



Project: Mesa County, CO  
 Site: Gunderson 13-11 Pad  
 Well: Gunderson 0994-14-17E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.273814  
 Longitude: -107.835000  
 Ground Level: 7272.0  
 well @ 7302.0ust (H&P #522)



#### SECTION DETAILS

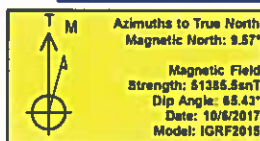
MD	Inc	Azi	TVD	+N/-S	+E/-W	Diag	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3" / 100')
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	EOB @ 34.13° Inc. / 258.01° Azm
1337.8	34.13	258.01	1271.7	-68.4	-321.8	3.00	258.01	329.0	Drop 3" / 100'
5262.6	34.13	258.01	4520.3	-625.9	-2476.0	0.00	0.00	2531.3	EOD @ Vertical
6400.3	0.00	0.00	5592.0	-594.2	-2787.9	3.00	180.00	2860.3	TD @ 8250.3' MD / 7442.0' TVD
8250.3	0.00	0.00	7442.0	-594.2	-2787.9	0.00	0.00	2860.3	

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Gunderson 0994-14-17E	7442.0	-594.2	-2787.9	1532592.68	2336242.44	39.272182	-107.844883

#### WELL DETAILS: Gunderson 0994-14-17E

+N/-S	+E/-W	7272.0	Northing	Easting	Latitude	Longitude
0.0	0.0		1533114.83	2339054.64	39.273814	-107.835000



#### REFERENCE INFORMATION

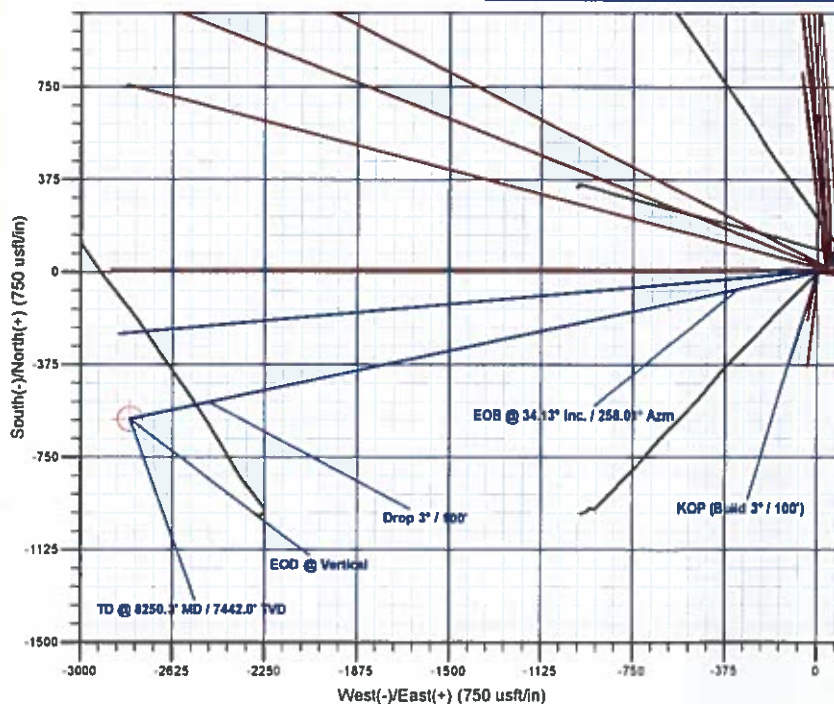
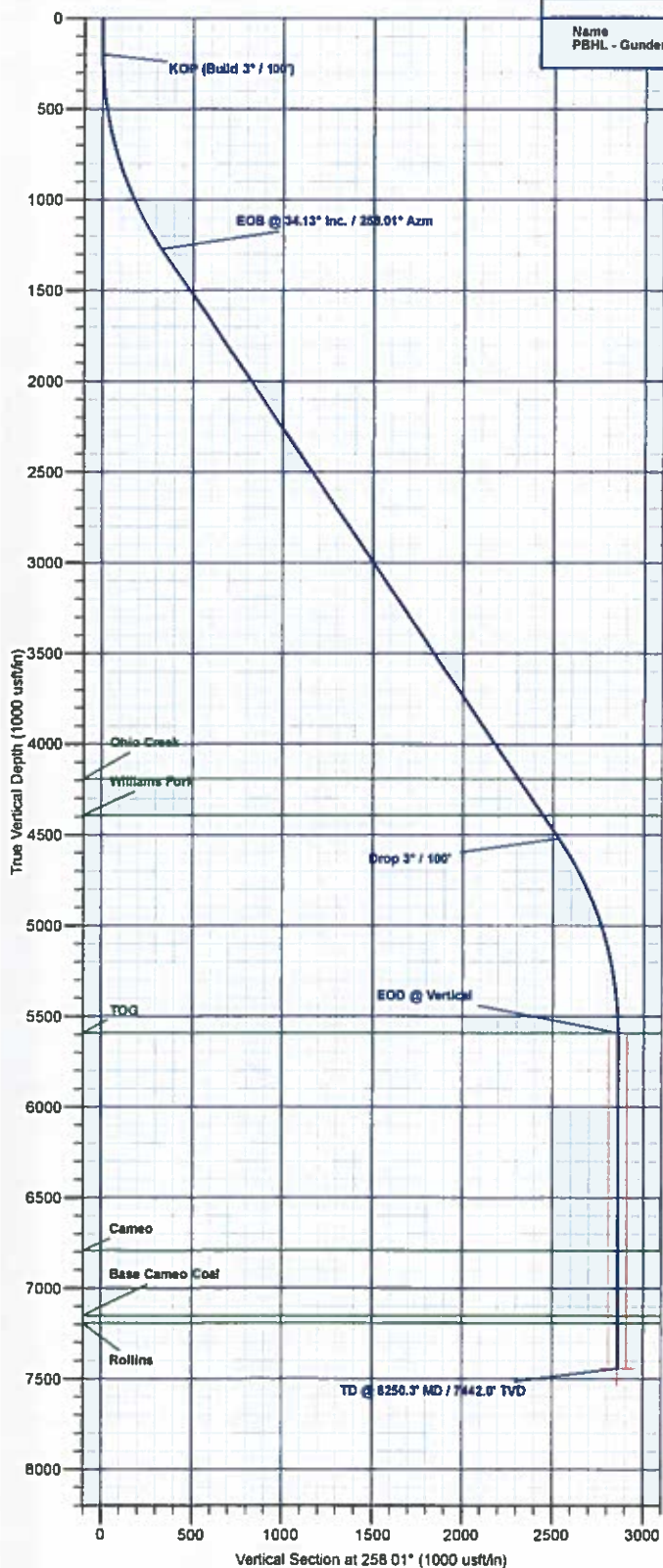
Co-ordinate (N/E) Reference: Well Gunderson 0994-14-17E, True North  
 Vertical (TVD) Reference: well @ 7302.0ust (H&P #522)  
 Section (VS) Reference: Blot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7302.0ust (H&P #522)  
 Calculation Method: Minimum Curvature

#### 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
4182.0	4865.9	Ohio Creek
4392.0	5107.5	Williams Fork
5592.0	6400.3	TOG
6792.0	7600.3	Cameo
7152.0	7950.3	Base Cameo Coal
7192.0	8000.3	Rollins



Plan: Design #1 (Gunderson 0994-14-17E/Wellbore #1)

Created By: Will Jircik

Date: 16:17, October 10 2017



# **Laramie Energy, LLC**

**Mesa County, CO**

**Gunderson 13-11 Pad**

**Gunderson 0994-14-17E**

**Wellbore #1**

**Plan: Design #1**

## **QES Well Planning Report**

**10 October, 2017**





# Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gunderson 0994-14-17E
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 0994-14-17E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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 0994-14-17E			
Well Position	+N/-S	-48.6 usft	Northing:	1,533,114.83 usft
	+E/-W	-46.8 usft	Easting:	2,339,054.65 usft
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	10/6/2017	9.57	65.43	51,385.49005371

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	258.01

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Buidl 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	
1,337.8	34.13	258.01	1,271.7	-68.4	-321.8	3.00	3.00	0.00	258.01	
5,262.6	34.13	258.01	4,520.3	-525.9	-2,476.0	0.00	0.00	0.00	0.00	
6,400.3	0.00	0.00	5,592.0	-594.2	-2,797.9	3.00	-3.00	0.00	180.00	
8,250.3	0.00	0.00	7,442.0	-594.2	-2,797.9	0.00	0.00	0.00	0.00	PBHL - Gunderson 09





## Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gunderson 0994-14-17E
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 0994-14-17E	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)
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
KOP (Build 3° / 100')									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	3.00	258.01	300.0	-0.5	-2.6	2.6	3.00	3.00	0.00
400.0	6.00	258.01	399.6	-2.2	-10.2	10.5	3.00	3.00	0.00
500.0	9.00	258.01	498.8	-4.9	-23.0	23.5	3.00	3.00	0.00
600.0	12.00	258.01	597.1	-8.7	-40.8	41.7	3.00	3.00	0.00
700.0	15.00	258.01	694.3	-13.5	-63.7	65.1	3.00	3.00	0.00
800.0	18.00	258.01	790.2	-19.4	-91.4	93.5	3.00	3.00	0.00
900.0	21.00	258.01	884.4	-26.4	-124.1	126.9	3.00	3.00	0.00
1,000.0	24.00	258.01	976.8	-34.3	-161.5	165.1	3.00	3.00	0.00
1,100.0	27.00	258.01	1,067.1	-43.2	-203.6	208.2	3.00	3.00	0.00
1,200.0	30.00	258.01	1,154.9	-53.2	-250.3	255.9	3.00	3.00	0.00
1,300.0	33.00	258.01	1,240.2	-64.0	-301.4	308.1	3.00	3.00	0.00
EOB @ 34.13° Inc. / 258.01° Azm									
1,337.8	34.13	258.01	1,271.7	-68.4	-321.8	329.0	3.00	3.00	0.00
1,400.0	34.13	258.01	1,323.2	-75.6	-356.0	363.9	0.00	0.00	0.00
1,500.0	34.13	258.01	1,405.9	-87.3	-410.9	420.0	0.00	0.00	0.00
8 5/8"									
1,530.0	34.13	258.01	1,430.8	-90.8	-427.3	436.9	0.00	0.00	0.00
1,600.0	34.13	258.01	1,488.7	-98.9	-465.8	476.1	0.00	0.00	0.00
1,700.0	34.13	258.01	1,571.5	-110.6	-520.6	532.3	0.00	0.00	0.00
1,800.0	34.13	258.01	1,654.3	-122.2	-575.5	588.4	0.00	0.00	0.00
1,900.0	34.13	258.01	1,737.0	-133.9	-630.4	644.5	0.00	0.00	0.00
2,000.0	34.13	258.01	1,819.8	-145.6	-685.3	700.6	0.00	0.00	0.00
2,100.0	34.13	258.01	1,902.6	-157.2	-740.2	756.7	0.00	0.00	0.00
2,200.0	34.13	258.01	1,985.4	-168.9	-795.1	812.8	0.00	0.00	0.00
2,300.0	34.13	258.01	2,068.1	-180.5	-850.0	868.9	0.00	0.00	0.00
2,400.0	34.13	258.01	2,150.9	-192.2	-904.9	925.0	0.00	0.00	0.00
2,500.0	34.13	258.01	2,233.7	-203.8	-959.7	981.1	0.00	0.00	0.00
2,600.0	34.13	258.01	2,316.4	-215.5	-1,014.6	1,037.3	0.00	0.00	0.00
2,700.0	34.13	258.01	2,399.2	-227.2	-1,069.5	1,093.4	0.00	0.00	0.00
2,800.0	34.13	258.01	2,482.0	-238.8	-1,124.4	1,149.5	0.00	0.00	0.00
2,900.0	34.13	258.01	2,564.8	-250.5	-1,179.3	1,205.6	0.00	0.00	0.00
3,000.0	34.13	258.01	2,647.5	-262.1	-1,234.2	1,261.7	0.00	0.00	0.00
3,100.0	34.13	258.01	2,730.3	-273.8	-1,289.1	1,317.8	0.00	0.00	0.00
3,200.0	34.13	258.01	2,813.1	-285.4	-1,344.0	1,373.9	0.00	0.00	0.00
3,300.0	34.13	258.01	2,895.9	-297.1	-1,398.8	1,430.0	0.00	0.00	0.00
3,400.0	34.13	258.01	2,978.6	-308.8	-1,453.7	1,486.2	0.00	0.00	0.00
3,500.0	34.13	258.01	3,061.4	-320.4	-1,508.6	1,542.3	0.00	0.00	0.00
3,600.0	34.13	258.01	3,144.2	-332.1	-1,563.5	1,598.4	0.00	0.00	0.00
3,700.0	34.13	258.01	3,227.0	-343.7	-1,618.4	1,654.5	0.00	0.00	0.00
3,800.0	34.13	258.01	3,309.7	-355.4	-1,673.3	1,710.6	0.00	0.00	0.00
3,900.0	34.13	258.01	3,392.5	-367.0	-1,728.2	1,766.7	0.00	0.00	0.00
4,000.0	34.13	258.01	3,475.3	-378.7	-1,783.0	1,822.8	0.00	0.00	0.00
4,100.0	34.13	258.01	3,558.1	-390.4	-1,837.9	1,878.9	0.00	0.00	0.00
4,200.0	34.13	258.01	3,640.8	-402.0	-1,892.8	1,935.0	0.00	0.00	0.00
4,300.0	34.13	258.01	3,723.6	-413.7	-1,947.7	1,991.2	0.00	0.00	0.00
4,400.0	34.13	258.01	3,806.4	-425.3	-2,002.6	2,047.3	0.00	0.00	0.00
4,500.0	34.13	258.01	3,889.1	-437.0	-2,057.5	2,103.4	0.00	0.00	0.00
4,600.0	34.13	258.01	3,971.9	-448.7	-2,112.4	2,159.5	0.00	0.00	0.00
4,700.0	34.13	258.01	4,054.7	-460.3	-2,167.3	2,215.6	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 0994-14-17E
<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 0994-14-17E	<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)
4,800.0	34.13	258.01	4,137.5	-472.0	-2,222.1	2,271.7	0.00	0.00	0.00
<b>Ohio Creek</b>									
4,865.9	34.13	258.01	4,192.0	-479.6	-2,258.3	2,308.7	0.00	0.00	0.00
4,900.0	34.13	258.01	4,220.2	-483.6	-2,277.0	2,327.8	0.00	0.00	0.00
5,000.0	34.13	258.01	4,303.0	-495.3	-2,331.9	2,383.9	0.00	0.00	0.00
5,100.0	34.13	258.01	4,385.8	-506.9	-2,386.8	2,440.1	0.00	0.00	0.00
<b>Williams Fork</b>									
5,107.5	34.13	258.01	4,392.0	-507.8	-2,390.9	2,444.3	0.00	0.00	0.00
5,200.0	34.13	258.01	4,468.6	-518.6	-2,441.7	2,496.2	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,262.6	34.13	258.01	4,520.3	-525.9	-2,476.0	2,531.3	0.00	0.00	0.00
5,300.0	33.01	258.01	4,551.5	-530.2	-2,496.3	2,552.0	3.00	-3.00	0.00
5,400.0	30.01	258.01	4,636.8	-541.0	-2,547.4	2,604.2	3.00	-3.00	0.00
5,500.0	27.01	258.01	4,724.6	-551.0	-2,594.1	2,652.0	3.00	-3.00	0.00
5,600.0	24.01	258.01	4,814.9	-559.9	-2,636.2	2,695.0	3.00	-3.00	0.00
5,700.0	21.01	258.01	4,907.3	-567.9	-2,673.7	2,733.3	3.00	-3.00	0.00
5,800.0	18.01	258.01	5,001.5	-574.8	-2,706.3	2,766.7	3.00	-3.00	0.00
5,900.0	15.01	258.01	5,097.4	-580.7	-2,734.1	2,795.1	3.00	-3.00	0.00
6,000.0	12.01	258.01	5,194.6	-585.6	-2,757.0	2,818.5	3.00	-3.00	0.00
6,100.0	9.01	258.01	5,292.9	-589.3	-2,774.8	2,836.7	3.00	-3.00	0.00
6,200.0	6.01	258.01	5,392.0	-592.1	-2,787.6	2,849.8	3.00	-3.00	0.00
6,300.0	3.01	258.01	5,491.7	-593.7	-2,795.3	2,857.6	3.00	-3.00	0.00
6,400.0	0.01	258.01	5,591.7	-594.2	-2,797.9	2,860.3	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
6,400.3	0.00	0.00	5,592.0	-594.2	-2,797.9	2,860.3	3.00	-3.00	0.00
6,500.0	0.00	0.00	5,691.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
6,600.0	0.00	0.00	5,791.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
6,700.0	0.00	0.00	5,891.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
6,800.0	0.00	0.00	5,991.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
6,900.0	0.00	0.00	6,091.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,000.0	0.00	0.00	6,191.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,100.0	0.00	0.00	6,291.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,200.0	0.00	0.00	6,391.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,300.0	0.00	0.00	6,491.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,400.0	0.00	0.00	6,591.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,500.0	0.00	0.00	6,691.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,600.0	0.00	0.00	6,791.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
<b>Cameo</b>									
7,600.3	0.00	0.00	6,792.0	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,700.0	0.00	0.00	6,891.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,800.0	0.00	0.00	6,991.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,091.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
7,960.3	0.00	0.00	7,152.0	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,191.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
<b>Rollins</b>									
8,000.3	0.00	0.00	7,192.0	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
8,100.0	0.00	0.00	7,291.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
8,200.0	0.00	0.00	7,391.7	-594.2	-2,797.9	2,860.3	0.00	0.00	0.00
<b>TD @ 8250.3' MD / 7442.0' TVD</b>									
8,250.3	0.00	0.00	7,442.0	-594.2	-2,797.9	2,860.3	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 0994-14-17E
<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 0994-14-17E	<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	7,442.0	-594.2	-2,797.9	1,532,592.69	2,336,242.44	39 272182	-107 844883

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,430.8	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,865.9	4,192.0	Ohio Creek			
5,107.5	4,392.0	Williams Fork			
6,400.3	5,592.0	TOG			
7,600.3	6,792.0	Cameo			
7,960.3	7,152.0	Base Cameo Coal			
8,000.3	7,192.0	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')
1,337.8	1,271.7	-68.4	-321.8	EOB @ 34.13° Inc. / 258.01° Azm
5,262.6	4,520.3	-525.9	-2,476.0	Drop 3" / 100'
6,400.3	5,592.0	-594.2	-2,797.9	EOD @ Vertical
8,250.3	7,442.0	-594.2	-2,797.9	TD @ 8250.3' MD / 7442.0' TVD