



Project: Mesa County, CO  
 Site: Gunderson 13-11 Pad  
 Well: Gunderson 0994-13-10E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.273884  
 Longitude: -107.834864  
 Ground Level: 7272.0  
 well @ 7302.0usft (H&P #522)



#### SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Diag	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
325.0	0.00	0.00	325.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1455.1	33.90	60.07	1390.3	162.0	281.4	3.00	60.07	324.7	EOB @ 33.90° Inc. / 60.07° Azm
5598.7	33.90	60.07	4764.7	1290.3	2240.8	0.00	0.00	2585.7	Drop 3° / 100'
6638.8	0.00	0.00	5820.0	1452.3	2522.2	3.00	180.00	2910.4	EOO @ Vertical
6488.8	0.00	0.00	7670.0	1452.3	2522.2	0.00	0.00	2910.4	TD @ 8488.8° MD / 7670.0° TVD

#### DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Gunderson 0994-13-10E	7670.0	1452.3	2522.2	1534526.30	2341652.47	39.277871	-107.825954

#### WELL DETAILS: Gunderson 0994-13-10E

+N-S	+E-W	7272.0	Northing	Easting	Latitude	Longitude
0.0	0.0		1833139.32	2339093.79	39.273884	-107.834864

**TM**  
 Azimuths to True North  
 Magnetic North: 9.57°  
 Magnetic Field  
 Strength: 51385.5nT  
 Dip Angle: 65.43°  
 Date: 10/5/2017  
 Model: IGRF2015

#### REFERENCE INFORMATION

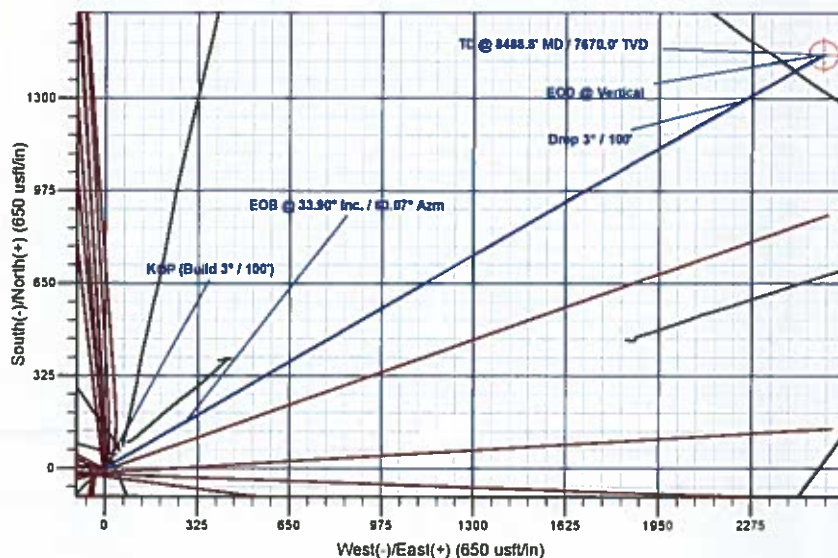
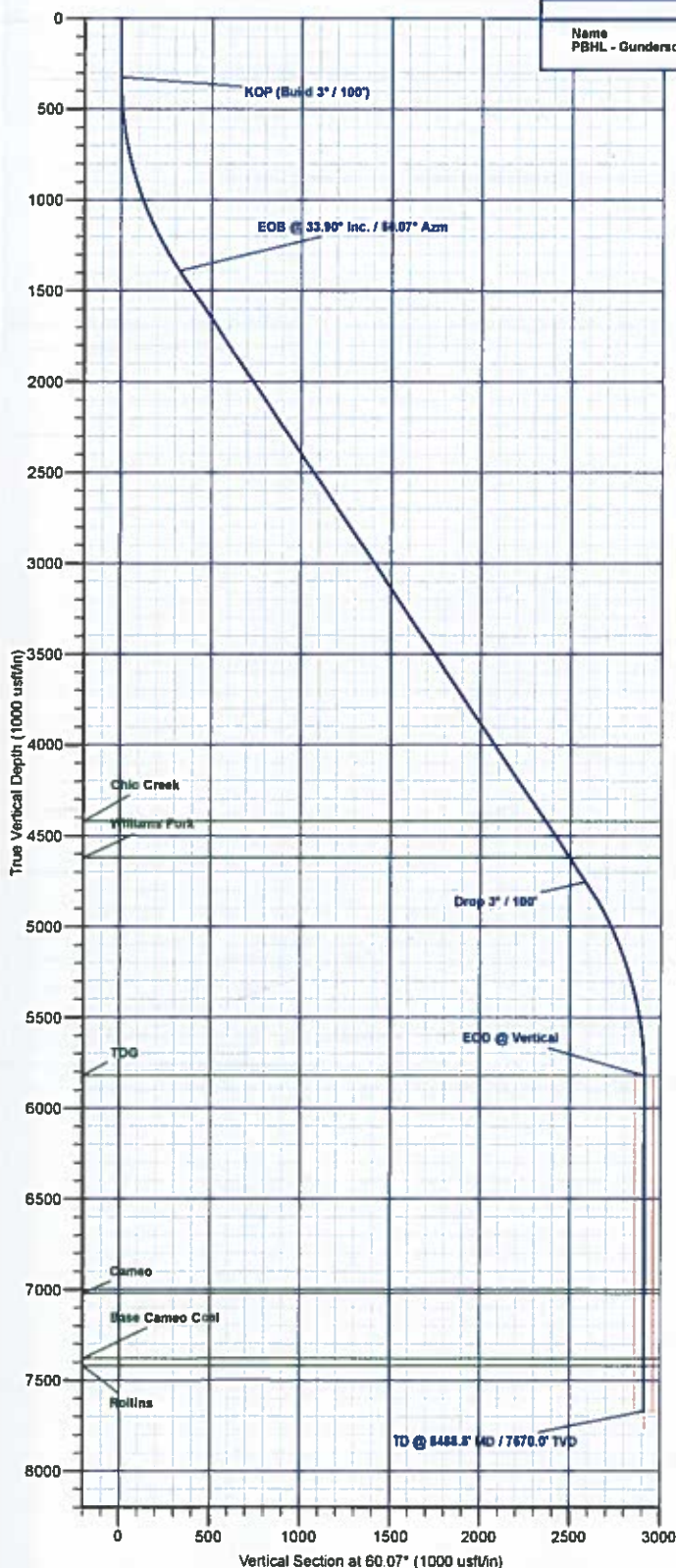
Co-ordinate (NE) Reference: Well Gunderson 0994-13-10E, True North  
 Vertical (TVD) Reference: well @ 7302.0usft (H&P #522)  
 Section (VS) Reference: Slot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7302.0usft (H&P #522)  
 Calculation Method: Minimum Curvature

#### 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
4420.0	5105.4	Ohio Creek
4620.0	5346.4	Williams Fork
5820.0	6638.8	TOG
7020.0	7838.8	Cameo
7360.0	8198.8	Base Cameo Coal
7420.0	8238.8	Rollins



Plan: Design #1 (Gunderson 0994-13-10E/Wellbore #1)

Created By: Will Jircik

Date: 14:20, October 10 2017



# **Laramie Energy, LLC**

**Mesa County, CO**

**Gunderson 13-11 Pad**

**Gunderson 0994-13-10E**

**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 0994-13-10E
<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 0994-13-10E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

Project		Mesa 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		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 0994-13-10E					
Well Position	+N/-S	-23.2 usft	Northing:	1,533,139.33 usft	Latitude:	39.273884
	+E/-W	-8.3 usft	Easting:	2,339,093.79 usft	Longitude:	-107.834864
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	7,272.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/5/2017	9.57	65.43	51,385.84746945

Design	Design #1			
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	60.07

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	
325.0	0.00	0.00	325.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,455.1	33.90	60.07	1,390.3	162.0	281.4	3.00	3.00	0.00	60.07	
5,508.7	33.90	60.07	4,754.7	1,290.3	2,240.8	0.00	0.00	0.00	0.00	
6,638.8	0.00	0.00	5,820.0	1,452.3	2,522.2	3.00	-3.00	0.00	180.00	
8,488.8	0.00	0.00	7,670.0	1,452.3	2,522.2	0.00	0.00	0.00	0.00	PBHL - Gunderson 0E





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Gunderson 0994-13-10E
<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 0994-13-10E	<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
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
<b>KOP (Build 3° / 100')</b>									
325.0	0.00	0.00	325.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	2.25	60.07	400.0	0.7	1.3	1.5	3.00	3.00	0.00
500.0	5.25	60.07	499.8	4.0	6.9	8.0	3.00	3.00	0.00
600.0	8.25	60.07	599.1	9.9	17.1	19.8	3.00	3.00	0.00
700.0	11.25	60.07	697.6	18.3	31.8	36.7	3.00	3.00	0.00
800.0	14.25	60.07	795.1	29.3	50.9	58.8	3.00	3.00	0.00
900.0	17.25	60.07	891.4	42.9	74.4	85.9	3.00	3.00	0.00
1,000.0	20.25	60.07	986.0	58.9	102.3	118.0	3.00	3.00	0.00
1,100.0	23.25	60.07	1,078.9	77.4	134.4	155.1	3.00	3.00	0.00
1,200.0	26.25	60.07	1,169.7	98.3	170.7	197.0	3.00	3.00	0.00
1,300.0	29.25	60.07	1,258.2	121.5	211.0	243.5	3.00	3.00	0.00
1,400.0	32.25	60.07	1,344.1	147.0	255.3	294.6	3.00	3.00	0.00
<b>EOB @ 33.90° Inc. / 60.07° Azm</b>									
1,455.1	33.90	60.07	1,390.3	162.0	281.4	324.7	3.00	3.00	0.00
1,500.0	33.90	60.07	1,427.6	174.5	303.1	349.8	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	33.90	60.07	1,452.5	182.9	317.6	366.5	0.00	0.00	0.00
1,600.0	33.90	60.07	1,510.6	202.4	351.4	405.5	0.00	0.00	0.00
1,700.0	33.90	60.07	1,593.6	230.2	399.8	461.3	0.00	0.00	0.00
1,800.0	33.90	60.07	1,676.6	258.0	448.1	517.1	0.00	0.00	0.00
1,900.0	33.90	60.07	1,759.6	285.9	496.5	572.9	0.00	0.00	0.00
2,000.0	33.90	60.07	1,842.6	313.7	544.8	628.6	0.00	0.00	0.00
2,100.0	33.90	60.07	1,925.6	341.5	593.1	684.4	0.00	0.00	0.00
2,200.0	33.90	60.07	2,008.6	369.4	641.5	740.2	0.00	0.00	0.00
2,300.0	33.90	60.07	2,091.6	397.2	689.8	796.0	0.00	0.00	0.00
2,400.0	33.90	60.07	2,174.6	425.0	738.1	851.8	0.00	0.00	0.00
2,500.0	33.90	60.07	2,257.6	452.9	786.5	907.5	0.00	0.00	0.00
2,600.0	33.90	60.07	2,340.5	480.7	834.8	963.3	0.00	0.00	0.00
2,700.0	33.90	60.07	2,423.5	508.5	883.2	1,019.1	0.00	0.00	0.00
2,800.0	33.90	60.07	2,506.5	536.3	931.5	1,074.9	0.00	0.00	0.00
2,900.0	33.90	60.07	2,589.5	564.2	979.8	1,130.6	0.00	0.00	0.00
3,000.0	33.90	60.07	2,672.5	592.0	1,028.2	1,186.4	0.00	0.00	0.00
3,100.0	33.90	60.07	2,755.5	619.8	1,076.5	1,242.2	0.00	0.00	0.00
3,200.0	33.90	60.07	2,838.5	647.7	1,124.8	1,298.0	0.00	0.00	0.00
3,300.0	33.90	60.07	2,921.5	675.5	1,173.2	1,353.8	0.00	0.00	0.00
3,400.0	33.90	60.07	3,004.5	703.3	1,221.5	1,409.5	0.00	0.00	0.00
3,500.0	33.90	60.07	3,087.5	731.2	1,269.9	1,465.3	0.00	0.00	0.00
3,600.0	33.90	60.07	3,170.5	759.0	1,318.2	1,521.1	0.00	0.00	0.00
3,700.0	33.90	60.07	3,253.5	786.8	1,366.5	1,576.9	0.00	0.00	0.00
3,800.0	33.90	60.07	3,336.5	814.7	1,414.9	1,632.7	0.00	0.00	0.00
3,900.0	33.90	60.07	3,419.5	842.5	1,463.2	1,688.4	0.00	0.00	0.00
4,000.0	33.90	60.07	3,502.5	870.3	1,511.5	1,744.2	0.00	0.00	0.00
4,100.0	33.90	60.07	3,585.5	898.2	1,559.9	1,800.0	0.00	0.00	0.00
4,200.0	33.90	60.07	3,668.5	926.0	1,608.2	1,855.8	0.00	0.00	0.00
4,300.0	33.90	60.07	3,751.5	953.8	1,656.6	1,911.5	0.00	0.00	0.00
4,400.0	33.90	60.07	3,834.5	981.7	1,704.9	1,967.3	0.00	0.00	0.00
4,500.0	33.90	60.07	3,917.5	1,009.5	1,753.2	2,023.1	0.00	0.00	0.00
4,600.0	33.90	60.07	4,000.5	1,037.3	1,801.6	2,078.9	0.00	0.00	0.00



# Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well Gunderson 0994-13-10E
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 0994-13-10E	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)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.0	33.90	60.07	4,083.5	1,065.2	1,849.9	2,134.7	0.00	0.00	0.00
4,800.0	33.90	60.07	4,166.5	1,093.0	1,898.2	2,190.4	0.00	0.00	0.00
4,900.0	33.90	60.07	4,249.5	1,120.8	1,946.6	2,246.2	0.00	0.00	0.00
5,000.0	33.90	60.07	4,332.5	1,148.7	1,994.9	2,302.0	0.00	0.00	0.00
5,100.0	33.90	60.07	4,415.5	1,176.5	2,043.3	2,357.8	0.00	0.00	0.00
<b>Ohio Creek</b>									
5,105.4	33.90	60.07	4,420.0	1,178.0	2,045.9	2,360.8	0.00	0.00	0.00
5,200.0	33.90	60.07	4,498.5	1,204.3	2,091.6	2,413.6	0.00	0.00	0.00
5,300.0	33.90	60.07	4,581.5	1,232.2	2,139.9	2,469.3	0.00	0.00	0.00
<b>Williams Fork</b>									
5,346.4	33.90	60.07	4,620.0	1,245.1	2,162.4	2,495.2	0.00	0.00	0.00
5,400.0	33.90	60.07	4,664.5	1,260.0	2,188.3	2,525.1	0.00	0.00	0.00
5,500.0	33.90	60.07	4,747.5	1,287.8	2,236.6	2,580.9	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,508.7	33.90	60.07	4,754.7	1,290.3	2,240.8	2,585.7	0.00	0.00	0.00
5,600.0	31.16	60.07	4,831.7	1,314.8	2,283.4	2,634.8	3.00	-3.00	0.00
5,700.0	28.16	60.07	4,918.6	1,339.4	2,326.2	2,684.3	3.00	-3.00	0.00
5,800.0	25.16	60.07	5,007.9	1,361.8	2,365.1	2,729.2	3.00	-3.00	0.00
5,900.0	22.16	60.07	5,099.5	1,381.9	2,399.9	2,769.3	3.00	-3.00	0.00
6,000.0	19.16	60.07	5,193.1	1,399.5	2,430.5	2,804.6	3.00	-3.00	0.00
6,100.0	16.16	60.07	5,288.4	1,414.6	2,456.8	2,834.9	3.00	-3.00	0.00
6,200.0	13.16	60.07	5,385.1	1,427.2	2,478.7	2,860.2	3.00	-3.00	0.00
6,300.0	10.16	60.07	5,483.0	1,437.3	2,496.2	2,880.5	3.00	-3.00	0.00
6,400.0	7.16	60.07	5,581.9	1,444.8	2,509.3	2,895.5	3.00	-3.00	0.00
6,500.0	4.16	60.07	5,681.4	1,449.8	2,517.8	2,905.4	3.00	-3.00	0.00
6,600.0	1.16	60.07	5,781.2	1,452.1	2,521.9	2,910.0	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
6,638.8	0.00	0.00	5,820.0	1,452.3	2,522.2	2,910.4	3.00	-3.00	-154.95
6,700.0	0.00	0.00	5,881.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
6,800.0	0.00	0.00	5,981.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,081.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,181.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,100.0	0.00	0.00	6,281.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,200.0	0.00	0.00	6,381.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,300.0	0.00	0.00	6,481.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,400.0	0.00	0.00	6,581.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,500.0	0.00	0.00	6,681.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,600.0	0.00	0.00	6,781.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,700.0	0.00	0.00	6,881.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,800.0	0.00	0.00	6,981.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
<b>Cameo</b>									
7,838.8	0.00	0.00	7,020.0	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,081.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,181.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,281.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,198.8	0.00	0.00	7,380.0	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
8,200.0	0.00	0.00	7,381.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
<b>Rollins</b>									
8,238.8	0.00	0.00	7,420.0	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
8,300.0	0.00	0.00	7,481.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
8,400.0	0.00	0.00	7,581.2	1,452.3	2,522.2	2,910.4	0.00	0.00	0.00
<b>TD @ 8488.8' MD / 7670.0' TVD</b>									



# Well Planning Report



<b>Database:</b>	EDM 5000 1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Gunderson 0994-13-10E
<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 0994-13-10E	<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)
8,488.8	0.00	0.00	7,670.0	1,452.3	2,522.2	2,910.4	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 - Gunderson 0994	0.00	0.00	7,670.0	1,452.3	2,522.2	1,534,526.30	2,341,652.48	39.277871	-107.825954
- plan hits target center									
- Circle (radius 50.0)									

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,452.5	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,105.4	4,420.0	Ohio Creek			
5,346.4	4,620.0	Williams Fork			
6,638.8	5,820.0	TOG			
7,838.8	7,020.0	Cameo			
8,198.8	7,380.0	Base Cameo Coal			
8,238.8	7,420.0	Rollins			

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
325.0	325.0	0.0	0.0	KOP (Build 3° / 100')
1,455.1	1,390.3	162.0	281.4	EOB @ 33.90° Inc. / 60.07° Azm
5,508.7	4,754.7	1,290.3	2,240.8	Drop 3° / 100'
6,638.8	5,820.0	1,452.3	2,522.2	EOD @ Vertical
8,488.8	7,670.0	1,452.3	2,522.2	TD @ 8488.8' MD / 7670.0' TVD