



Project: Mesa County, CO
 Site: Gunderson 13-11 Pad
 Well: Gunderson 0994-13-16E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.273824
 Longitude: -107.834937
 Ground Level: 7272.0
 well @ 7302.0ust (H&P #522)



SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dieg	TFace	V/Sect	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')
1176.6	29.30	91.96	1134.6	-8.4	244.2	3.00	91.96	244.3	EOB @ 29.30° Inc. / 91.96° Azm
6451.2	29.30	91.96	4862.4	-80.0	2334.8	0.00	0.00	2336.2	Drop 3" / 100'
6427.8	0.00	0.00	6797.0	-88.4	2579.0	3.00	180.00	2580.5	EOO @ Vertical
8927.8	0.00	0.00	8197.0	-88.4	2579.0	0.00	0.00	2580.5	TD @ 8427.8' MD / 8197.0' TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Gunderson 0994-13-16E	8197.0	-88.4	2579.0	1532963.39	2341648.41	39.273561	-107.825827

WELL DETAILS: Gunderson 0994-13-16E

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1533118.01	2339072.57	39.273824	-107.834937

REFERENCE INFORMATION

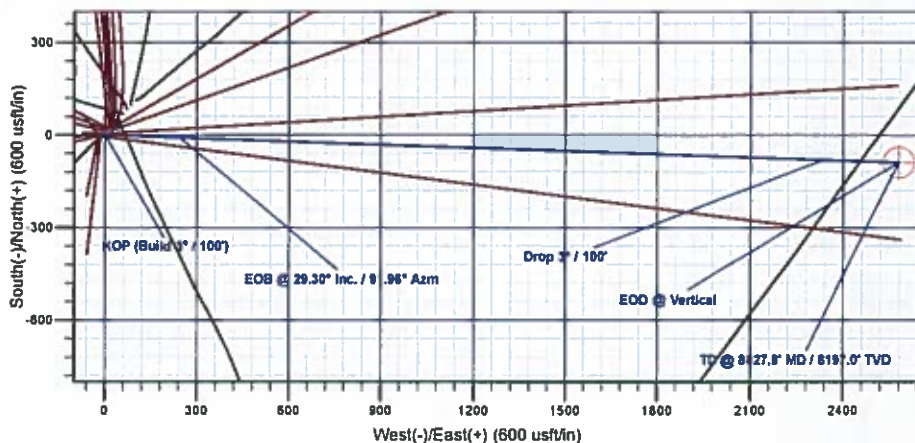
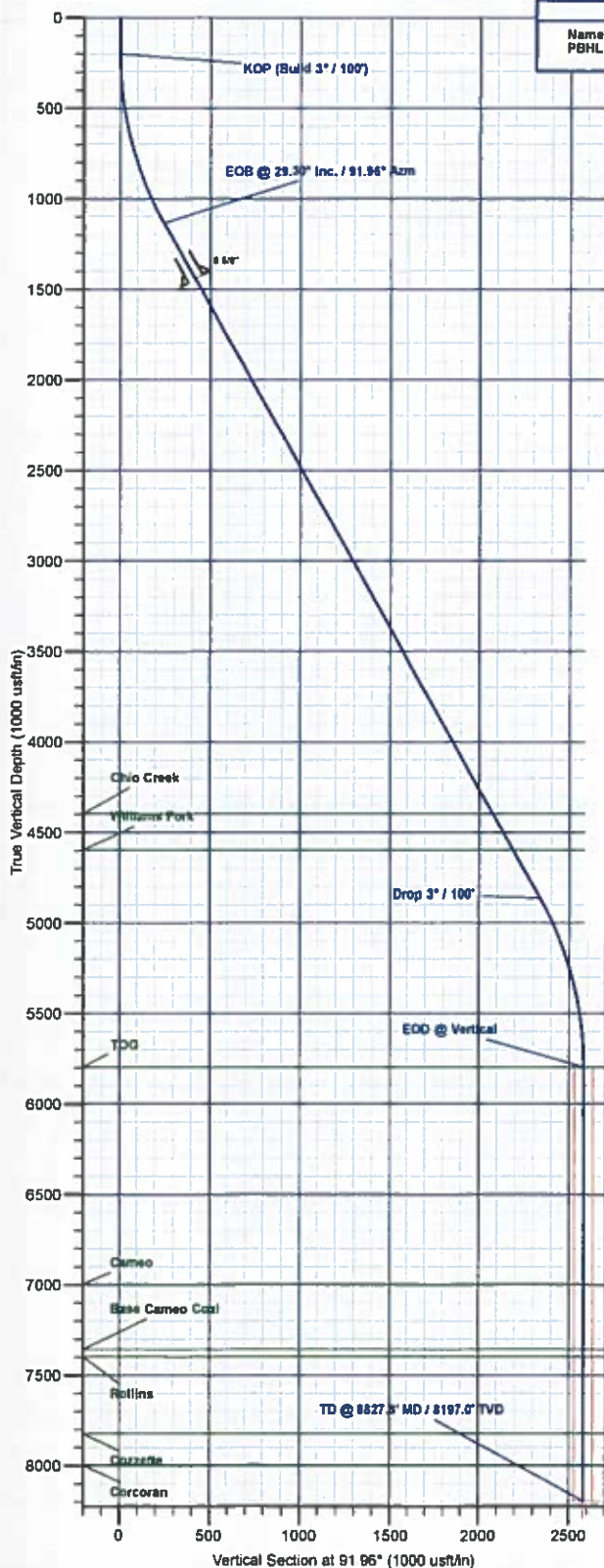
Co-ordinate (N/E) Reference: Well Gunderson 0994-13-16E, True North
 Vertical (TVD) Reference: well @ 7302.0ust (H&P #522)
 Section (V/S) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7302.0ust (H&P #522)
 Calculation Method: Minimum Curvature

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
4397.0	4917.6	Ohio Creek
4597.0	5146.9	Williams Fork
5797.0	6427.8	TOG
6997.0	7627.8	Cameo
7397.0	7987.8	Base Cameo Coal
7397.0	8027.8	Rollins
7822.0	8452.8	Cozzette
7997.0	8627.8	Corcoran



Plan: Design #1 (Gunderson 0994-13-16E/Wellbore #1)

Created By: Will Jircik Date: 16:28, October 10 2017



Laramie Energy, LLC

Mesa County, CO

Gunderson 13-11 Pad

Gunderson 0994-13-16E

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 0994-13-16E
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 0994-13-16E	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 0994-13-16E			
Well Position	+N/-S	-45.0 usft	Northing:	1,533,118.01 usft
	+E/-W	-29.0 usft	Easting:	2,339,072.57 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	
			Ground Level:	7,272.0 usft

Wellbore	Wellbore #1			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/6/2017	9.57	65.43	51,385.50342732

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	91.96

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,176.6	29.30	91.96	1,134.6	-8.4	244.2	3.00	3.00	0.00	91.96	
5,451.2	29.30	91.96	4,862.4	-80.0	2,334.8	0.00	0.00	0.00	0.00	
6,427.8	0.00	0.00	5,797.0	-88.4	2,579.0	3.00	-3.00	0.00	180.00	
8,827.8	0.00	0.00	8,197.0	-88.4	2,579.0	0.00	0.00	0.00	0.00	PBHL - Gunderson 05



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well Gunderson 0994-13-16E
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 0994-13-16E	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	91.96	300.0	-0.1	2.6	2.6	3.00	3.00	0.00
400.0	6.00	91.96	399.6	-0.4	10.5	10.5	3.00	3.00	0.00
500.0	9.00	91.96	498.8	-0.8	23.5	23.5	3.00	3.00	0.00
600.0	12.00	91.96	597.1	-1.4	41.7	41.7	3.00	3.00	0.00
700.0	15.00	91.96	694.3	-2.2	65.0	65.1	3.00	3.00	0.00
800.0	18.00	91.96	790.2	-3.2	93.4	93.5	3.00	3.00	0.00
900.0	21.00	91.96	884.4	-4.3	126.8	126.9	3.00	3.00	0.00
1,000.0	24.00	91.96	976.8	-5.7	165.0	165.1	3.00	3.00	0.00
1,100.0	27.00	91.96	1,067.1	-7.1	208.0	208.2	3.00	3.00	0.00
EOB @ 29.30° Inc. / 91.96° Azm									
1,176.6	29.30	91.96	1,134.6	-8.4	244.2	244.3	3.00	3.00	0.00
1,200.0	29.30	91.96	1,155.0	-8.8	255.6	255.7	0.00	0.00	0.00
1,300.0	29.30	91.96	1,242.2	-10.4	304.5	304.7	0.00	0.00	0.00
1,400.0	29.30	91.96	1,329.4	-12.1	353.4	353.6	0.00	0.00	0.00
1,500.0	29.30	91.96	1,416.6	-13.8	402.3	402.6	0.00	0.00	0.00
8 5/8"									
1,530.0	29.30	91.96	1,442.8	-14.3	417.0	417.2	0.00	0.00	0.00
1,600.0	29.30	91.96	1,503.8	-15.5	451.2	451.5	0.00	0.00	0.00
1,700.0	29.30	91.96	1,591.0	-17.1	500.1	500.4	0.00	0.00	0.00
1,800.0	29.30	91.96	1,678.2	-18.8	549.0	549.4	0.00	0.00	0.00
1,900.0	29.30	91.96	1,765.5	-20.5	598.0	598.3	0.00	0.00	0.00
2,000.0	29.30	91.96	1,852.7	-22.2	646.9	647.2	0.00	0.00	0.00
2,100.0	29.30	91.96	1,939.9	-23.8	695.8	696.2	0.00	0.00	0.00
2,200.0	29.30	91.96	2,027.1	-25.5	744.7	745.1	0.00	0.00	0.00
2,300.0	29.30	91.96	2,114.3	-27.2	793.6	794.1	0.00	0.00	0.00
2,400.0	29.30	91.96	2,201.5	-28.9	842.5	843.0	0.00	0.00	0.00
2,500.0	29.30	91.96	2,288.7	-30.5	891.4	891.9	0.00	0.00	0.00
2,600.0	29.30	91.96	2,375.9	-32.2	940.3	940.9	0.00	0.00	0.00
2,700.0	29.30	91.96	2,463.1	-33.9	989.2	989.8	0.00	0.00	0.00
2,800.0	29.30	91.96	2,550.3	-35.6	1,038.1	1,038.7	0.00	0.00	0.00
2,900.0	29.30	91.96	2,637.5	-37.2	1,087.0	1,087.7	0.00	0.00	0.00
3,000.0	29.30	91.96	2,724.7	-38.9	1,136.0	1,136.6	0.00	0.00	0.00
3,100.0	29.30	91.96	2,811.9	-40.6	1,184.9	1,185.6	0.00	0.00	0.00
3,200.0	29.30	91.96	2,899.2	-42.3	1,233.8	1,234.5	0.00	0.00	0.00
3,300.0	29.30	91.96	2,986.4	-44.0	1,282.7	1,283.4	0.00	0.00	0.00
3,400.0	29.30	91.96	3,073.6	-45.6	1,331.6	1,332.4	0.00	0.00	0.00
3,500.0	29.30	91.96	3,160.8	-47.3	1,380.5	1,381.3	0.00	0.00	0.00
3,600.0	29.30	91.96	3,248.0	-49.0	1,429.4	1,430.2	0.00	0.00	0.00
3,700.0	29.30	91.96	3,335.2	-50.7	1,478.3	1,479.2	0.00	0.00	0.00
3,800.0	29.30	91.96	3,422.4	-52.3	1,527.2	1,528.1	0.00	0.00	0.00
3,900.0	29.30	91.96	3,509.6	-54.0	1,576.1	1,577.1	0.00	0.00	0.00
4,000.0	29.30	91.96	3,596.8	-55.7	1,625.0	1,626.0	0.00	0.00	0.00
4,100.0	29.30	91.96	3,684.0	-57.4	1,673.9	1,674.9	0.00	0.00	0.00
4,200.0	29.30	91.96	3,771.2	-59.0	1,722.9	1,723.9	0.00	0.00	0.00
4,300.0	29.30	91.96	3,858.4	-60.7	1,771.8	1,772.8	0.00	0.00	0.00
4,400.0	29.30	91.96	3,945.6	-62.4	1,820.7	1,821.7	0.00	0.00	0.00
4,500.0	29.30	91.96	4,032.8	-64.1	1,869.6	1,870.7	0.00	0.00	0.00
4,600.0	29.30	91.96	4,120.1	-65.7	1,918.5	1,919.6	0.00	0.00	0.00
4,700.0	29.30	91.96	4,207.3	-67.4	1,967.4	1,968.5	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 0994-13-16E
 Wellbore: Wellbore #1
 Design: Design #1

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

Well Gunderson 0994-13-16E
 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	29.30	91.96	4,294.5	-69.1	2,016.3	2,017.5	0.00	0.00	0.00
4,900.0	29.30	91.96	4,381.7	-70.8	2,065.2	2,066.4	0.00	0.00	0.00
Ohio Creek									
4,917.6	29.30	91.96	4,397.0	-71.1	2,073.8	2,075.0	0.00	0.00	0.00
5,000.0	29.30	91.96	4,468.9	-72.4	2,114.1	2,115.4	0.00	0.00	0.00
5,100.0	29.30	91.96	4,556.1	-74.1	2,163.0	2,164.3	0.00	0.00	0.00
Williams Fork									
5,146.9	29.30	91.96	4,597.0	-74.9	2,186.0	2,187.3	0.00	0.00	0.00
5,200.0	29.30	91.96	4,643.3	-75.8	2,211.9	2,213.2	0.00	0.00	0.00
5,300.0	29.30	91.96	4,730.5	-77.5	2,260.8	2,262.2	0.00	0.00	0.00
5,400.0	29.30	91.96	4,817.7	-79.1	2,309.8	2,311.1	0.00	0.00	0.00
Drop 3° / 100'									
5,451.2	29.30	91.96	4,862.4	-80.0	2,334.8	2,336.2	0.00	0.00	0.00
5,500.0	27.84	91.96	4,905.2	-80.8	2,358.1	2,359.5	3.00	-3.00	0.00
5,600.0	24.84	91.96	4,994.8	-82.3	2,402.4	2,403.9	3.00	-3.00	0.00
5,700.0	21.84	91.96	5,086.6	-83.7	2,442.0	2,443.5	3.00	-3.00	0.00
5,800.0	18.84	91.96	5,180.4	-84.9	2,476.8	2,478.2	3.00	-3.00	0.00
5,900.0	15.84	91.96	5,275.8	-85.9	2,506.5	2,508.0	3.00	-3.00	0.00
6,000.0	12.84	91.96	5,372.7	-86.7	2,531.3	2,532.8	3.00	-3.00	0.00
6,100.0	9.84	91.96	5,470.8	-87.4	2,550.9	2,552.4	3.00	-3.00	0.00
6,200.0	6.84	91.96	5,569.7	-87.9	2,565.4	2,566.9	3.00	-3.00	0.00
6,300.0	3.84	91.96	5,669.3	-88.2	2,574.7	2,576.2	3.00	-3.00	0.00
6,400.0	0.84	91.96	5,769.2	-88.4	2,578.8	2,580.3	3.00	-3.00	0.00
EOD @ Vertical - TOG									
6,427.8	0.00	0.00	5,797.0	-88.4	2,579.0	2,580.5	3.00	-3.00	-330.26
6,500.0	0.00	0.00	5,869.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
6,600.0	0.00	0.00	5,969.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
6,700.0	0.00	0.00	6,069.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
6,800.0	0.00	0.00	6,169.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
6,900.0	0.00	0.00	6,269.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,000.0	0.00	0.00	6,369.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,100.0	0.00	0.00	6,469.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,200.0	0.00	0.00	6,569.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,300.0	0.00	0.00	6,669.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,400.0	0.00	0.00	6,769.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,500.0	0.00	0.00	6,869.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,600.0	0.00	0.00	6,969.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
Cameo									
7,627.8	0.00	0.00	6,997.0	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,700.0	0.00	0.00	7,069.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,800.0	0.00	0.00	7,169.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,269.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
Base Cameo Coal									
7,987.8	0.00	0.00	7,357.0	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,369.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
Rollins									
8,027.8	0.00	0.00	7,397.0	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,100.0	0.00	0.00	7,469.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,200.0	0.00	0.00	7,569.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,300.0	0.00	0.00	7,669.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,400.0	0.00	0.00	7,769.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
Cozzette									
8,452.8	0.00	0.00	7,822.0	-88.4	2,579.0	2,580.5	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gunderson 0994-13-16E
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 0994-13-16E	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)
8,500.0	0.00	0.00	7,869.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,600.0	0.00	0.00	7,969.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
Corcoran									
8,627.8	0.00	0.00	7,997.0	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,700.0	0.00	0.00	8,069.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
8,800.0	0.00	0.00	8,169.2	-88.4	2,579.0	2,580.5	0.00	0.00	0.00
TD @ 8827.8' MD / 8197.0' TVD									
8,827.8	0.00	0.00	8,197.0	-88.4	2,579.0	2,580.5	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	8,197.0	-88.4	2,579.0	1,532,963.40	2,341,648.42	39.273581	-107.825827
- plan hits target center									
- Circle (radius 50.0)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,530.0	1,442.8	8 5/8"	8-5/8	11	

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,917.6	4,397.0	Ohio Creek			
5,148.9	4,597.0	Williams Fork			
6,427.8	5,797.0	TOG			
7,627.8	6,997.0	Cameo			
7,987.8	7,357.0	Base Cameo Coal			
8,027.8	7,397.0	Rollins			
8,452.8	7,822.0	Cozzette			
8,627.8	7,997.0	Corcoran			

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
200.0	200.0	0.0	0.0	KOP (Build 3° / 100')
1,178.6	1,134.6	-8.4	244.2	EOB @ 29.30° Inc. / 91.96° Azm
5,451.2	4,862.4	-80.0	2,334.8	Drop 3° / 100'
6,427.8	5,797.0	-88.4	2,579.0	EOD @ Vertical
8,827.8	8,197.0	-88.4	2,579.0	TD @ 8827.8' MD / 8197.0' TVD