,486.7	10.07	85.58	6,398.0	78.4	1,014.1	1,017.1	0.00	0.00	0.00
6,500.0	10.07	85.58	6,411.1	78.6	1,016.4	1,019.4	0.00	0.00	0.00
6,600.0	10.07	85.58	6,509.5	80.0	1,033.8	1,036.9	0.00	0.00	0.00
Williams Fork									
6,689.8	10.07	85.58	6,598.0	81.2	1,049.5	1,052.6	0.00	0.00	0.00
6,700.0	10.07	85.58	6,608.0	81.3	1,051.3	1,054.4	0.00	0.00	0.00
6,800.0	10.07	85.58	6,706.5	82.7	1,068.7	1,071.9	0.00	0.00	0.00
6,900.0	10.07	85.58	6,804.9	84.0	1,086.1	1,089.4	0.00	0.00	0.00
Drop 3° / 100'									
6,960.2	10.07	85.58	6,864.2	84.8	1,096.6	1,099.9	0.00	0.00	0.00
7,000.0	8.87	85.58	6,903.5	85.3	1,103.1	1,106.4	3.00	-3.00	0.00
7,100.0	5.87	85.58	7,002.6	86.3	1,115.9	1,119.2	3.00	-3.00	0.00
7,200.0	2.87	85.58	7,102.3	86.9	1,123.5	1,126.9	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,295.7	0.00	0.00	7,198.0	87.1	1,125.9	1,129.3	3.00	-3.00	0.00
7,300.0	0.00	0.00	7,202.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
7,400.0	0.00	0.00	7,302.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
7,500.0	0.00	0.00	7,402.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
7,600.0	0.00	0.00	7,502.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
7,700.0	0.00	0.00	7,602.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
7,800.0	0.00	0.00	7,702.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,802.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,902.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,100.0	0.00	0.00	8,002.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,200.0	0.00	0.00	8,102.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,300.0	0.00	0.00	8,202.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,400.0	0.00	0.00	8,302.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,500.0	0.00	0.00	8,402.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,600.0	0.00	0.00	8,502.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,700.0	0.00	0.00	8,602.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,800.0	0.00	0.00	8,702.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
Cameo									
8,895.7	0.00	0.00	8,798.0	87.1	1,125.9	1,129.3	0.00	0.00	0.00
8,900.0	0.00	0.00	8,802.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
9,000.0	0.00	0.00	8,902.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
9,100.0	0.00	0.00	9,002.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00



## Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well CC 0697-04-14W
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	WELL @ 8559.0usft (H&P #522)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	WELL @ 8559.0usft (H&P #522)
<b>Site:</b>	CC 604-12-13 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 0697-04-14W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	A-2		
<b>Design:</b>	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	9,102.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
9,285.7	0.00	0.00	9,188.0	87.1	1,125.9	1,129.3	0.00	0.00	0.00
<b>Rollins</b>									
9,295.7	0.00	0.00	9,198.0	87.1	1,125.9	1,129.3	0.00	0.00	0.00
9,300.0	0.00	0.00	9,202.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
9,400.0	0.00	0.00	9,302.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
9,500.0	0.00	0.00	9,402.3	87.1	1,125.9	1,129.3	0.00	0.00	0.00
<b>TD @ 9545.7' MD / 9448.0' TVD</b>									
9,545.7	0.00	0.00	9,448.0	87.1	1,125.9	1,129.3	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 0697-04-14V - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,448.0	87.1	1,125.9	1,638,040.34	2,230,487.55	39.553469	-108.229468

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,502.2	9 5/8"	9-5/8	14-3/4

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,486.7	6,398.0	Ohio Creek			
6,689.8	6,598.0	Williams Fork			
7,285.7	7,198.0	TOG			
8,895.7	8,798.0	Cameo			
9,285.7	9,188.0	Base Cameo Coal			
9,295.7	9,198.0	Rollins			

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.0	500.0	0.0	0.0	Build 3" / 100'
835.5	833.8	2.3	29.3	EOB @ 10.07" Inc. / 85.58° Azm
6,960.2	6,864.2	84.8	1,096.6	Drop 3" / 100'
7,295.7	7,198.0	87.1	1,125.9	EOD @ Vertical
9,545.7	9,448.0	87.1	1,125.9	TD @ 9545.7' MD / 9448.0' TVD