



Project: Mesa County, CO  
 Site: H Thomas 0993 26-06 Pad  
 Well: H. Thomas 0993-23-19W  
 Wellbore: B-5  
 Design: Design #1  
 Latitude: 39.249137  
 Longitude: -107.742583  
 Ground Level: 7631.0  
 well @ 7655.0usft (H&P #290)



#### 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

#### SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	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')
250.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	EOB @ 28.24" Inc. / 338.04" Azm
1141.3	28.24	338.04	1103.6	210.8	-85.0	3.00	338.04	227.3	Drop 3" / 100'
5974.2	28.24	338.04	5381.4	2331.5	-840.2	0.00	0.00	2813.9	EOB @ Vertical
6915.4	0.00	0.00	6265.0	2542.3	-1025.2	3.00	180.00	2741.2	TD @ 8815.4' MD / 8165.0' TVD
8815.4	0.00	0.00	8165.0	2542.3	-1025.2	0.00	0.00	2741.2	

#### DESIGN TARGET DETAILS

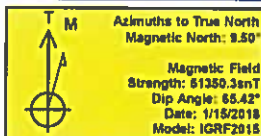
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FBHL - H. Thomas 0993-23-19W	8165.0	2542.3	-1025.2	1526037.49	2364024.80	39.256117	-107.746204

#### WELL DETAILS: H. Thomas 0993-23-19W

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1523470.69	2364986.94	39.249137	-107.742583

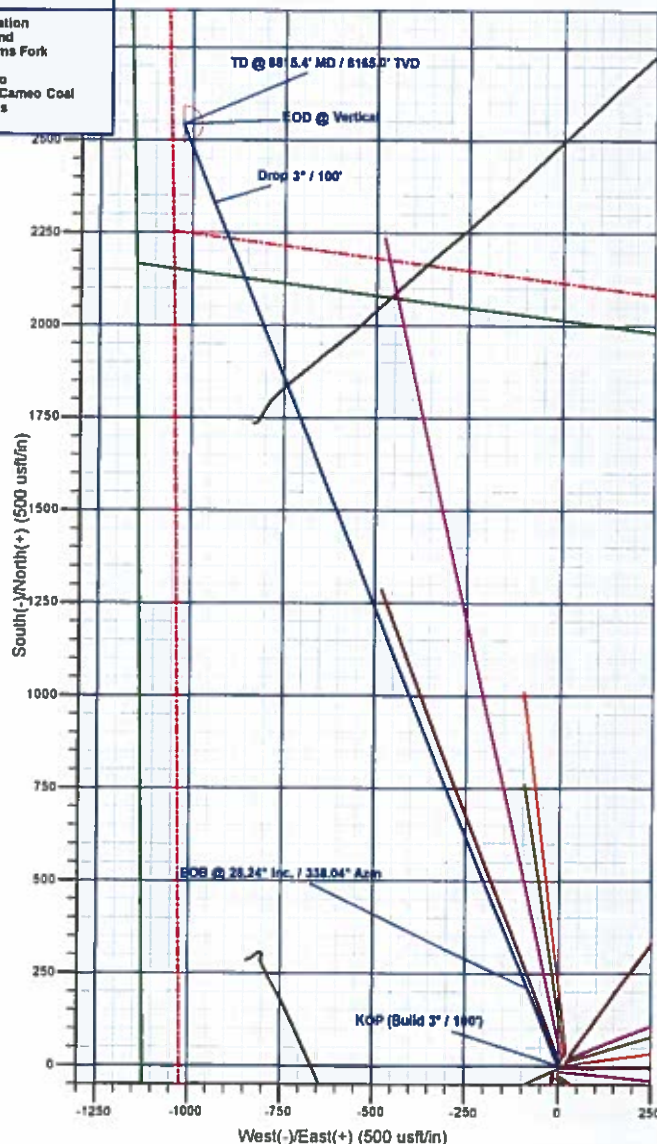
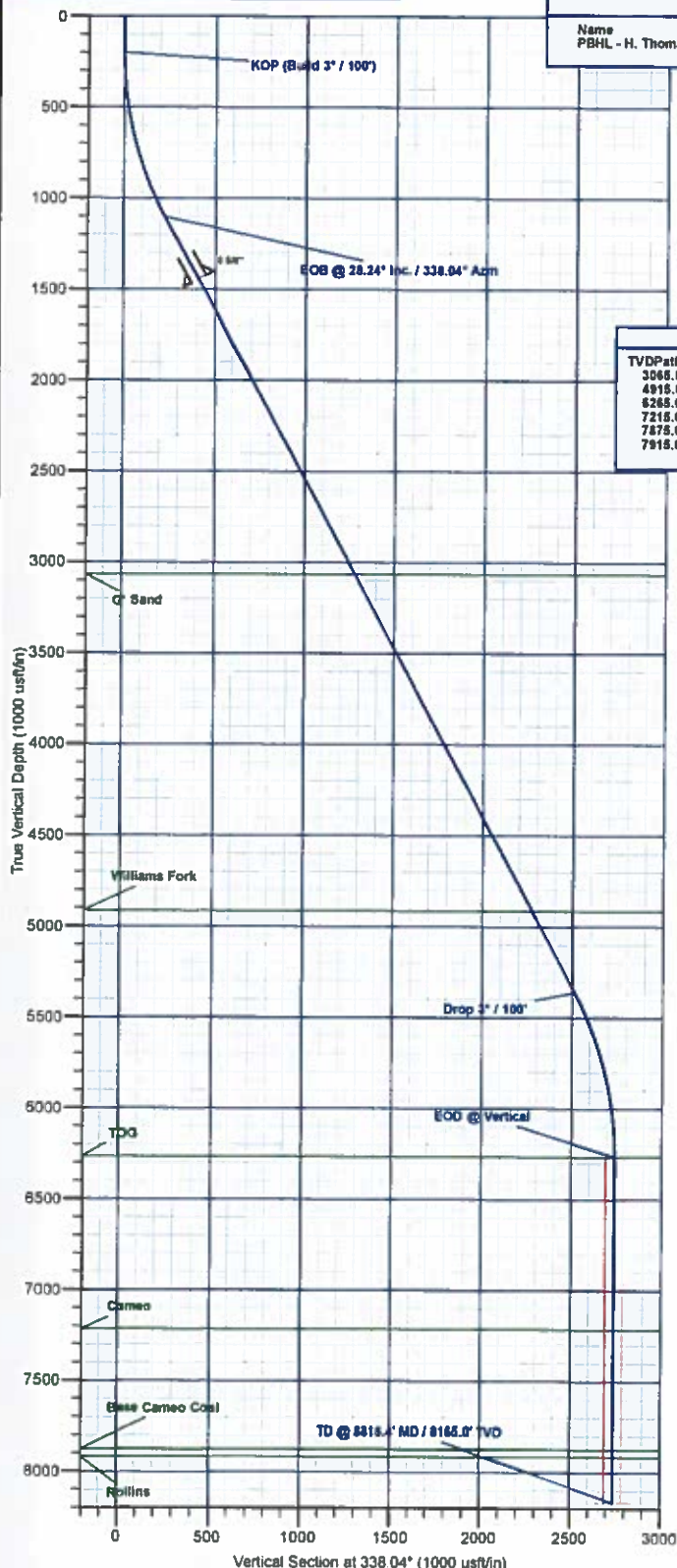
#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well H. Thomas 0993-23-19W, True North  
 Vertical (TVD) Reference: well @ 7655.0usft (H&P #290)  
 Section (VS) Reference: Slot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7655.0usft (H&P #290)  
 Calculation Method: Minimum Curvature



#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3065.0	3367.6	G' Sand
4915.0	5467.5	Williams Fork
6265.0	6915.4	TOG
7215.0	7865.4	Cameo
7675.0	8625.4	Base Cameo Coal
7915.0	8565.4	Rollins



Plan: Design #1 (H. Thomas 0993-23-19W/B-5)

Created By: Will Jircik Date: 16:19, January 18 2018



# **Laramie Energy, LLC**

**Mesa County, CO**

**H Thomas 0993 26-06 Pad**

**H. Thomas 0993-23-19W**

**B-5**

**Plan: Design #1**

## **QES Well Planning Report**

**18 January, 2018**





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well H. Thomas 0993-23-19W
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7655.0usft (H&P #290)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7655.0usft (H&P #290)
<b>Site:</b>	H Thomas 0993 26-06 Pad	<b>North Reference:</b>	True
<b>Well:</b>	H. Thomas 0993-23-19W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-5		
<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		

<b>Site</b>	H Thomas 0993 26-06 Pad			
<b>Site Position:</b>		<b>Northing:</b>	1,523,440.69 usft	<b>Latitude:</b> 39.249054
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,364,977.70 usft	<b>Longitude:</b> -107.742613
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b> -1.41°

<b>Well</b>	H. Thomas 0993-23-19W			
<b>Well Position</b>	+N/-S	30.2 usft	<b>Northing:</b>	1,523,470.70 usft
	+E/-W	8.5 usft	<b>Easting:</b>	2,364,986.94 usft
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>	<b>Ground Level:</b> 7,631.0 usft

<b>Wellbore</b>	B-5				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	1/15/2018	9.50	65.42	51,350.34371412

<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	338.04

<b>Plan Sections</b>										
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	
1,141.3	28.24	338.04	1,103.6	210.8	-85.0	3.00	3.00	0.00	338.04	
5,974.2	28.24	338.04	5,361.4	2,331.5	-940.2	0.00	0.00	0.00	0.00	
6,915.4	0.00	0.00	6,265.0	2,542.3	-1,025.2	3.00	-3.00	0.00	180.00	
8,815.4	0.00	0.00	8,165.0	2,542.3	-1,025.2	0.00	0.00	0.00	0.00	PBHL - H. Thomas 09





## Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well H. Thomas 0993-23-19W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7655 0usft (H&P #290)
Project:	Mesa County, CO	MD Reference:	well @ 7655 0usft (H&P #290)
Site:	H Thomas 0993 28-06 Pad	North Reference:	True
Well:	H. Thomas 0993-23-19W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-5		
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	338.04	300.0	2.4	-1.0	2.6	3.00	3.00	0.00
400.0	6.00	338.04	399.6	9.7	-3.9	10.5	3.00	3.00	0.00
500.0	9.00	338.04	498.8	21.8	-8.8	23.5	3.00	3.00	0.00
600.0	12.00	338.04	597.1	38.7	-15.6	41.7	3.00	3.00	0.00
700.0	15.00	338.04	694.3	60.4	-24.3	65.1	3.00	3.00	0.00
800.0	18.00	338.04	790.2	86.7	-35.0	93.5	3.00	3.00	0.00
900.0	21.00	338.04	884.4	117.6	-47.4	126.9	3.00	3.00	0.00
1,000.0	24.00	338.04	976.8	153.1	-61.8	165.1	3.00	3.00	0.00
1,100.0	27.00	338.04	1,067.1	193.1	-77.9	208.2	3.00	3.00	0.00
EOB @ 28.24° Inc. / 338.04° Azm									
1,141.3	28.24	338.04	1,103.6	210.8	-85.0	227.3	3.00	3.00	0.00
1,200.0	28.24	338.04	1,155.4	236.6	-95.4	255.1	0.00	0.00	0.00
1,300.0	28.24	338.04	1,243.5	280.4	-113.1	302.4	0.00	0.00	0.00
1,400.0	28.24	338.04	1,331.6	324.3	-130.8	349.7	0.00	0.00	0.00
1,500.0	28.24	338.04	1,419.7	368.2	-148.5	397.0	0.00	0.00	0.00
8 5/8"									
1,530.0	28.24	338.04	1,446.1	381.4	-153.8	411.2	0.00	0.00	0.00
1,600.0	28.24	338.04	1,507.8	412.1	-166.2	444.3	0.00	0.00	0.00
1,700.0	28.24	338.04	1,595.9	456.0	-183.9	491.6	0.00	0.00	0.00
1,800.0	28.24	338.04	1,684.0	499.8	-201.6	539.0	0.00	0.00	0.00
1,900.0	28.24	338.04	1,772.1	543.7	-219.3	586.3	0.00	0.00	0.00
2,000.0	28.24	338.04	1,860.2	587.6	-237.0	633.6	0.00	0.00	0.00
2,100.0	28.24	338.04	1,948.3	631.5	-254.7	680.9	0.00	0.00	0.00
2,200.0	28.24	338.04	2,036.4	675.4	-272.4	728.2	0.00	0.00	0.00
2,300.0	28.24	338.04	2,124.5	719.2	-290.0	775.5	0.00	0.00	0.00
2,400.0	28.24	338.04	2,212.6	763.1	-307.7	822.8	0.00	0.00	0.00
2,500.0	28.24	338.04	2,300.7	807.0	-325.4	870.2	0.00	0.00	0.00
2,600.0	28.24	338.04	2,388.8	850.9	-343.1	917.5	0.00	0.00	0.00
2,700.0	28.24	338.04	2,476.9	894.8	-360.8	964.8	0.00	0.00	0.00
2,800.0	28.24	338.04	2,565.0	938.6	-378.5	1,012.1	0.00	0.00	0.00
2,900.0	28.24	338.04	2,653.1	982.5	-396.2	1,059.4	0.00	0.00	0.00
3,000.0	28.24	338.04	2,741.1	1,026.4	-413.9	1,106.7	0.00	0.00	0.00
3,100.0	28.24	338.04	2,829.2	1,070.3	-431.6	1,154.0	0.00	0.00	0.00
3,200.0	28.24	338.04	2,917.3	1,114.2	-449.3	1,201.3	0.00	0.00	0.00
3,300.0	28.24	338.04	3,005.4	1,158.0	-467.0	1,248.7	0.00	0.00	0.00
G' Sand									
3,367.6	28.24	338.04	3,065.0	1,187.7	-479.0	1,280.6	0.00	0.00	0.00
3,400.0	28.24	338.04	3,093.5	1,201.9	-484.7	1,296.0	0.00	0.00	0.00
3,500.0	28.24	338.04	3,181.6	1,245.8	-502.4	1,343.3	0.00	0.00	0.00
3,600.0	28.24	338.04	3,269.7	1,289.7	-520.1	1,390.6	0.00	0.00	0.00
3,700.0	28.24	338.04	3,357.8	1,333.6	-537.8	1,437.9	0.00	0.00	0.00
3,800.0	28.24	338.04	3,445.9	1,377.4	-555.5	1,485.2	0.00	0.00	0.00
3,900.0	28.24	338.04	3,534.0	1,421.3	-573.2	1,532.5	0.00	0.00	0.00
4,000.0	28.24	338.04	3,622.1	1,465.2	-590.9	1,579.8	0.00	0.00	0.00
4,100.0	28.24	338.04	3,710.2	1,509.1	-608.6	1,627.2	0.00	0.00	0.00
4,200.0	28.24	338.04	3,798.3	1,553.0	-626.3	1,674.5	0.00	0.00	0.00
4,300.0	28.24	338.04	3,886.4	1,596.8	-643.9	1,721.8	0.00	0.00	0.00
4,400.0	28.24	338.04	3,974.5	1,640.7	-661.6	1,769.1	0.00	0.00	0.00
4,500.0	28.24	338.04	4,062.6	1,684.6	-679.3	1,816.4	0.00	0.00	0.00
4,600.0	28.24	338.04	4,150.7	1,728.5	-697.0	1,863.7	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: H Thomas 0993-23-06 Pad  
 Well: H. Thomas 0993-23-19W  
 Wellbore: B-5  
 Design: Design #1

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

Well H. Thomas 0993-23-19W  
 well @ 7655 0usft (H&P #290)  
 well @ 7655 0usft (H&P #290)  
 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)
4,700.0	28.24	338.04	4,238.8	1,772.4	-714.7	1,911.0	0.00	0.00	0.00
4,800.0	28.24	338.04	4,326.9	1,816.2	-732.4	1,958.4	0.00	0.00	0.00
4,900.0	28.24	338.04	4,415.0	1,860.1	-750.1	2,005.7	0.00	0.00	0.00
5,000.0	28.24	338.04	4,503.1	1,904.0	-767.8	2,053.0	0.00	0.00	0.00
5,100.0	28.24	338.04	4,591.2	1,947.9	-785.5	2,100.3	0.00	0.00	0.00
5,200.0	28.24	338.04	4,679.3	1,991.8	-803.2	2,147.6	0.00	0.00	0.00
5,300.0	28.24	338.04	4,767.4	2,035.6	-820.9	2,194.9	0.00	0.00	0.00
5,400.0	28.24	338.04	4,855.5	2,079.5	-838.6	2,242.2	0.00	0.00	0.00
<b>Williams Fork</b>									
5,467.5	28.24	338.04	4,915.0	2,109.1	-850.5	2,274.2	0.00	0.00	0.00
5,500.0	28.24	338.04	4,943.6	2,123.4	-856.3	2,289.6	0.00	0.00	0.00
5,600.0	28.24	338.04	5,031.7	2,167.3	-874.0	2,336.9	0.00	0.00	0.00
5,700.0	28.24	338.04	5,119.8	2,211.2	-891.7	2,384.2	0.00	0.00	0.00
5,800.0	28.24	338.04	5,207.9	2,255.0	-909.4	2,431.5	0.00	0.00	0.00
5,900.0	28.24	338.04	5,296.0	2,298.9	-927.1	2,478.8	0.00	0.00	0.00
<b>Drop 3" / 100'</b>									
5,974.2	28.24	338.04	5,361.4	2,331.5	-940.2	2,513.9	0.00	0.00	0.00
6,000.0	27.46	338.04	5,384.2	2,342.7	-944.7	2,526.0	3.00	-3.00	0.00
6,100.0	24.46	338.04	5,474.1	2,383.3	-961.1	2,569.7	3.00	-3.00	0.00
6,200.0	21.46	338.04	5,566.2	2,419.4	-975.7	2,608.7	3.00	-3.00	0.00
6,300.0	18.46	338.04	5,660.1	2,451.1	-988.4	2,642.9	3.00	-3.00	0.00
6,400.0	15.46	338.04	5,755.8	2,478.1	-999.3	2,672.1	3.00	-3.00	0.00
6,500.0	12.46	338.04	5,852.8	2,500.5	-1,008.4	2,696.2	3.00	-3.00	0.00
6,600.0	9.46	338.04	5,951.0	2,518.2	-1,015.5	2,715.2	3.00	-3.00	0.00
6,700.0	6.46	338.04	6,050.0	2,531.0	-1,020.7	2,729.1	3.00	-3.00	0.00
6,800.0	3.46	338.04	6,149.6	2,539.0	-1,023.9	2,737.7	3.00	-3.00	0.00
6,900.0	0.46	338.04	6,249.6	2,542.2	-1,025.2	2,741.1	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
6,915.4	0.00	0.00	6,265.0	2,542.3	-1,025.2	2,741.2	3.00	-3.00	0.00
7,000.0	0.00	0.00	6,349.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,100.0	0.00	0.00	6,449.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,200.0	0.00	0.00	6,549.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,300.0	0.00	0.00	6,649.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,400.0	0.00	0.00	6,749.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,500.0	0.00	0.00	6,849.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,600.0	0.00	0.00	6,949.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,700.0	0.00	0.00	7,049.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,800.0	0.00	0.00	7,149.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
<b>Cameo</b>									
7,865.4	0.00	0.00	7,215.0	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
7,900.0	0.00	0.00	7,249.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,000.0	0.00	0.00	7,349.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,100.0	0.00	0.00	7,449.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,200.0	0.00	0.00	7,549.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,300.0	0.00	0.00	7,649.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,400.0	0.00	0.00	7,749.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,500.0	0.00	0.00	7,849.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,525.4	0.00	0.00	7,875.0	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
<b>Rollins</b>									
8,565.4	0.00	0.00	7,915.0	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,600.0	0.00	0.00	7,949.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
8,700.0	0.00	0.00	8,049.6	2,542.3	-1,025.2	2,741.2	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: H Thomas 0993 26-06 Pad  
 Well: H. Thomas 0993-23-19W  
 Wellbore: B-5  
 Design: Design #1

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

Well H. Thomas 0993-23-19W  
 well @ 7655.0usft (H&P #290)  
 well @ 7655.0usft (H&P #290)  
 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)
8,800.0	0.00	0.00	8,149.6	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00
TD @ 8815.4' MD / 8165.0' TVD									
8,815.4	0.00	0.00	8,165.0	2,542.3	-1,025.2	2,741.2	0.00	0.00	0.00

## 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 - H. Thomas 0993 - plan hits target center - Circle (radius 50.0)	0.00	0.00	8,165.0	2,542.3	-1,025.2	1,526,037.49	2,364,024.81	39.256117	-107.746204

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,446.1	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,367.6	3,065.0	G' Sand			
5,467.5	4,915.0	Williams Fork			
6,915.4	6,265.0	TOG			
7,865.4	7,215.0	Cameo			
8,525.4	7,875.0	Base Cameo Coal			
8,565.4	7,915.0	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')
1,141.3	1,103.6	210.8	-85.0	EOB @ 28.24° Inc. / 338.04° Azm
5,974.2	5,361.4	2,331.5	-940.2	Drop 3° / 100'
6,915.4	6,265.0	2,542.3	-1,025.2	EOD @ Vertical
8,815.4	8,165.0	2,542.3	-1,025.2	TD @ 8815.4' MD / 8165.0' TVD