



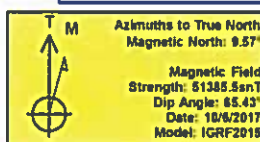
Project: Mesa County, CO  
 Site: Gunderson 13-11 Pad  
 Well: Gunderson 0994-13-17E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.273810  
 Longitude: -107.834956  
 Ground Level: 7272.0  
 well @ 7302.0usft (H&P #522)



SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dieg	TFace	VSect	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	KOP (Build 3" / 100')
1189.6	29.69	97.33	1148.9	-32.0	248.6	3.00	97.33	250.7	EOB @ 29.69° Inc. / 97.33° Azm
5448.9	29.69	97.33	4846.1	-301.1	2340.6	0.00	0.00	2360.1	Drop 3" / 100'
8438.4	0.00	0.00	6792.0	-333.1	2589.5	3.00	180.00	2610.8	EOD @ Vertical
8288.4	0.00	0.00	7642.0	-333.1	2589.5	0.00	0.00	2610.8	TD @ 8288.4' MD / 7642.0' TVD

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Gunderson 0994-13-17E	7642.0	-333.1	2589.5	1532713.49	2341647.11	39.272895	-107.825809

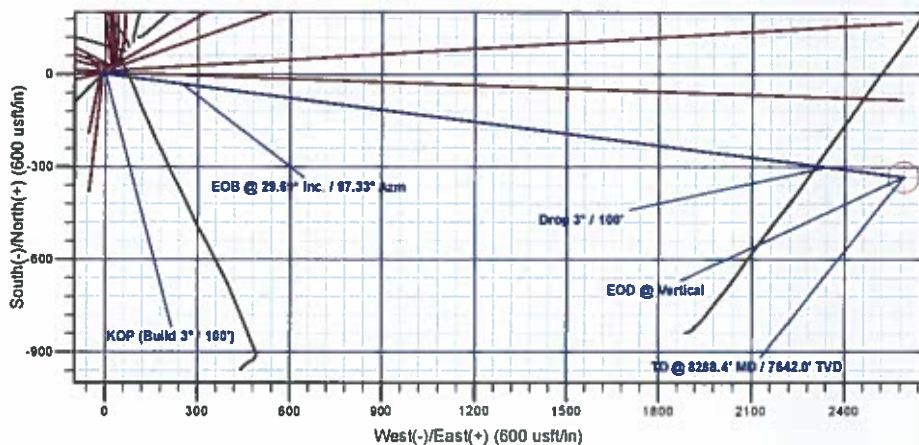
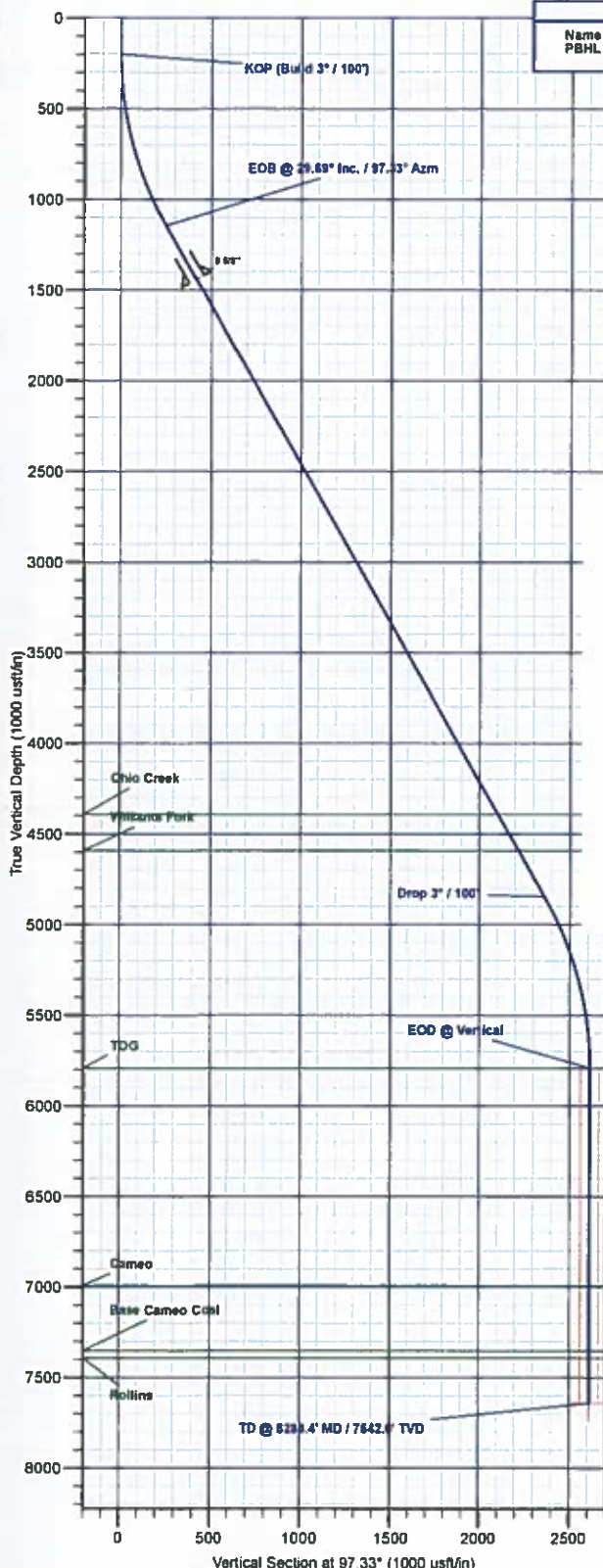
WELL DETAILS: Gunderson 0994-13-17E					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1533113.05	2339067.06	39.273810	-107.834956



REFERENCE INFORMATION	
Co-ordinate (N/E) Reference:	Well Gunderson 0994-13-17E, True North
Vertical (TVD) Reference:	well @ 7302.0usft (H&P #522)
Section (VS) Reference:	Slot - (0.6N, 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
4392.0	4926.1	Ohio Creek
4592.0	5166.3	Williams Fork
5792.0	6438.4	TCO
6992.0	7638.4	Cameo
7352.0	7999.4	Base Cameo Coal
7392.0	8038.4	Rollins





# **Laramie Energy, LLC**

**Mesa County, CO**

**Gunderson 13-11 Pad**

**Gunderson 0994-13-17E**

**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 0994-13-17E
<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 0994-13-17E	<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 0994-13-17E					
Well Position	+N/-S	-50.1 usft	Northing:	1,533,113.05 usft	Latitude:	39.273810
	+E/-W	-34.3 usft	Easting:	2,339,067.06 usft	Longitude:	-107.834956
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	10/6/2017	9.57	65.43	51,385.49346670

<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	97.33

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	<b>TFO (°)</b>	<b>Target</b>
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	
1,189.6	29.69	97.33	1,145.9	-32.0	248.6	3.00	3.00	0.00	97.33	
5,448.9	29.69	97.33	4,846.1	-301.1	2,340.8	0.00	0.00	0.00	0.00	
6,438.4	0.00	0.00	5,792.0	-333.1	2,589.5	3.00	-3.00	0.00	180.00	
8,288.4	0.00	0.00	7,642.0	-333.1	2,589.5	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 0994-13-17E
<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 0994-13-17E	<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	97.33	300.0	-0.3	2.6	2.6	3.00	3.00	0.00
400.0	6.00	97.33	399.6	-1.3	10.4	10.5	3.00	3.00	0.00
500.0	9.00	97.33	498.8	-3.0	23.3	23.5	3.00	3.00	0.00
600.0	12.00	97.33	597.1	-5.3	41.4	41.7	3.00	3.00	0.00
700.0	15.00	97.33	694.3	-8.3	64.5	65.1	3.00	3.00	0.00
800.0	18.00	97.33	790.2	-11.9	92.7	93.5	3.00	3.00	0.00
900.0	21.00	97.33	884.4	-16.2	125.8	126.9	3.00	3.00	0.00
1,000.0	24.00	97.33	976.8	-21.1	163.8	165.1	3.00	3.00	0.00
1,100.0	27.00	97.33	1,067.1	-26.6	206.5	208.2	3.00	3.00	0.00
<b>EOB @ 29.69° Inc. / 97.33° Azm</b>									
1,189.6	29.69	97.33	1,145.9	-32.0	248.6	250.7	3.00	3.00	0.00
1,200.0	29.69	97.33	1,154.9	-32.6	253.8	255.8	0.00	0.00	0.00
1,300.0	29.69	97.33	1,241.8	-39.0	302.9	305.4	0.00	0.00	0.00
1,400.0	29.69	97.33	1,328.7	-45.3	352.0	354.9	0.00	0.00	0.00
1,500.0	29.69	97.33	1,415.6	-51.6	401.1	404.4	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	29.69	97.33	1,441.6	-53.5	415.9	419.3	0.00	0.00	0.00
1,600.0	29.69	97.33	1,502.4	-57.9	450.2	454.0	0.00	0.00	0.00
1,700.0	29.69	97.33	1,589.3	-64.2	499.4	503.5	0.00	0.00	0.00
1,800.0	29.69	97.33	1,676.2	-70.6	548.5	553.0	0.00	0.00	0.00
1,900.0	29.69	97.33	1,763.1	-76.9	597.6	602.5	0.00	0.00	0.00
2,000.0	29.69	97.33	1,849.9	-83.2	646.7	652.1	0.00	0.00	0.00
2,100.0	29.69	97.33	1,936.8	-89.5	695.8	701.6	0.00	0.00	0.00
2,200.0	29.69	97.33	2,023.7	-95.8	745.0	751.1	0.00	0.00	0.00
2,300.0	29.69	97.33	2,110.6	-102.2	794.1	800.6	0.00	0.00	0.00
2,400.0	29.69	97.33	2,197.4	-108.5	843.2	850.2	0.00	0.00	0.00
2,500.0	29.69	97.33	2,284.3	-114.8	892.3	899.7	0.00	0.00	0.00
2,600.0	29.69	97.33	2,371.2	-121.1	941.5	949.2	0.00	0.00	0.00
2,700.0	29.69	97.33	2,458.1	-127.4	990.6	998.7	0.00	0.00	0.00
2,800.0	29.69	97.33	2,544.9	-133.8	1,039.7	1,048.3	0.00	0.00	0.00
2,900.0	29.69	97.33	2,631.8	-140.1	1,088.8	1,097.8	0.00	0.00	0.00
3,000.0	29.69	97.33	2,718.7	-146.4	1,137.9	1,147.3	0.00	0.00	0.00
3,100.0	29.69	97.33	2,805.6	-152.7	1,187.1	1,196.8	0.00	0.00	0.00
3,200.0	29.69	97.33	2,892.4	-159.0	1,236.2	1,246.4	0.00	0.00	0.00
3,300.0	29.69	97.33	2,979.3	-165.3	1,285.3	1,295.9	0.00	0.00	0.00
3,400.0	29.69	97.33	3,066.2	-171.7	1,334.4	1,345.4	0.00	0.00	0.00
3,500.0	29.69	97.33	3,153.1	-178.0	1,383.5	1,394.9	0.00	0.00	0.00
3,600.0	29.69	97.33	3,239.9	-184.3	1,432.7	1,444.5	0.00	0.00	0.00
3,700.0	29.69	97.33	3,326.8	-190.6	1,481.8	1,494.0	0.00	0.00	0.00
3,800.0	29.69	97.33	3,413.7	-196.9	1,530.9	1,543.5	0.00	0.00	0.00
3,900.0	29.69	97.33	3,500.6	-203.3	1,580.0	1,593.0	0.00	0.00	0.00
4,000.0	29.69	97.33	3,587.4	-209.6	1,629.1	1,642.6	0.00	0.00	0.00
4,100.0	29.69	97.33	3,674.3	-215.9	1,678.3	1,692.1	0.00	0.00	0.00
4,200.0	29.69	97.33	3,761.2	-222.2	1,727.4	1,741.6	0.00	0.00	0.00
4,300.0	29.69	97.33	3,848.1	-228.5	1,776.5	1,791.1	0.00	0.00	0.00
4,400.0	29.69	97.33	3,934.9	-234.9	1,825.6	1,840.7	0.00	0.00	0.00
4,500.0	29.69	97.33	4,021.8	-241.2	1,874.8	1,890.2	0.00	0.00	0.00
4,600.0	29.69	97.33	4,108.7	-247.5	1,923.9	1,939.7	0.00	0.00	0.00
4,700.0	29.69	97.33	4,195.6	-253.8	1,973.0	1,989.3	0.00	0.00	0.00



## Well Planning Report



Database: EDM 5000 1 Single User Db  
 Company: Laramie Energy, LLC  
 Project: Mesa County, CO  
 Site: Gunderson 13-11 Pad  
 Well: Gunderson 0994-13-17E  
 Wellbore: Wellbore #1  
 Design: Design #1

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

Well Gunderson 0994-13-17E  
 well @ 7302.0usft (H&P #522)  
 well @ 7302.0usft (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)
4 800.0	29.69	97.33	4 282.4	-260.1	2,022.1	2 038.8	0.00	0.00	0.00
4 900.0	29.69	97.33	4 369.3	-266.5	2,071.2	2 088.3	0.00	0.00	0.00
<b>Ohio Creek</b>									
4 926.1	29.69	97.33	4 392.0	-268.1	2,084.1	2 101.2	0.00	0.00	0.00
5 000.0	29.69	97.33	4 456.2	-272.8	2,120.4	2 137.8	0.00	0.00	0.00
5 100.0	29.69	97.33	4 543.1	-279.1	2,169.5	2 187.4	0.00	0.00	0.00
<b>Williams Fork</b>									
5 156.3	29.69	97.33	4 592.0	-282.7	2,197.2	2 215.3	0.00	0.00	0.00
5 200.0	29.69	97.33	4 629.9	-285.4	2,218.6	2 236.9	0.00	0.00	0.00
5 300.0	29.69	97.33	4 716.8	-291.7	2,267.7	2 286.4	0.00	0.00	0.00
5 400.0	29.69	97.33	4 803.7	-298.0	2,316.8	2 335.9	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5 448.9	29.69	97.33	4 846.1	-301.1	2,340.8	2 360.1	0.00	0.00	0.00
5 500.0	28.15	97.33	4 890.9	-304.3	2,365.4	2 384.9	3.00	-3.00	0.00
5 600.0	25.15	97.33	4 980.2	-310.0	2,409.9	2 429.7	3.00	-3.00	0.00
5 700.0	22.15	97.33	5 071.8	-315.1	2,449.6	2 469.8	3.00	-3.00	0.00
5 800.0	19.15	97.33	5 165.4	-319.6	2,484.6	2 505.1	3.00	-3.00	0.00
5 900.0	16.15	97.33	5 260.7	-323.5	2,514.7	2 535.4	3.00	-3.00	0.00
6 000.0	13.15	97.33	5 357.4	-326.7	2,539.8	2 560.7	3.00	-3.00	0.00
6 100.0	10.15	97.33	5 455.3	-329.3	2,559.8	2 580.9	3.00	-3.00	0.00
6 200.0	7.15	97.33	5 554.2	-331.2	2,574.7	2 595.9	3.00	-3.00	0.00
6 300.0	4.15	97.33	5 653.7	-332.5	2,584.5	2 605.8	3.00	-3.00	0.00
6 400.0	1.15	97.33	5 753.6	-333.1	2 589.1	2 610.4	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
6 438.4	0.00	0.00	5 792.0	-333.1	2 589.5	2 610.8	3.00	-3.00	0.00
6 500.0	0.00	0.00	5 853.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
6 600.0	0.00	0.00	5 953.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
6 700.0	0.00	0.00	6 053.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
6 800.0	0.00	0.00	6 153.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
6 900.0	0.00	0.00	6 253.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 000.0	0.00	0.00	6 353.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 100.0	0.00	0.00	6 453.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 200.0	0.00	0.00	6 553.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 300.0	0.00	0.00	6 653.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 400.0	0.00	0.00	6 753.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 500.0	0.00	0.00	6 853.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 600.0	0.00	0.00	6 953.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
<b>Cameo</b>									
7 638.4	0.00	0.00	6 992.0	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 700.0	0.00	0.00	7 053.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 800.0	0.00	0.00	7 153.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
7 900.0	0.00	0.00	7 253.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
7 998.4	0.00	0.00	7 352.0	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
8 000.0	0.00	0.00	7 353.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
<b>Rollins</b>									
8 038.4	0.00	0.00	7 392.0	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
8 100.0	0.00	0.00	7 453.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
8 200.0	0.00	0.00	7 553.6	-333.1	2 589.5	2 610.8	0.00	0.00	0.00
<b>TD @ 8288.4' MD / 7642.0' TVD</b>									
8 288.4	0.00	0.00	7 642.0	-333.1	2 589.5	2 610.8	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 Gunderson 0894-13-17E
<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 0994-13-17E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

## 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 - Gunderson 0994 - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,642.0	-333.1	2,589.5	1,532,713.49	2,341,647.11	39.272895	-107.825809

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,441.6	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,926.1	4,392.0	Ohio Creek			
5,156.3	4,592.0	Williams Fork			
6,438.4	5,792.0	TOG			
7,638.4	6,992.0	Cameo			
7,998.4	7,352.0	Base Cameo Coal			
8,038.4	7,392.0	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')
1,189.6	1,145.9	-32.0	248.6	EOB @ 29.69° Inc. / 87.33° Azm
5,448.9	4,846.1	-301.1	2,340.8	Drop 3" / 100'
6,438.4	5,792.0	-333.1	2,589.5	EOD @ Vertical
8,288.4	7,642.0	-333.1	2,589.5	TD @ 8288.4' MD / 7642.0' TVD