

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 0697-04-14W
 Wellbore: B-2
 Design: Design #2
 Latitude: 39.553212
 Longitude: -108.233439
 Ground Level: 8529.0
 WELL @ 8559.0ustf (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	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.0	
1050.7	10.52	85.22	1048.7	2.7	32.0	3.00	85.22	32.1	KOP/ (Build 3.00"/100')
6852.8	10.52	85.22	6763.3	91.0	1087.7	0.00	0.00	1091.5	EOB @ 10.52" Inc / 85.22" Azm
7203.5	0.00	0.00	7102.0	93.6	1119.7	3.00	180.00	1123.6	Drop @ 3.00"/100'
8390.5	0.00	0.00	8289.0	93.6	1119.7	0.00	0.00	1123.6	EOD @ Vertical
									TD @ 8390.5' MD / 8289.0' TVD

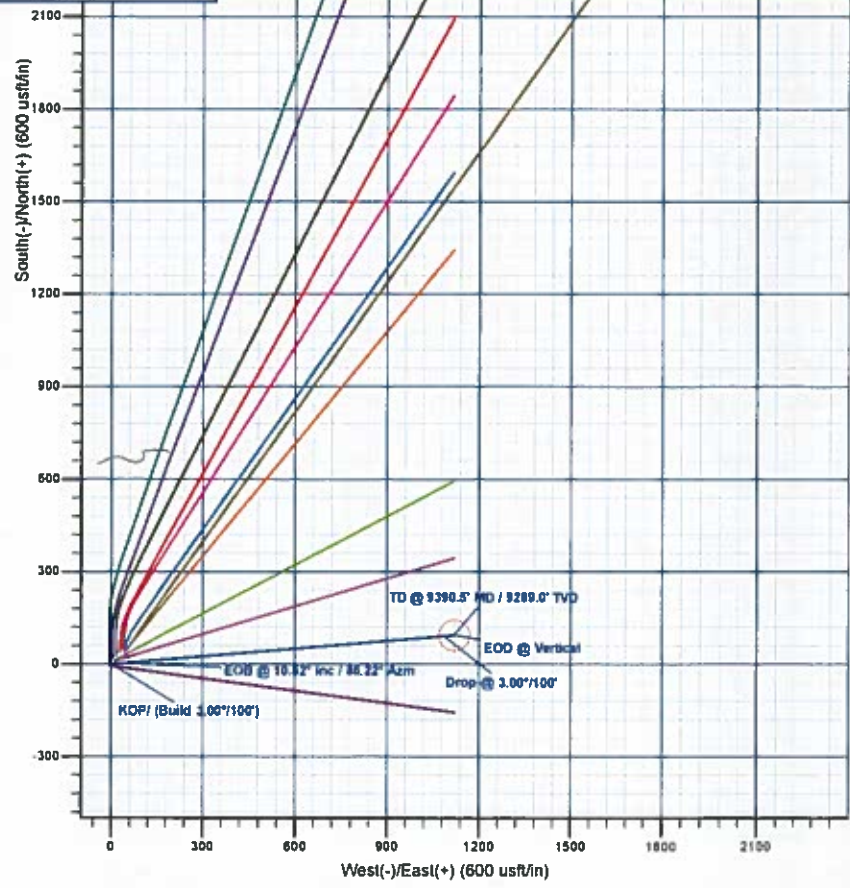
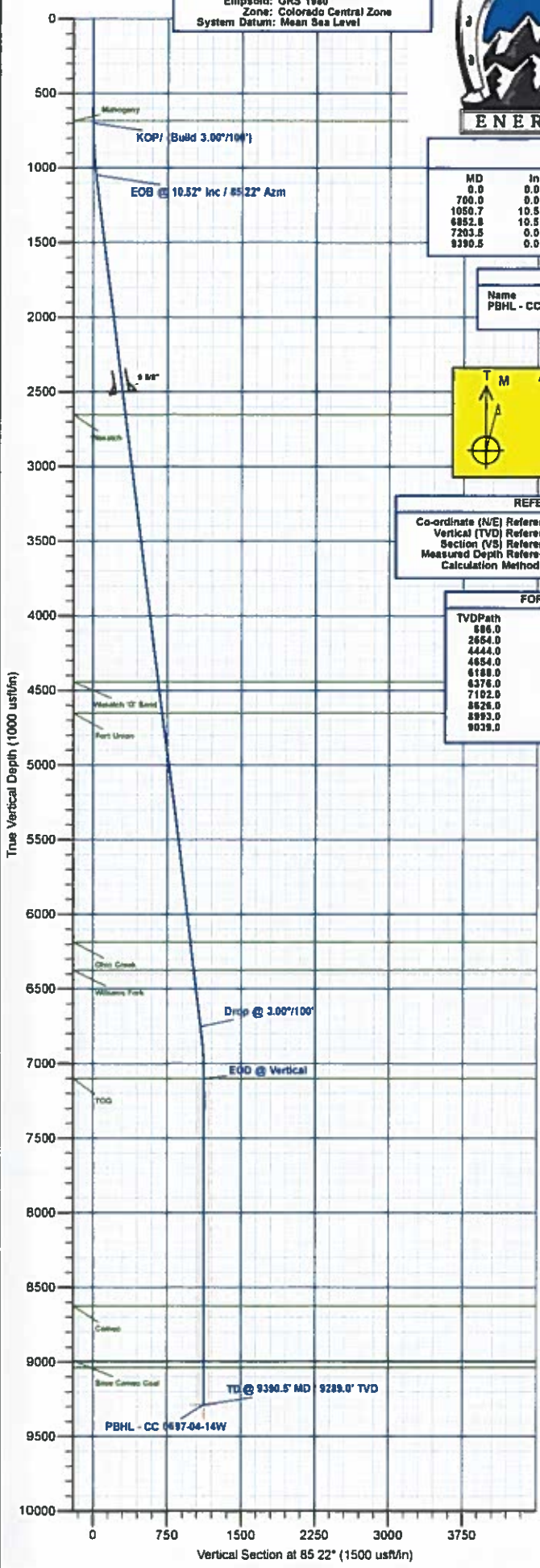
DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-04-14W	8289.0	93.6	1119.7	1638040.35	2230487.55	39.553469	-108.229488

WELL DETAILS: CC 0697-04-14W					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1637980.43	2229365.54	39.553212	-108.233439

Azimuths to True North
 Magnetic North: 9.76°
 Magnetic Field Strength: 51455.2nT
 Dip Angle: 66.58°
 Date: 12/11/2017
 Model: IGRF2015

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

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
686.0	686.0	Mahogany
2654.0	2683.4	Wasatch
4444.0	4504.0	Wasatch 'G' Sand
4654.0	4717.8	Fort Union
6188.0	6277.8	Ohio Creek
6378.0	6469.1	Williams Fork
7102.0	7203.5	TOG
8628.0	8727.5	Cameo
8993.5	9094.5	Base Cameo Coal
9039.0	9140.5	Rollings



Plan: Design #2 (CC 0697-04-14W/B-2)
 Created By: Will Jircik Date: 15:26, June 23 2018



Laramie Energy, LLC

Garfield County, CO

CC 604-12-13 Pad

CC 0697-04-14W

B-2

Plan: Design #2

QES Well Planning Report

23 June, 2018





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-14W
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 0697-04-14W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-2		
Design:	Design #2		

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 0697-04-14W			
Well Position	+N/-S	-52.5 usft	Northing:	1,637,980.43 usft
	+E/-W	-43.4 usft	Easting:	2,229,365.54 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:		Ground Level: 8,529.0 usft

Wellbore	B-2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/11/2017	9.76	65.58	51,455.17005663

Design	Design #2			
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	85.22

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	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,050.7	10.52	85.22	1,048.7	2.7	32.0	3.00	3.00	0.00	85.22	
6,852.8	10.52	85.22	6,753.3	91.0	1,087.7	0.00	0.00	0.00	0.00	
7,203.5	0.00	0.00	7,102.0	93.6	1,119.7	3.00	-3.00	0.00	180.00	
9,390.5	0.00	0.00	9,289.0	93.6	1,119.7	0.00	0.00	0.00	0.00	PBHL - CC 0697-04-1



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-14W
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 0697-04-14W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-2		
Design:	Design #2		

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
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
Mahogany									
686.0	0.00	0.00	686.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP/ (Build 3.00°/100')									
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	3.00	85.22	800.0	0.2	2.6	2.6	3.00	3.00	0.00
900.0	6.00	85.22	899.6	0.9	10.4	10.5	3.00	3.00	0.00
1,000.0	9.00	85.22	998.8	2.0	23.4	23.5	3.00	3.00	0.00
EOB @ 10.52° Inc / 85.22° Azm									
1,050.7	10.52	85.22	1,048.7	2.7	32.0	32.1	3.00	3.00	0.00
1,100.0	10.52	85.22	1,097.2	3.4	41.0	41.1	0.00	0.00	0.00
1,200.0	10.52	85.22	1,195.5	4.9	59.2	59.4	0.00	0.00	0.00
1,300.0	10.52	85.22	1,293.8	6.5	77.4	77.6	0.00	0.00	0.00
1,400.0	10.52	85.22	1,392.2	8.0	95.6	95.9	0.00	0.00	0.00
1,500.0	10.52	85.22	1,490.5	9.5	113.7	114.1	0.00	0.00	0.00
1,600.0	10.52	85.22	1,588.8	11.0	131.9	132.4	0.00	0.00	0.00
1,700.0	10.52	85.22	1,687.1	12.6	150.1	150.7	0.00	0.00	0.00
1,800.0	10.52	85.22	1,785.4	14.1	168.3	168.9	0.00	0.00	0.00
1,900.0	10.52	85.22	1,883.8	15.6	186.5	187.2	0.00	0.00	0.00
2,000.0	10.52	85.22	1,982.1	17.1	204.7	205.4	0.00	0.00	0.00
2,100.0	10.52	85.22	2,080.4	18.6	222.9	223.7	0.00	0.00	0.00
2,200.0	10.52	85.22	2,178.7	20.2	241.1	242.0	0.00	0.00	0.00
2,300.0	10.52	85.22	2,277.0	21.7	259.3	260.2	0.00	0.00	0.00
2,400.0	10.52	85.22	2,375.3	23.2	277.5	278.5	0.00	0.00	0.00
2,500.0	10.52	85.22	2,473.7	24.7	295.7	296.7	0.00	0.00	0.00
9 5/8"									
2,530.0	10.52	85.22	2,503.2	25.2	301.2	302.2	0.00	0.00	0.00
2,600.0	10.52	85.22	2,572.0	26.3	313.9	315.0	0.00	0.00	0.00
Wasatch									
2,683.4	10.52	85.22	2,654.0	27.5	329.1	330.2	0.00	0.00	0.00
2,700.0	10.52	85.22	2,670.3	27.8	332.1	333.3	0.00	0.00	0.00
2,800.0	10.52	85.22	2,768.6	29.3	350.3	351.5	0.00	0.00	0.00
2,900.0	10.52	85.22	2,866.9	30.8	368.5	369.8	0.00	0.00	0.00
3,000.0	10.52	85.22	2,965.3	32.3	386.7	388.0	0.00	0.00	0.00
3,100.0	10.52	85.22	3,063.6	33.9	404.9	406.3	0.00	0.00	0.00
3,200.0	10.52	85.22	3,161.9	35.4	423.1	424.5	0.00	0.00	0.00
3,300.0	10.52	85.22	3,260.2	36.9	441.3	442.8	0.00	0.00	0.00
3,400.0	10.52	85.22	3,358.5	38.4	459.5	461.1	0.00	0.00	0.00
3,500.0	10.52	85.22	3,456.9	39.9	477.7	479.3	0.00	0.00	0.00
3,600.0	10.52	85.22	3,555.2	41.5	495.9	497.6	0.00	0.00	0.00
3,700.0	10.52	85.22	3,653.5	43.0	514.0	515.8	0.00	0.00	0.00
3,800.0	10.52	85.22	3,751.8	44.5	532.2	534.1	0.00	0.00	0.00
3,900.0	10.52	85.22	3,850.1	46.0	550.4	552.4	0.00	0.00	0.00
4,000.0	10.52	85.22	3,948.5	47.6	568.6	570.6	0.00	0.00	0.00
4,100.0	10.52	85.22	4,046.8	49.1	586.8	588.9	0.00	0.00	0.00
4,200.0	10.52	85.22	4,145.1	50.6	605.0	607.1	0.00	0.00	0.00
4,300.0	10.52	85.22	4,243.4	52.1	623.2	625.4	0.00	0.00	0.00
4,400.0	10.52	85.22	4,341.7	53.6	641.4	643.7	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-14W
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 0697-04-14W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-2		
Design:	Design #2		

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)
4,500.0	10.52	85.22	4,440.0	55.2	659.6	661.9	0.00	0.00	0.00
Wasatch 'G' Sand									
4,504.0	10.52	85.22	4,444.0	55.2	660.3	662.6	0.00	0.00	0.00
4,600.0	10.52	85.22	4,538.4	56.7	677.8	680.2	0.00	0.00	0.00
4,700.0	10.52	85.22	4,636.7	58.2	696.0	698.4	0.00	0.00	0.00
Fort Union									
4,717.6	10.52	85.22	4,654.0	58.5	699.2	701.6	0.00	0.00	0.00
4,800.0	10.52	85.22	4,735.0	59.7	714.2	716.7	0.00	0.00	0.00
4,900.0	10.52	85.22	4,833.3	61.3	732.4	734.9	0.00	0.00	0.00
5,000.0	10.52	85.22	4,931.6	62.8	750.6	753.2	0.00	0.00	0.00
5,100.0	10.52	85.22	5,030.0	64.3	768.8	771.5	0.00	0.00	0.00
5,200.0	10.52	85.22	5,128.3	65.8	787.0	789.7	0.00	0.00	0.00
5,300.0	10.52	85.22	5,226.6	67.3	805.2	808.0	0.00	0.00	0.00
5,400.0	10.52	85.22	5,324.9	68.9	823.4	826.2	0.00	0.00	0.00
5,500.0	10.52	85.22	5,423.2	70.4	841.6	844.5	0.00	0.00	0.00
5,600.0	10.52	85.22	5,521.6	71.9	859.8	862.8	0.00	0.00	0.00
5,700.0	10.52	85.22	5,619.9	73.4	878.0	881.0	0.00	0.00	0.00
5,800.0	10.52	85.22	5,718.2	74.9	896.2	899.3	0.00	0.00	0.00
5,900.0	10.52	85.22	5,816.5	76.5	914.3	917.5	0.00	0.00	0.00
6,000.0	10.52	85.22	5,914.8	78.0	932.5	935.8	0.00	0.00	0.00
6,100.0	10.52	85.22	6,013.2	79.5	950.7	954.1	0.00	0.00	0.00
6,200.0	10.52	85.22	6,111.5	81.0	968.9	972.3	0.00	0.00	0.00
Ohio Creek									
6,277.8	10.52	85.22	6,188.0	82.2	983.1	986.5	0.00	0.00	0.00
6,300.0	10.52	85.22	6,209.8	82.6	987.1	990.6	0.00	0.00	0.00
6,400.0	10.52	85.22	6,308.1	84.1	1,005.3	1,008.8	0.00	0.00	0.00
Williams Fork									
6,489.1	10.52	85.22	6,376.0	85.1	1,017.9	1,021.4	0.00	0.00	0.00
6,500.0	10.52	85.22	6,406.4	85.6	1,023.5	1,027.1	0.00	0.00	0.00
6,600.0	10.52	85.22	6,504.7	87.1	1,041.7	1,045.4	0.00	0.00	0.00
6,700.0	10.52	85.22	6,603.1	88.6	1,059.9	1,063.6	0.00	0.00	0.00
6,800.0	10.52	85.22	6,701.4	90.2	1,078.1	1,081.9	0.00	0.00	0.00
Drop @ 3.00°/100'									
6,852.8	10.52	85.22	6,753.3	91.0	1,087.7	1,091.5	0.00	0.00	0.00
6,900.0	9.10	85.22	6,799.8	91.6	1,095.7	1,099.6	3.00	-3.00	0.00
7,000.0	6.10	85.22	6,898.9	92.7	1,108.9	1,112.8	3.00	-3.00	0.00
7,100.0	3.10	85.22	6,998.6	93.4	1,116.9	1,120.8	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,203.5	0.00	0.00	7,102.0	93.6	1,119.7	1,123.6	3.00	-3.00	0.00
7,300.0	0.00	0.00	7,198.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
7,400.0	0.00	0.00	7,298.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
7,500.0	0.00	0.00	7,398.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
7,600.0	0.00	0.00	7,498.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,598.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,698.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,798.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,898.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,100.0	0.00	0.00	7,998.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,200.0	0.00	0.00	8,098.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,300.0	0.00	0.00	8,198.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,400.0	0.00	0.00	8,298.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,500.0	0.00	0.00	8,398.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,600.0	0.00	0.00	8,498.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-14W
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 0697-04-14W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-2		
Design:	Design #2		

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)
8,700.0	0.00	0.00	8,598.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
Cameo									
8,727.5	0.00	0.00	8,626.0	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,800.0	0.00	0.00	8,698.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
8,900.0	0.00	0.00	8,798.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
9,000.0	0.00	0.00	8,898.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
Base Cameo Coal									
9,094.5	0.00	0.00	8,993.0	93.6	1,119.7	1,123.6	0.00	0.00	0.00
9,100.0	0.00	0.00	8,998.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
Rollings									
9,140.5	0.00	0.00	9,039.0	93.6	1,119.7	1,123.6	0.00	0.00	0.00
9,200.0	0.00	0.00	9,098.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
9,300.0	0.00	0.00	9,198.5	93.6	1,119.7	1,123.6	0.00	0.00	0.00
TD @ 9390.5' MD / 9289.0' TVD									
9,390.5	0.00	0.00	9,289.0	93.6	1,119.7	1,123.6	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 0697-04-14V - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,289.0	93.6	1,119.7	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	2,503.2	9 5/8"	9-5/8	14-1/2

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
686.0	686.0	Mahogany			
2,683.4	2,654.0	Wasatch			
4,504.0	4,444.0	Wasatch 'G' Sand			
4,717.8	4,654.0	Fort Union			
6,277.8	6,188.0	Ohio Creek			
6,469.1	6,378.0	Williams Fork			
7,203.5	7,102.0	TOG			
8,727.5	8,626.0	Cameo			
9,094.5	8,993.0	Base Cameo Coal			
9,140.5	9,039.0	Rollings			



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0897-04-14W
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 0897-04-14W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-2		
Design:	Design #2		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.0	700.0	0.0	0.0	KOP/ (Build 3.00"/100')
1,050.7	1,048.7	2.7	32.0	EOB @ 10.52° Inc / 85.22° Azm
6,852.8	6,753.3	91.0	1,087.7	Drop @ 3.00"/100'
7,203.5	7,102.0	93.6	1,119.7	EOD @ Vertical
9,390.5	9,289.0	93.6	1,119.7	TD @ 9390.5' MD / 9289.0' TVD