



Project: Mesa County, CO  
 Site: Gunderson 13-11 Pad  
 Well: Gunderson 0994-14-11E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.273873  
 Longitude: -107.834926  
 Ground Level: 7272.0  
 well @ 7302.0usft (H&P #522)



#### SECTION DETAILS

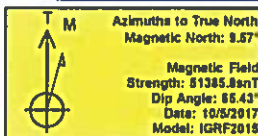
MD	Inc	Azi	TVD	+N/-S	+E/-W	Diep	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3" / 100')
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	EOB @ 34.63° Inc. / 291.51° Azm
1354.2	34.63	291.51	1285.2	124.0	-314.7	3.00	291.51	338.3	Drop 3" / 100'
5323.9	34.63	291.51	4551.8	950.9	-2413.3	0.00	0.00	2593.9	EOD @ Vertical
6478.1	0.00	0.00	5637.0	1075.0	-2728.0	3.00	180.00	2932.2	TD @ 8328.1' MD / 7487.0' TVD
8328.1	0.00	0.00	7487.0	1075.0	-2728.0	0.00	0.00	2932.2	

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PSHL - Gunderson 0994-14-11E	7487.0	1075.0	-2728.0	1534280.48	2336376.83	39.276824	-107.844563

#### WELL DETAILS: Gunderson 0994-14-11E

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1533135.77	2339078.14	39.273873	-107.834926



#### REFERENCE INFORMATION

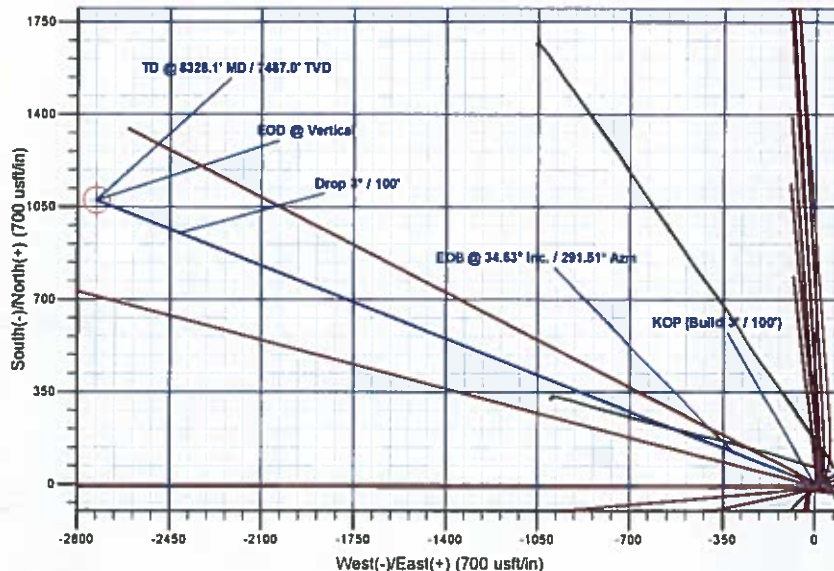
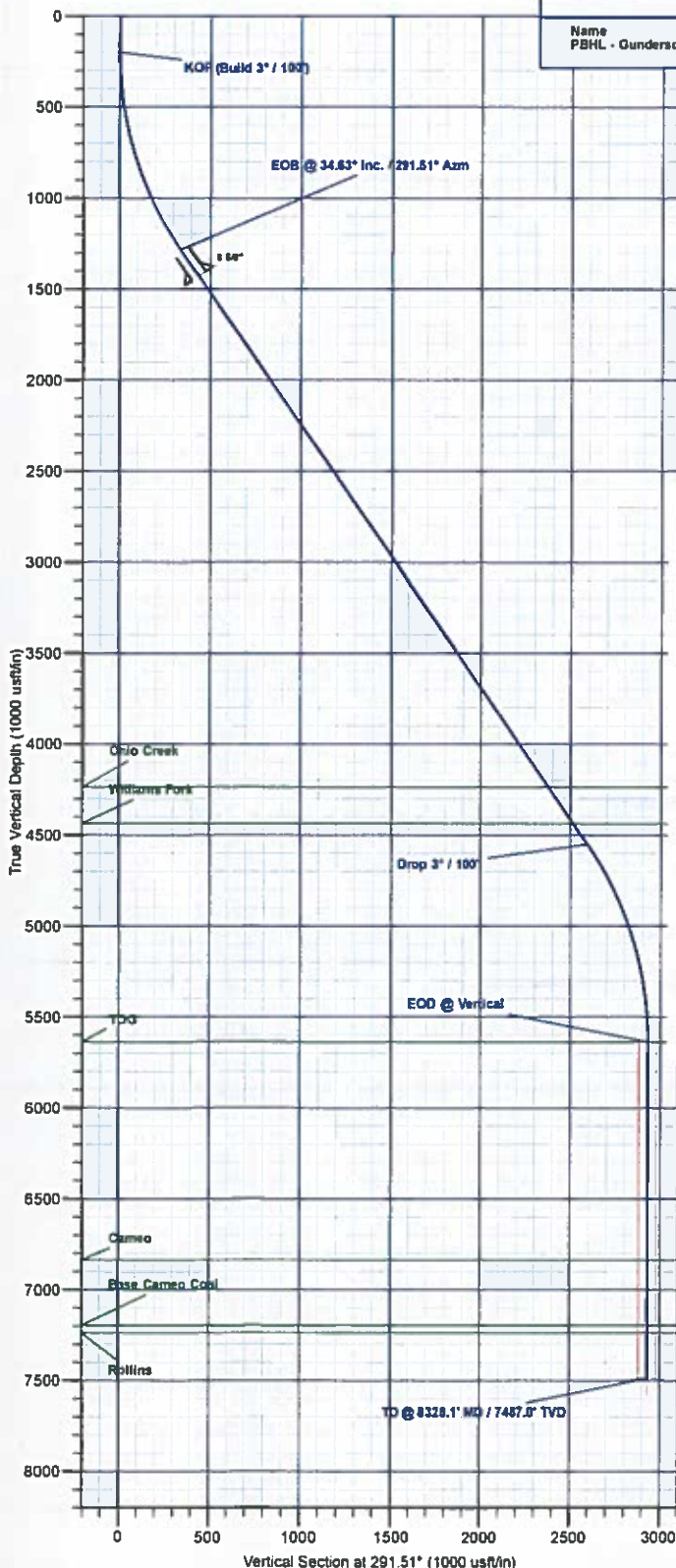
Co-ordinate (N/E) Reference: Well Gunderson 0994-14-11E, True North  
 Vertical (TVD) Reference: well @ 7302.0usft (H&P #522)  
 Section (VS) Reference: Slot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7302.0usft (H&P #522)  
 Calculation Method: Minimum Curvature

#### PROJECT DETAILS: Mesa 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

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4237.0	4941.3	Ohio Creek
4437.0	5184.4	Williams Fork
5637.0	6475.1	TOG
6837.0	7675.1	Cameo
7197.0	8035.1	Base Cameo Coal
7237.0	8075.1	Rollins



Plan: Design #1 (Gunderson 0994-14-11E/Wellbore #1)

Created By: Will Jircik

Date: 15:51, October 10 2017



# **Laramie Energy, LLC**

**Mesa County, CO**

**Gunderson 13-11 Pad**

**Gunderson 0994-14-11E**

**Wellbore #1**

**Plan: Design #1**

## **QES Well Planning Report**

**10 October, 2017**





# Well Planning Report



<b>Database:</b>	EDM 5000 1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Gunderson 0994-14-11E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7302.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7302.0usft (H&P #522)
<b>Site:</b>	Gunderson 13-11 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Gunderson 0994-14-11E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

<b>Project</b>	Mesa 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		

Site	Gunderson 13-11 Pad				
Site Position:		Northing:	1,533,162.26 usft	Latitude:	39.273948
From:	Lat/Long	Easting:	2,339,102.68 usft	Longitude:	-107.834835
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well	Gunderson 0994-14-11E					
Well Position	+N/-S	-27.2 usft	Northing:	1,533,135.77 usft	Latitude:	39.273873
	+E/-W	-25.9 usft	Easting:	2,339,076.14 usft	Longitude:	-107.834926
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	7,272.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	10/5/2017	9.57	65.43	51,385.83368275

<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	291.51

<b>Plan Sections</b>										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Bulld 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	
1,354.2	34.63	291.51	1,285.2	124.0	-314.7	3.00	3.00	0.00	291.51	
5,323.9	34.63	291.51	4,551.8	950.9	-2,413.3	0.00	0.00	0.00	0.00	
6,478.1	0.00	0.00	5,637.0	1,075.0	-2,728.0	3.00	-3.00	0.00	180.00	
8,328.1	0.00	0.00	7,487.0	1,075.0	-2,728.0	0.00	0.00	0.00	0.00	PBHL - Gunderson 05





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Gunderson 0994-14-11E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7302.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7302.0usft (H&P #522)
<b>Site:</b>	Gunderson 13-11 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Gunderson 0994-14-11E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<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)
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
<b>KOP (Build 3° / 100')</b>									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	3.00	291.51	300.0	1.0	-2.4	2.6	3.00	3.00	0.00
400.0	6.00	291.51	399.6	3.8	-9.7	10.5	3.00	3.00	0.00
500.0	9.00	291.51	498.8	8.6	-21.9	23.5	3.00	3.00	0.00
600.0	12.00	291.51	597.1	15.3	-38.8	41.7	3.00	3.00	0.00
700.0	15.00	291.51	694.3	23.9	-60.5	65.1	3.00	3.00	0.00
800.0	18.00	291.51	790.2	34.3	-87.0	93.5	3.00	3.00	0.00
900.0	21.00	291.51	884.4	46.5	-118.0	126.9	3.00	3.00	0.00
1,000.0	24.00	291.51	976.8	60.5	-153.6	165.1	3.00	3.00	0.00
1,100.0	27.00	291.51	1,067.1	76.3	-193.7	208.2	3.00	3.00	0.00
1,200.0	30.00	291.51	1,154.9	93.8	-238.1	255.9	3.00	3.00	0.00
1,300.0	33.00	291.51	1,240.2	113.0	-286.7	308.1	3.00	3.00	0.00
<b>EOB @ 34.63° Inc. / 291.51° Azm</b>									
1,354.2	34.63	291.51	1,285.2	124.0	-314.7	338.3	3.00	3.00	0.00
1,400.0	34.63	291.51	1,322.9	133.6	-338.9	364.3	0.00	0.00	0.00
1,500.0	34.63	291.51	1,405.2	154.4	-391.8	421.1	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	34.63	291.51	1,429.9	160.6	-407.7	438.2	0.00	0.00	0.00
1,600.0	34.63	291.51	1,487.5	175.2	-444.7	477.9	0.00	0.00	0.00
1,700.0	34.63	291.51	1,569.8	198.0	-497.5	534.8	0.00	0.00	0.00
1,800.0	34.63	291.51	1,652.1	216.9	-550.4	591.6	0.00	0.00	0.00
1,900.0	34.63	291.51	1,734.3	237.7	-603.3	648.4	0.00	0.00	0.00
2,000.0	34.63	291.51	1,816.6	258.5	-656.1	705.2	0.00	0.00	0.00
2,100.0	34.63	291.51	1,898.9	279.4	-709.0	762.1	0.00	0.00	0.00
2,200.0	34.63	291.51	1,981.2	300.2	-761.9	818.9	0.00	0.00	0.00
2,300.0	34.63	291.51	2,063.5	321.0	-814.7	875.7	0.00	0.00	0.00
2,400.0	34.63	291.51	2,145.8	341.9	-867.6	932.5	0.00	0.00	0.00
2,500.0	34.63	291.51	2,228.1	362.7	-920.5	989.3	0.00	0.00	0.00
2,600.0	34.63	291.51	2,310.4	383.5	-973.3	1,046.2	0.00	0.00	0.00
2,700.0	34.63	291.51	2,392.6	404.4	-1,026.2	1,103.0	0.00	0.00	0.00
2,800.0	34.63	291.51	2,474.9	425.2	-1,079.1	1,159.8	0.00	0.00	0.00
2,900.0	34.63	291.51	2,557.2	446.0	-1,131.9	1,216.6	0.00	0.00	0.00
3,000.0	34.63	291.51	2,639.5	466.9	-1,184.8	1,273.4	0.00	0.00	0.00
3,100.0	34.63	291.51	2,721.8	487.7	-1,237.6	1,330.3	0.00	0.00	0.00
3,200.0	34.63	291.51	2,804.1	508.5	-1,290.5	1,387.1	0.00	0.00	0.00
3,300.0	34.63	291.51	2,886.4	529.3	-1,343.4	1,443.9	0.00	0.00	0.00
3,400.0	34.63	291.51	2,968.7	550.2	-1,396.2	1,500.7	0.00	0.00	0.00
3,500.0	34.63	291.51	3,051.0	571.0	-1,449.1	1,557.6	0.00	0.00	0.00
3,600.0	34.63	291.51	3,133.2	591.8	-1,502.0	1,614.4	0.00	0.00	0.00
3,700.0	34.63	291.51	3,215.5	612.7	-1,554.8	1,671.2	0.00	0.00	0.00
3,800.0	34.63	291.51	3,297.8	633.5	-1,607.7	1,728.0	0.00	0.00	0.00
3,900.0	34.63	291.51	3,380.1	654.3	-1,660.6	1,784.8	0.00	0.00	0.00
4,000.0	34.63	291.51	3,462.4	675.2	-1,713.4	1,841.7	0.00	0.00	0.00
4,100.0	34.63	291.51	3,544.7	696.0	-1,766.3	1,898.5	0.00	0.00	0.00
4,200.0	34.63	291.51	3,627.0	716.8	-1,819.2	1,955.3	0.00	0.00	0.00
4,300.0	34.63	291.51	3,709.3	737.7	-1,872.0	2,012.1	0.00	0.00	0.00
4,400.0	34.63	291.51	3,791.5	758.5	-1,924.9	2,068.9	0.00	0.00	0.00
4,500.0	34.63	291.51	3,873.8	779.3	-1,977.8	2,125.8	0.00	0.00	0.00
4,600.0	34.63	291.51	3,956.1	800.2	-2,030.6	2,182.6	0.00	0.00	0.00
4,700.0	34.63	291.51	4,038.4	821.0	-2,083.5	2,239.4	0.00	0.00	0.00



## Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well Gunderson 0994-14-11E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7302 0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7302 0usft (H&P #522)
Site:	Gunderson 13-11 Pad	North Reference:	True
Well:	Gunderson 0994-14-11E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
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)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
4,800.0	34.63	291.51	4,120.7	841.8	-2,136.4	2,296.2	0.00	0.00	0.00
4,900.0	34.63	291.51	4,203.0	862.6	-2,189.2	2,353.1	0.00	0.00	0.00
<b>Ohio Creek</b>									
4,941.3	34.63	291.51	4,237.0	871.3	-2,211.1	2,376.5	0.00	0.00	0.00
5,000.0	34.63	291.51	4,285.3	883.5	-2,242.1	2,409.9	0.00	0.00	0.00
5,100.0	34.63	291.51	4,367.6	904.3	-2,295.0	2,466.7	0.00	0.00	0.00
<b>Williams Fork</b>									
5,184.4	34.63	291.51	4,437.0	921.9	-2,339.6	2,514.6	0.00	0.00	0.00
5,200.0	34.63	291.51	4,449.8	925.1	-2,347.8	2,523.5	0.00	0.00	0.00
5,300.0	34.63	291.51	4,532.1	946.0	-2,400.7	2,580.3	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,323.9	34.63	291.51	4,551.8	950.9	-2,413.3	2,593.9	0.00	0.00	0.00
5,400.0	32.34	291.51	4,615.3	966.3	-2,452.4	2,635.9	3.00	-3.00	0.00
5,500.0	29.34	291.51	4,701.1	985.1	-2,500.1	2,687.2	3.00	-3.00	0.00
5,600.0	26.34	291.51	4,789.5	1,002.3	-2,543.5	2,733.9	3.00	-3.00	0.00
5,700.0	23.34	291.51	4,880.3	1,017.7	-2,582.6	2,775.9	3.00	-3.00	0.00
5,800.0	20.34	291.51	4,973.1	1,031.3	-2,617.2	2,813.1	3.00	-3.00	0.00
5,900.0	17.34	291.51	5,067.7	1,043.1	-2,647.3	2,845.4	3.00	-3.00	0.00
6,000.0	14.34	291.51	5,163.9	1,053.1	-2,672.7	2,872.7	3.00	-3.00	0.00
6,100.0	11.34	291.51	5,261.4	1,061.3	-2,693.3	2,894.9	3.00	-3.00	0.00
6,200.0	8.34	291.51	5,359.9	1,067.6	-2,709.2	2,912.0	3.00	-3.00	0.00
6,300.0	5.34	291.51	5,459.2	1,071.9	-2,720.3	2,923.9	3.00	-3.00	0.00
6,400.0	2.34	291.51	5,558.9	1,074.4	-2,726.5	2,930.6	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
6,478.1	0.00	0.00	5,637.0	1,075.0	-2,728.0	2,932.2	3.00	-3.00	87.72
6,500.0	0.00	0.00	5,658.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
6,600.0	0.00	0.00	5,758.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
6,700.0	0.00	0.00	5,858.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
6,800.0	0.00	0.00	5,958.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
6,900.0	0.00	0.00	6,058.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,000.0	0.00	0.00	6,158.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,100.0	0.00	0.00	6,258.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,200.0	0.00	0.00	6,358.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,300.0	0.00	0.00	6,458.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,400.0	0.00	0.00	6,558.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,500.0	0.00	0.00	6,658.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,600.0	0.00	0.00	6,758.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
<b>Cameo</b>									
7,678.1	0.00	0.00	6,837.0	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,700.0	0.00	0.00	6,858.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,800.0	0.00	0.00	6,958.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
7,900.0	0.00	0.00	7,058.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
8,000.0	0.00	0.00	7,158.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,038.1	0.00	0.00	7,197.0	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
<b>Rollins</b>									
8,078.1	0.00	0.00	7,237.0	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
8,100.0	0.00	0.00	7,258.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
8,200.0	0.00	0.00	7,358.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
8,300.0	0.00	0.00	7,458.9	1,075.0	-2,728.0	2,932.2	0.00	0.00	0.00
<b>TD @ 8328.1' MD / 7487.0' TVD</b>									
8,328.1	0.00	0.00	7,487.0	1,075.0	-2,728.0	2,932.2	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 Gunderson 0994-14-11E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7302.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7302.0usft (H&P #522)
<b>Site:</b>	Gunderson 13-11 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Gunderson 0994-14-11E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

## Design Targets

### Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
PBHL - Gunderson 0994 - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,487.0	1,075.0	-2,728.0	1,534,280.49	2,336,376.63	39.276824	-107.844563

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,429.9	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,941.3	4,237.0	Ohio Creek			
5,184.4	4,437.0	Williams Fork			
6,478.1	5,637.0	TOG			
7,678.1	6,837.0	Cameo			
8,038.1	7,197.0	Base Cameo Coal			
8,078.1	7,237.0	Rollins			

## 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	KOP (Build 3" / 100')
1,354.2	1,285.2	124.0	-314.7	EOB @ 34.63° Inc. / 291.51° Azm
5,323.9	4,551.8	950.9	-2,413.3	Drop 3" / 100'
6,478.1	5,637.0	1,075.0	-2,728.0	EOD @ Vertical
8,328.1	7,487.0	1,075.0	-2,728.0	TD @ 8328.1' MD / 7487.0' TVD