

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

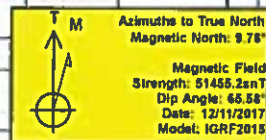


Project: Garfield County, CO
 Site: CC 604-12-13 Pad
 Well: CC 0697-04-12W
 Wellbore: B-5
 Design: Design #2
 Latitude: 39.553254
 Longitude: -108.233381
 Ground Level: 8529.0
 WELL @ 8559.0usft (H&P #522)



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')
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	EOB @ 11.46° Inc / 62.31° Azm
882.1	11.46	62.31	879.6	17.7	33.7	3.00	62.31	38.1	Drop @ 3.00°/100'
8862.3	11.46	62.31	8742.4	580.8	1088.5	0.00	0.00	1206.7	EOD @ Vertical
7244.4	0.00	0.00	7122.0	578.5	1102.2	3.00	180.00	1244.8	TD @ 8431.4' MD / 9309.0' TVD
9431.4	0.00	0.00	9309.0	578.5	1102.2	0.00	0.00	1244.8	

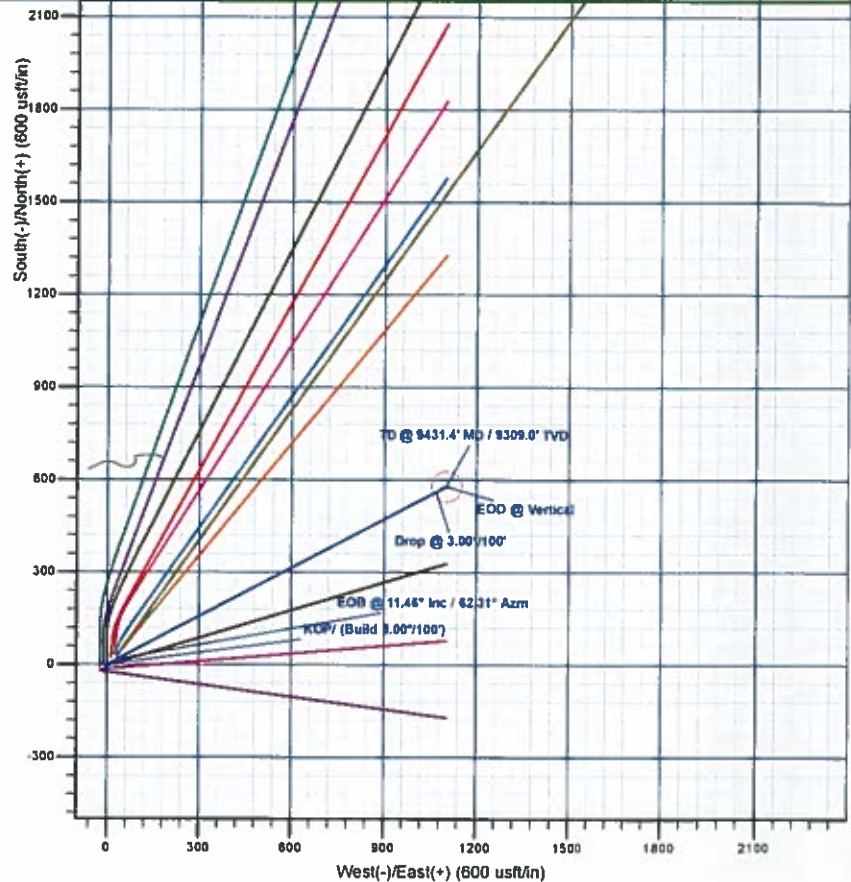
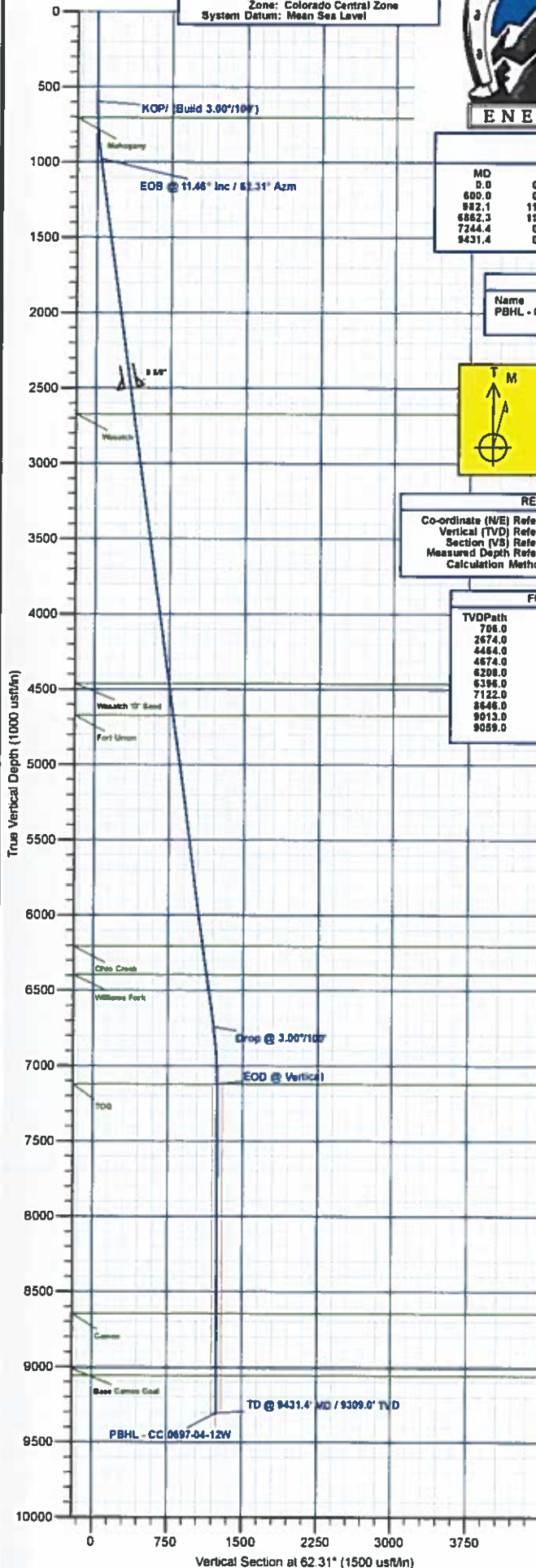
DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-04-12W	9309.0	578.5	1102.2	1638540.26	2230501.45	39.554842	-108.229472



WELL DETAILS: CC 0697-04-12W					
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1637995.23	2229382.34	39.553254	-108.233381

REFERENCE INFORMATION
 Co-ordinate (N/E) Reference: Well CC 0697-04-12W, 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

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
706.0	706.1	Mahogany
2674.0	2711.0	Wasatch
4464.0	4537.5	Wasatch 'G' Sand
4874.0	4751.7	Fort Union
6208.0	6317.0	Ohio Creek
6398.0	6504.0	Williams Fork
7122.0	7244.4	TOG
8646.0	8763.4	Cameo
9013.0	9135.4	Base Cameo Coal
9059.0	9181.4	Rollings



Plan: Design #2 (CC 0697-04-12W/B-5)
 Created By: Will Jirclik Date: 15:21, June 23 2018



Laramie Energy, LLC

Garfield County, CO

CC 604-12-13 Pad

CC 0697-04-12W

B-5

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 0697-04-12W
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 0697-04-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-5		
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 0697-04-12W					
Well Position	+N/-S	-37.2 usft	Northing:	1,637,995.23 usft	Latitude:	39.553254
	+E/-W	-27.1 usft	Easting:	2,229,382.34 usft	Longitude:	-108.233381
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,529.0 usft

Wellbore	B-5
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/11/2017	9.76	65.58	51,455.20004365

Design	Design #2
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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 62.31

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	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.00	0.00	
982.1	11.46	62.31	979.6	17.7	33.7	3.00	3.00	0.00	62.31	
6,862.3	11.46	62.31	6,742.4	560.8	1,068.5	0.00	0.00	0.00	0.00	
7,244.4	0.00	0.00	7,122.0	578.5	1,102.2	3.00	-3.00	0.00	180.00	
9,431.4	0.00	0.00	9,309.0	578.5	1,102.2	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 0697-04-12W
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 0697-04-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-5		
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
KOP/ (Build 3.00°/100°)									
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	3.00	62.31	700.0	1.2	2.3	2.6	3.00	3.00	0.00
Mahogany									
706.1	3.18	62.31	706.0	1.4	2.6	2.9	3.00	3.00	0.00
800.0	6.00	62.31	799.6	4.9	9.3	10.5	3.00	3.00	0.00
900.0	9.00	62.31	898.8	10.9	20.8	23.5	3.00	3.00	0.00
EOB @ 11.46° Inc / 62.31° Azm									
982.1	11.46	62.31	979.6	17.7	33.7	38.1	3.00	3.00	0.00
1,000.0	11.46	62.31	997.1	19.4	36.9	41.7	0.00	0.00	0.00
1,100.0	11.46	62.31	1,095.1	28.6	54.5	61.5	0.00	0.00	0.00
1,200.0	11.46	62.31	1,193.1	37.8	72.1	81.4	0.00	0.00	0.00
1,300.0	11.46	62.31	1,291.1	47.1	89.7	101.3	0.00	0.00	0.00
1,400.0	11.46	62.31	1,389.1	56.3	107.3	121.1	0.00	0.00	0.00
1,500.0	11.46	62.31	1,487.1	65.5	124.9	141.0	0.00	0.00	0.00
1,600.0	11.46	62.31	1,585.1	74.8	142.5	160.9	0.00	0.00	0.00
1,700.0	11.46	62.31	1,683.1	84.0	160.1	180.8	0.00	0.00	0.00
1,800.0	11.46	62.31	1,781.1	93.2	177.7	200.6	0.00	0.00	0.00
1,900.0	11.46	62.31	1,879.1	102.5	195.3	220.5	0.00	0.00	0.00
2,000.0	11.46	62.31	1,977.2	111.7	212.9	240.4	0.00	0.00	0.00
2,100.0	11.46	62.31	2,075.2	120.9	230.4	260.3	0.00	0.00	0.00
2,200.0	11.46	62.31	2,173.2	130.2	248.0	280.1	0.00	0.00	0.00
2,300.0	11.46	62.31	2,271.2	139.4	265.6	300.0	0.00	0.00	0.00
2,400.0	11.46	62.31	2,369.2	148.6	283.2	319.9	0.00	0.00	0.00
2,500.0	11.46	62.31	2,467.2	157.9	300.8	339.8	0.00	0.00	0.00
9 5/8"									
2,530.0	11.46	62.31	2,496.6	160.7	306.1	345.7	0.00	0.00	0.00
2,600.0	11.46	62.31	2,565.2	167.1	318.4	359.6	0.00	0.00	0.00
2,700.0	11.46	62.31	2,663.2	176.4	336.0	379.5	0.00	0.00	0.00
Wasatch									
2,711.0	11.46	62.31	2,674.0	177.4	338.0	381.7	0.00	0.00	0.00
2,800.0	11.46	62.31	2,761.2	185.6	353.6	399.4	0.00	0.00	0.00
2,900.0	11.46	62.31	2,859.2	194.8	371.2	419.2	0.00	0.00	0.00
3,000.0	11.46	62.31	2,957.2	204.1	388.8	439.1	0.00	0.00	0.00
3,100.0	11.46	62.31	3,055.2	213.3	406.4	459.0	0.00	0.00	0.00
3,200.0	11.46	62.31	3,153.2	222.5	424.0	478.9	0.00	0.00	0.00
3,300.0	11.46	62.31	3,251.2	231.8	441.6	498.7	0.00	0.00	0.00
3,400.0	11.46	62.31	3,349.2	241.0	459.2	518.6	0.00	0.00	0.00
3,500.0	11.46	62.31	3,447.2	250.2	476.8	538.5	0.00	0.00	0.00
3,600.0	11.46	62.31	3,545.2	259.5	494.4	558.4	0.00	0.00	0.00
3,700.0	11.46	62.31	3,643.2	268.7	512.0	578.2	0.00	0.00	0.00
3,800.0	11.46	62.31	3,741.2	277.9	529.6	598.1	0.00	0.00	0.00
3,900.0	11.46	62.31	3,839.3	287.2	547.2	618.0	0.00	0.00	0.00
4,000.0	11.46	62.31	3,937.3	296.4	564.8	637.8	0.00	0.00	0.00
4,100.0	11.46	62.31	4,035.3	305.6	582.4	657.7	0.00	0.00	0.00
4,200.0	11.46	62.31	4,133.3	314.9	600.0	677.6	0.00	0.00	0.00
4,300.0	11.46	62.31	4,231.3	324.1	617.6	697.5	0.00	0.00	0.00
4,400.0	11.46	62.31	4,329.3	333.4	635.2	717.3	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 0697-04-12W
 Wellbore: B-5
 Design: Design #2

Local Co-ordinate Reference:

TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well CC 0697-04-12W

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)
4,500.0	11.46	62.31	4,427.3	342.6	652.8	737.2	0.00	0.00	0.00
Wasatch 'G' Sand									
4,537.5	11.46	62.31	4,464.0	346.0	659.4	744.7	0.00	0.00	0.00
4,600.0	11.46	62.31	4,525.3	351.8	670.4	757.1	0.00	0.00	0.00
4,700.0	11.46	62.31	4,623.3	361.1	688.0	777.0	0.00	0.00	0.00
Fort Union									
4,751.7	11.46	62.31	4,674.0	365.8	697.1	787.2	0.00	0.00	0.00
4,800.0	11.46	62.31	4,721.3	370.3	705.6	796.8	0.00	0.00	0.00
4,900.0	11.46	62.31	4,819.3	379.5	723.2	816.7	0.00	0.00	0.00
5,000.0	11.46	62.31	4,917.3	388.8	740.8	836.6	0.00	0.00	0.00
5,100.0	11.46	62.31	5,015.3	398.0	758.4	856.5	0.00	0.00	0.00
5,200.0	11.46	62.31	5,113.3	407.2	776.0	876.3	0.00	0.00	0.00
5,300.0	11.46	62.31	5,211.3	416.5	793.6	896.2	0.00	0.00	0.00
5,400.0	11.46	62.31	5,309.3	425.7	811.2	916.1	0.00	0.00	0.00
5,500.0	11.46	62.31	5,407.3	434.9	828.7	935.9	0.00	0.00	0.00
5,600.0	11.46	62.31	5,505.3	444.2	846.3	955.8	0.00	0.00	0.00
5,700.0	11.46	62.31	5,603.4	453.4	863.9	975.7	0.00	0.00	0.00
5,800.0	11.46	62.31	5,701.4	462.6	881.5	995.6	0.00	0.00	0.00
5,900.0	11.46	62.31	5,799.4	471.9	899.1	1,015.4	0.00	0.00	0.00
6,000.0	11.46	62.31	5,897.4	481.1	916.7	1,035.3	0.00	0.00	0.00
6,100.0	11.46	62.31	5,995.4	490.4	934.3	1,055.2	0.00	0.00	0.00
6,200.0	11.46	62.31	6,093.4	499.6	951.9	1,075.1	0.00	0.00	0.00
6,300.0	11.46	62.31	6,191.4	508.8	969.5	1,094.9	0.00	0.00	0.00
Ohio Creek									
6,317.0	11.46	62.31	6,208.0	510.4	972.5	1,098.3	0.00	0.00	0.00
6,400.0	11.46	62.31	6,289.4	518.1	987.1	1,114.8	0.00	0.00	0.00
6,500.0	11.46	62.31	6,387.4	527.3	1,004.7	1,134.7	0.00	0.00	0.00
Williams Fork									
6,508.8	11.46	62.31	6,396.0	528.1	1,006.3	1,136.4	0.00	0.00	0.00
6,600.0	11.46	62.31	6,485.4	536.5	1,022.3	1,154.8	0.00	0.00	0.00
6,700.0	11.46	62.31	6,583.4	545.8	1,039.9	1,174.4	0.00	0.00	0.00
6,800.0	11.46	62.31	6,681.4	555.0	1,057.5	1,194.3	0.00	0.00	0.00
Drop @ 3.00°/100'									
6,862.3	11.46	62.31	6,742.4	560.8	1,068.5	1,206.7	0.00	0.00	0.00
6,900.0	10.33	62.31	6,779.5	564.1	1,074.8	1,213.8	3.00	-3.00	0.00
7,000.0	7.33	62.31	6,878.3	571.2	1,088.4	1,229.2	3.00	-3.00	0.00
7,100.0	4.33	62.31	6,977.8	575.9	1,097.4	1,239.3	3.00	-3.00	0.00
7,200.0	1.33	62.31	7,077.6	578.2	1,101.7	1,244.3	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,244.4	0.00	0.00	7,122.0	578.5	1,102.2	1,244.8	3.00	-3.00	-140.41
7,300.0	0.00	0.00	7,177.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
7,400.0	0.00	0.00	7,277.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
7,500.0	0.00	0.00	7,377.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
7,600.0	0.00	0.00	7,477.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
7,700.0	0.00	0.00	7,577.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
7,800.0	0.00	0.00	7,677.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
7,900.0	0.00	0.00	7,777.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,000.0	0.00	0.00	7,877.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,100.0	0.00	0.00	7,977.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,200.0	0.00	0.00	8,077.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,300.0	0.00	0.00	8,177.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,400.0	0.00	0.00	8,277.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,500.0	0.00	0.00	8,377.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-12W
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 0697-04-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-5		
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)
8 600.0	0.00	0.00	8,477.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,700.0	0.00	0.00	8,577.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
Cameo									
8,768.4	0.00	0.00	8,646.0	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,800.0	0.00	0.00	8,677.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
8,900.0	0.00	0.00	8,777.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
9,000.0	0.00	0.00	8,877.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
9,100.0	0.00	0.00	8,977.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
Base Cameo Coal									
9,135.4	0.00	0.00	9,013.0	578.5	1,102.2	1,244.8	0.00	0.00	0.00
Rollings									
9,181.4	0.00	0.00	9,059.0	578.5	1,102.2	1,244.8	0.00	0.00	0.00
9,200.0	0.00	0.00	9,077.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
9,300.0	0.00	0.00	9,177.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
9,400.0	0.00	0.00	9,277.6	578.5	1,102.2	1,244.8	0.00	0.00	0.00
TD @ 9431.4' MD / 9309.0' TVD									
9 431.4	0.00	0.00	9,309.0	578.5	1,102.2	1,244.8	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 0697-04-12V	0.00	0.00	9,309.0	578.5	1,102.2	1,638,540.26	2,230,501.45	39.554842	-108.229472
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,496.6	9 5/8"	9-5/8	14-1/2

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
706.1	706.0	Mahogany			
2,711.0	2,674.0	Wasatch			
4,537.5	4,464.0	Wasatch 'G' Sand			
4,751.7	4,674.0	Fort Union			
6,317.0	6,208.0	Ohio Creek			
6,508.8	6,396.0	Williams Fork			
7,244.4	7,122.0	TOG			
8,768.4	8,646.0	Cameo			
9,135.4	9,013.0	Base Cameo Coal			
9,181.4	9,059.0	Rollings			



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-12W
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 0697-04-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-5		
Design:	Design #2		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
600.0	600.0	0.0	0.0	KOP/ (Build 3.00"/100')
982.1	979.6	17.7	33.7	EOB @ 11.46" Inc / 62.31" Azm
6,862.3	6,742.4	560.8	1,068.5	Drop @ 3.00"/100'
7,244.4	7,122.0	578.5	1,102.2	EOD @ Vertical
9,431.4	9,309.0	578.5	1,102.2	TD @ 9431.4' MD / 9309.0' TVD