



Project: Mesa County, CO  
 Site: H Thomas 0993 26-06 Pad  
 Well: H. Thomas 0993-23-21W  
 Wellbore: B-3  
 Design: Design #1  
 Latitude: 39.249183  
 Longitude: -107.742543  
 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	Dieg	TFace	VSecl	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 @ %INC% Inc. / %AZI% Azm
574.4	23.23	347.56	553.4	161.2	-33.4	3.00	347.56	154.9	Drop 3° / 100'
5951.2	23.23	347.56	5526.6	2068.3	-456.2	0.00	0.00	2118.0	EOD @ Vertical
6725.7	0.00	0.00	6280.0	2219.6	-489.6	3.00	180.00	2272.9	TD @ 8625.7 MD / 8180.0' TVD
8625.7	0.00	0.00	8180.0	2219.6	-489.6	0.00	0.00		

#### DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - H. Thomas 0993-23-21W	8180.0	2219.6	-489.6	1525718.12	2364564.02	39.256277	-107.744272

#### WELL DETAILS: H. Thomas 0993-23-21W

+N-S	+E-W	Northing	7631.0 Easting	Latitude	Longitude
0.0	0.0	1523467.16	2364998.68	39.249183	-107.742543

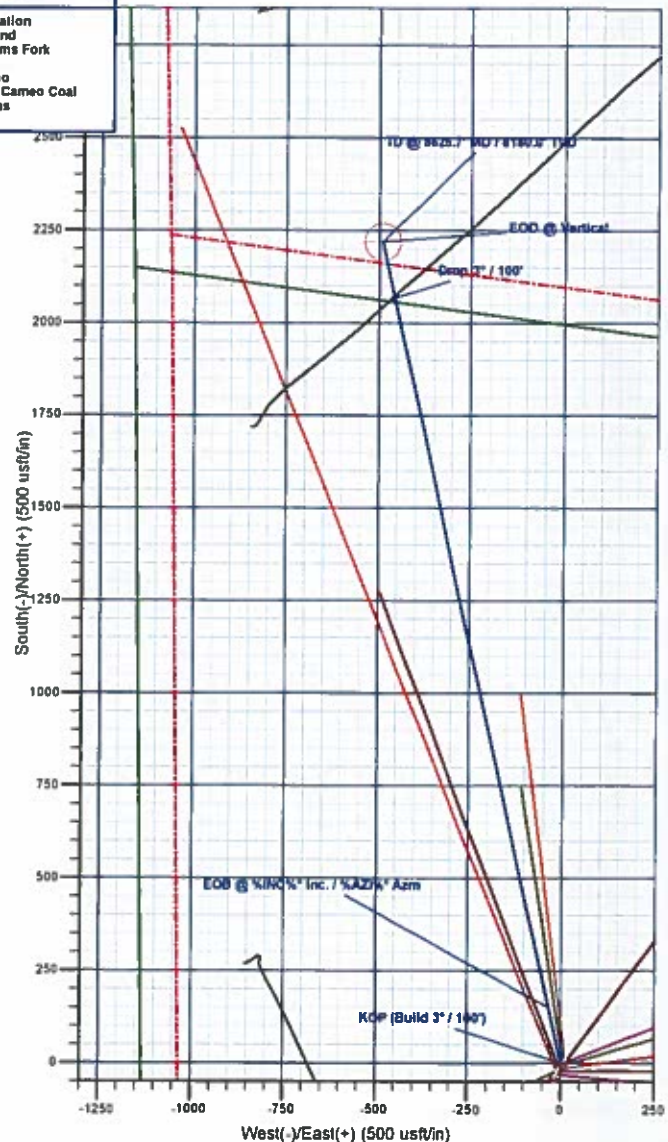
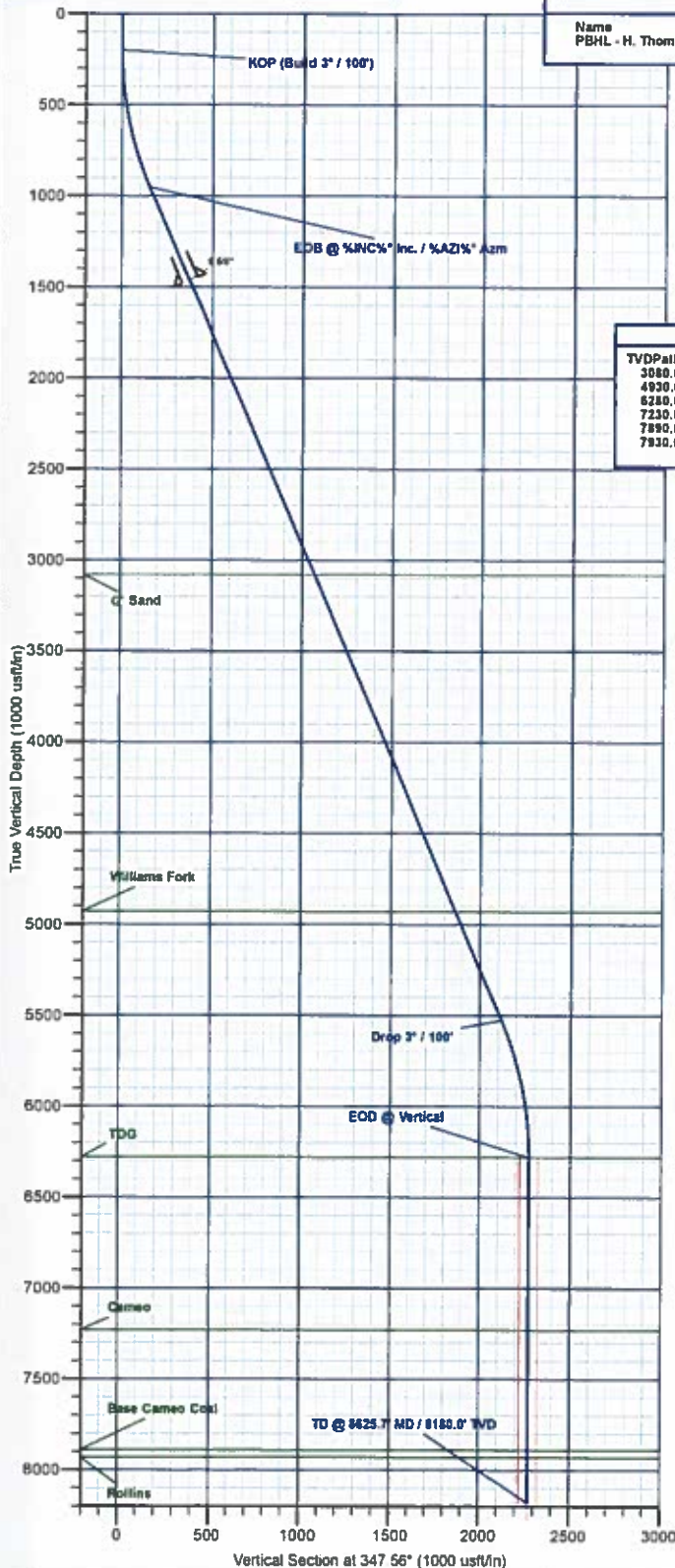
#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well H. Thomas 0993-23-21W, 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
3080.0	3288.7	G' Sand
4930.0	5302.0	Williams Fork
6280.0	6725.7	TOG
7230.0	7675.7	Cameo
7890.0	8335.7	Base Cameo Coal
7930.0	8375.7	Rollins



Plan: Design #1 (H. Thomas 0993-23-21W/B-3)

Created By: Will Jircik

Date: 16:58, January 18 2018



# **Laramie Energy, LLC**

**Mesa County, CO**

**H Thomas 0993 26-06 Pad**

**H. Thomas 0993-23-21W**

**B-3**

**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 0993-23-21W
<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 0993-23-21W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-3		
<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> -107.742813
<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 0993-23-21W			
<b>Well Position</b>	+N-S	47.0 usft	<b>Northing:</b>	1,523,487.17 usft
	+E-W	19.8 usft	<b>Easting:</b>	2,364,998.68 usft
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>	<b>Ground Level:</b> 7,631.0 usft

<b>Wellbore</b>	B-3				
<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	51,350.37355976

<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	347.56

<b>Plan Sections</b>										
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	
974.4	23.23	347.56	953.4	151.2	-33.4	3.00	3.00	0.00	347.56	
5,951.2	23.23	347.56	5,526.6	2,068.3	-456.2	0.00	0.00	0.00	0.00	
6,725.7	0.00	0.00	6,280.0	2,219.6	-489.6	3.00	-3.00	0.00	180.00	
8,625.7	0.00	0.00	8,180.0	2,219.6	-489.6	0.00	0.00	0.00	0.00	PBHL - H. Thomas 05





# Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well H. Thomas 0993-23-21W
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 0993-23-06 Pad	North Reference:	True
Well:	H. Thomas 0993-23-21W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-3		
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
<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	347.56	300.0	2.6	-0.6	2.6	3.00	3.00	0.00
400.0	6.00	347.56	399.6	10.2	-2.3	10.5	3.00	3.00	0.00
500.0	9.00	347.56	498.8	23.0	-5.1	23.5	3.00	3.00	0.00
600.0	12.00	347.56	597.1	40.8	-9.0	41.7	3.00	3.00	0.00
700.0	15.00	347.56	694.3	63.5	-14.0	65.1	3.00	3.00	0.00
800.0	18.00	347.56	790.2	91.3	-20.1	93.5	3.00	3.00	0.00
900.0	21.00	347.56	884.4	123.9	-27.3	126.9	3.00	3.00	0.00
<b>EOB @ %INC% Inc. / %AZI% Azm</b>									
974.4	23.23	347.56	953.4	151.2	-33.4	154.9	3.00	3.00	0.00
1,000.0	23.23	347.56	976.9	161.1	-35.5	165.0	0.00	0.00	0.00
1,100.0	23.23	347.56	1,068.8	199.6	-44.0	204.4	0.00	0.00	0.00
1,200.0	23.23	347.56	1,160.7	238.1	-52.5	243.9	0.00	0.00	0.00
1,300.0	23.23	347.56	1,252.6	276.6	-61.0	283.3	0.00	0.00	0.00
1,400.0	23.23	347.56	1,344.4	315.2	-69.5	322.7	0.00	0.00	0.00
1,500.0	23.23	347.56	1,436.3	353.7	-78.0	362.2	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	23.23	347.56	1,463.9	365.2	-80.6	374.0	0.00	0.00	0.00
1,600.0	23.23	347.56	1,528.2	392.2	-86.5	401.6	0.00	0.00	0.00
1,700.0	23.23	347.56	1,620.1	430.7	-95.0	441.1	0.00	0.00	0.00
1,800.0	23.23	347.56	1,712.0	469.2	-103.5	480.5	0.00	0.00	0.00
1,900.0	23.23	347.56	1,803.9	507.8	-112.0	520.0	0.00	0.00	0.00
2,000.0	23.23	347.56	1,895.8	546.3	-120.5	559.4	0.00	0.00	0.00
2,100.0	23.23	347.56	1,987.7	584.8	-129.0	598.9	0.00	0.00	0.00
2,200.0	23.23	347.56	2,079.6	623.3	-137.5	638.3	0.00	0.00	0.00
2,300.0	23.23	347.56	2,171.5	661.9	-146.0	677.8	0.00	0.00	0.00
2,400.0	23.23	347.56	2,263.4	700.4	-154.5	717.2	0.00	0.00	0.00
2,500.0	23.23	347.56	2,355.2	738.9	-163.0	756.7	0.00	0.00	0.00
2,600.0	23.23	347.56	2,447.1	777.4	-171.5	796.1	0.00	0.00	0.00
2,700.0	23.23	347.56	2,539.0	815.9	-180.0	835.5	0.00	0.00	0.00
2,800.0	23.23	347.56	2,630.9	854.5	-188.5	875.0	0.00	0.00	0.00
2,900.0	23.23	347.56	2,722.8	893.0	-197.0	914.4	0.00	0.00	0.00
3,000.0	23.23	347.56	2,814.7	931.5	-205.5	953.9	0.00	0.00	0.00
3,100.0	23.23	347.56	2,906.6	970.0	-214.0	993.3	0.00	0.00	0.00
3,200.0	23.23	347.56	2,998.5	1,008.5	-222.5	1,032.8	0.00	0.00	0.00
<b>G' Sand</b>									
3,288.7	23.23	347.56	3,080.0	1,042.7	-230.0	1,067.8	0.00	0.00	0.00
3,300.0	23.23	347.56	3,090.4	1,047.1	-231.0	1,072.2	0.00	0.00	0.00
3,400.0	23.23	347.56	3,182.3	1,085.6	-239.5	1,111.7	0.00	0.00	0.00
3,500.0	23.23	347.56	3,274.2	1,124.1	-248.0	1,151.1	0.00	0.00	0.00
3,600.0	23.23	347.56	3,366.0	1,162.6	-256.5	1,190.6	0.00	0.00	0.00
3,700.0	23.23	347.56	3,457.9	1,201.1	-264.9	1,230.0	0.00	0.00	0.00
3,800.0	23.23	347.56	3,549.8	1,239.7	-273.4	1,269.5	0.00	0.00	0.00
3,900.0	23.23	347.56	3,641.7	1,278.2	-281.9	1,308.9	0.00	0.00	0.00
4,000.0	23.23	347.56	3,733.6	1,316.7	-290.4	1,348.3	0.00	0.00	0.00
4,100.0	23.23	347.56	3,825.5	1,355.2	-298.9	1,387.8	0.00	0.00	0.00
4,200.0	23.23	347.56	3,917.4	1,393.7	-307.4	1,427.2	0.00	0.00	0.00
4,300.0	23.23	347.56	4,009.3	1,432.3	-315.9	1,466.7	0.00	0.00	0.00
4,400.0	23.23	347.56	4,101.2	1,470.8	-324.4	1,506.1	0.00	0.00	0.00
4,500.0	23.23	347.56	4,193.1	1,509.3	-332.9	1,545.6	0.00	0.00	0.00
4,600.0	23.23	347.56	4,285.0	1,547.8	-341.4	1,585.0	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 0993-23-21W  
 Well: H. Thomas 0993-23-21W  
 Wellbore: B-3  
 Design: Design #1

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

Well H. Thomas 0993-23-21W  
 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	23.23	347.56	4,376.9	1,586.3	-349.9	1,624.5	0.00	0.00	0.00
4,800.0	23.23	347.56	4,468.7	1,624.9	-358.4	1,663.9	0.00	0.00	0.00
4,900.0	23.23	347.56	4,560.6	1,663.4	-366.8	1,703.4	0.00	0.00	0.00
5,000.0	23.23	347.56	4,652.5	1,701.9	-375.4	1,742.8	0.00	0.00	0.00
5,100.0	23.23	347.56	4,744.4	1,740.4	-383.9	1,782.3	0.00	0.00	0.00
5,200.0	23.23	347.56	4,836.3	1,778.9	-392.4	1,821.7	0.00	0.00	0.00
5,300.0	23.23	347.56	4,928.2	1,817.5	-400.9	1,861.2	0.00	0.00	0.00
<b>Williams Fork</b>									
5,302.0	23.23	347.56	4,930.0	1,818.2	-401.1	1,861.9	0.00	0.00	0.00
5,400.0	23.23	347.56	5,020.1	1,856.0	-409.4	1,900.6	0.00	0.00	0.00
5,500.0	23.23	347.56	5,112.0	1,894.5	-417.9	1,940.0	0.00	0.00	0.00
5,600.0	23.23	347.56	5,203.9	1,933.0	-426.4	1,979.5	0.00	0.00	0.00
5,700.0	23.23	347.56	5,295.8	1,971.5	-434.9	2,018.9	0.00	0.00	0.00
5,800.0	23.23	347.56	5,387.7	2,010.1	-443.4	2,058.4	0.00	0.00	0.00
5,900.0	23.23	347.56	5,479.5	2,048.6	-451.9	2,097.8	0.00	0.00	0.00
<b>Drop 3" / 100'</b>									
5,951.2	23.23	347.56	5,526.6	2,068.3	-456.2	2,118.0	0.00	0.00	0.00
6,000.0	21.77	347.56	5,571.7	2,086.5	-460.3	2,136.7	3.00	-3.00	0.00
6,100.0	18.77	347.56	5,665.5	2,120.4	-467.7	2,171.3	3.00	-3.00	0.00
6,200.0	15.77	347.56	5,761.0	2,149.4	-474.1	2,201.0	3.00	-3.00	0.00
6,300.0	12.77	347.56	5,857.9	2,173.4	-479.4	2,225.7	3.00	-3.00	0.00
6,400.0	9.77	347.56	5,955.9	2,192.5	-483.6	2,245.2	3.00	-3.00	0.00
6,500.0	6.77	347.56	6,054.9	2,206.5	-486.7	2,259.6	3.00	-3.00	0.00
6,600.0	3.77	347.56	6,154.4	2,215.5	-488.7	2,268.8	3.00	-3.00	0.00
6,700.0	0.77	347.56	6,254.3	2,219.4	-489.6	2,272.7	3.00	-3.00	0.00
<b>EOD @ Vertical - TOG</b>									
6,725.7	0.00	0.00	6,280.0	2,219.6	-489.6	2,272.9	3.00	-3.00	0.00
6,800.0	0.00	0.00	6,354.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
6,900.0	0.00	0.00	6,454.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,000.0	0.00	0.00	6,554.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,100.0	0.00	0.00	6,654.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,200.0	0.00	0.00	6,754.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,300.0	0.00	0.00	6,854.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,400.0	0.00	0.00	6,954.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,500.0	0.00	0.00	7,054.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,600.0	0.00	0.00	7,154.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
<b>Cameo</b>									
7,675.7	0.00	0.00	7,230.0	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,700.0	0.00	0.00	7,254.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,800.0	0.00	0.00	7,354.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
7,900.0	0.00	0.00	7,454.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,000.0	0.00	0.00	7,554.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,100.0	0.00	0.00	7,654.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,200.0	0.00	0.00	7,754.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,300.0	0.00	0.00	7,854.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,335.7	0.00	0.00	7,890.0	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
<b>Rollins</b>									
8,375.7	0.00	0.00	7,930.0	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,400.0	0.00	0.00	7,954.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,500.0	0.00	0.00	8,054.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
8,600.0	0.00	0.00	8,154.3	2,219.6	-489.6	2,272.9	0.00	0.00	0.00
<b>TD @ 8625.7' MD / 8180.0' TVD</b>									



## Well Planning Report



<b>Database:</b>	EDM 5000 1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well H. Thomas 0993-23-21W
<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 28-06 Pad	<b>North Reference:</b>	True
<b>Well:</b>	H. Thomas 0993-23-21W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-3		
<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)
8,625.7	0.00	0.00	8,180.0	2,219.6	-489.6	2,272.9	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	8,180.0	2,219.6	-489.6	1,525,718.13	2,364,564.02	39.255277	-107.744272

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,463.9	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,288.7	3,080.0	G' Sand			
5,302.0	4,930.0	Williams Fork			
6,725.7	6,280.0	TOG			
7,675.7	7,230.0	Cameo			
8,335.7	7,890.0	Base Cameo Coal			
8,375.7	7,930.0	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')
974.4	953.4	151.2	-33.4	EOB @ %INC% Inc. / %AZI% Azm
5,951.2	5,526.6	2,068.3	-456.2	Drop 3" / 100'
6,725.7	6,280.0	2,219.6	-489.6	EOD @ Vertical
8,625.7	8,180.0	2,219.6	-489.6	TD @ 8625.7 MD / 8180.0' TVD