



Project: Mesa County, CO  
 Site: Nichols 24-07 Pad  
 Well: Nichols Federal 0994-24-21E  
 Wellbore: Wellbore #1  
 Design: Design #2  
 Latitude: 39.263180  
 Longitude: -107.830853  
 Ground Level: 7212.0  
 well @ 7236.0usft (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	
94.0	0.00	0.00	94.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3" / 100')
1233.6	34.19	153.45	1167.1	-295.2	147.5	3.00	153.45	330.0	EOB @ 34.19° Inc. / 153.45° Azm
5199.6	34.19	153.45	4447.9	-2288.7	1143.5	0.00	0.00	2588.5	Drop 3" / 100'
6339.1	0.00	0.00	5521.0	-2583.9	1291.0	3.00	180.00	2688.5	EOD @ Vertical
8189.1	0.00	0.00	7371.0	-2583.9	1291.0	0.00	0.00	2688.5	TD @ 8189.1' MD / 7371.0' TVD

#### DESIGN TARGET DETAILS

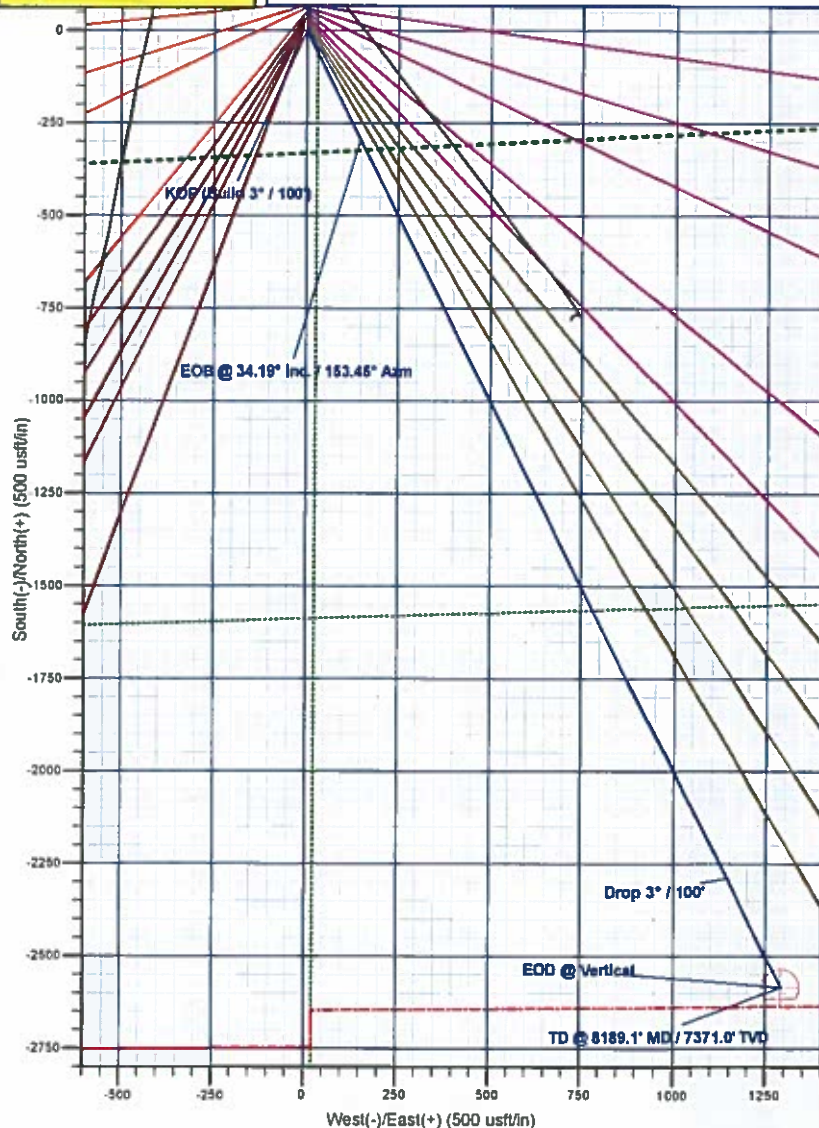
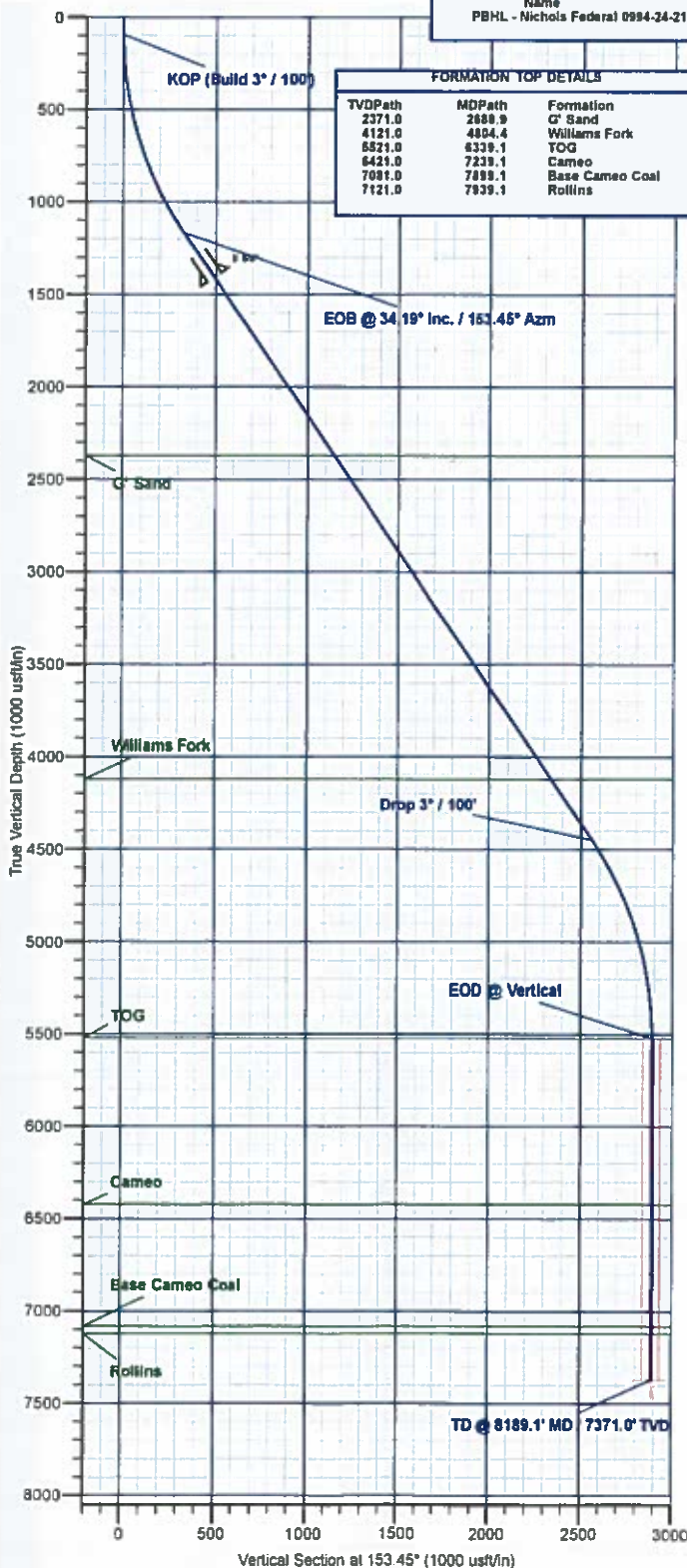
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols Federal 0994-24-21E D#2	7371.0	-2583.9	1291.0	1526596.83	2341353.22	39.256986	-107.826294

#### WELL DETAILS: Nichols Federal 0994-24-21E

+N/-S	+E/-W	Ground Level	Northing	Easting	Latitude	Longitude
0.0	0.0	7212.0	1529213.05	2340126.94	39.263180	-107.830853

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Nichols Federal 0994-24-21E, True North  
 Vertical (TVD) Reference: well @ 7236.0usft (H&P #290)  
 Section (VS) Reference: Slope - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7236.0usft (H&P #290)  
 Calculation Method: Minimum Curvature



Plan: Design #2 (Nichols Federal 0994-24-21E/Wellbore #1)

Created By: Will Jircik

Date: 10:27, January 29 2018



# **Laramie Energy, LLC**

**Mesa County, CO**

**Nichols 24-07 Pad**

**Nichols Federal 0994-24-21E**

**Wellbore #1**

**Plan: Design #2**

## **QES Well Planning Report**

**29 January, 2018**





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Nichols Federal 0994-24-21E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Site:</b>	Nichols 24-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Nichols Federal 0994-24-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #2		

<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>	Nichols 24-07 Pad			
<b>Site Position:</b>		<b>Northing:</b>	1,529,213.07 usft	<b>Latitude:</b> 39.263181
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,340,128.94 usft	<b>Longitude:</b> -107.830853
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b> -1.47 "

<b>Well</b>	Nichols Federal 0994-24-21E			
<b>Well Position</b>	+N/-S	0.0 usft	<b>Northing:</b>	1,529,213.05 usft
	+E/-W	0.0 usft	<b>Easting:</b>	2,340,128.94 usft
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>	0.0 usft
			<b>Ground Level:</b>	7,212.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	3/9/2017	9.63	65.43	51,444.95480663

<b>Design</b>	Design #2			
<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	153.45

<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	
94.0	0.00	0.00	94.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,233.6	34.19	153.45	1,167.1	-295.2	147.5	3.00	3.00	0.00	153.45	
5,199.6	34.19	153.45	4,447.9	-2,288.7	1,143.5	0.00	0.00	0.00	0.00	
6,339.1	0.00	0.00	5,521.0	-2,583.9	1,291.0	3.00	-3.00	0.00	180.00	
8,189.1	0.00	0.00	7,371.0	-2,583.9	1,291.0	0.00	0.00	0.00	0.00	PBHL - Nichols Feder



# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Nichols Federal 0994-24-21E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Site:</b>	Nichols 24-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Nichols Federal 0994-24-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #2		

## 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
<b>KOP (Build 3° / 100')</b>									
94.0	0.00	0.00	94.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.18	153.45	100.0	0.0	0.0	0.0	3.00	3.00	0.00
200.0	3.18	153.45	199.9	-2.6	1.3	2.9	3.00	3.00	0.00
300.0	6.18	153.45	299.6	-9.9	5.0	11.1	3.00	3.00	0.00
400.0	9.18	153.45	398.7	-21.9	10.9	24.5	3.00	3.00	0.00
500.0	12.18	153.45	498.9	-38.5	19.2	43.0	3.00	3.00	0.00
600.0	15.18	153.45	594.1	-59.6	29.8	66.6	3.00	3.00	0.00
700.0	18.18	153.45	689.9	-85.3	42.6	95.3	3.00	3.00	0.00
800.0	21.18	153.45	784.0	-115.4	57.7	129.0	3.00	3.00	0.00
900.0	24.18	153.45	876.3	-149.9	74.9	167.6	3.00	3.00	0.00
1,000.0	27.18	153.45	966.4	-188.7	94.3	210.9	3.00	3.00	0.00
1,100.0	30.18	153.45	1,054.1	-231.6	115.7	258.9	3.00	3.00	0.00
1,200.0	33.18	153.45	1,139.2	-278.6	139.2	311.4	3.00	3.00	0.00
<b>EOB @ 34.19° Inc. / 153.45° Azm</b>									
1,233.6	34.19	153.45	1,167.1	-295.2	147.5	330.0	3.00	3.00	0.00
1,300.0	34.19	153.45	1,222.1	-328.6	164.2	367.3	0.00	0.00	0.00
1,400.0	34.19	153.45	1,304.8	-378.9	189.3	423.5	0.00	0.00	0.00
1,500.0	34.19	153.45	1,387.5	-429.1	214.4	479.7	0.00	0.00	0.00
<b>8 5/8"</b>									
1,524.0	34.19	153.45	1,407.4	-441.2	220.4	493.2	0.00	0.00	0.00
1,600.0	34.19	153.45	1,470.3	-479.4	239.5	535.9	0.00	0.00	0.00
1,700.0	34.19	153.45	1,553.0	-529.7	284.6	592.1	0.00	0.00	0.00
1,800.0	34.19	153.45	1,635.7	-579.9	289.7	648.3	0.00	0.00	0.00
1,900.0	34.19	153.45	1,718.4	-630.2	314.9	704.5	0.00	0.00	0.00
2,000.0	34.19	153.45	1,801.1	-680.5	340.0	760.7	0.00	0.00	0.00
2,100.0	34.19	153.45	1,883.9	-730.7	365.1	816.9	0.00	0.00	0.00
2,200.0	34.19	153.45	1,966.6	-781.0	390.2	873.0	0.00	0.00	0.00
2,300.0	34.19	153.45	2,049.3	-831.3	415.3	929.2	0.00	0.00	0.00
2,400.0	34.19	153.45	2,132.0	-881.5	440.4	985.4	0.00	0.00	0.00
2,500.0	34.19	153.45	2,214.7	-931.8	465.5	1,041.6	0.00	0.00	0.00
2,600.0	34.19	153.45	2,297.5	-982.1	490.7	1,097.8	0.00	0.00	0.00
<b>G' Sand</b>									
2,688.9	34.19	153.45	2,371.0	-1,026.7	513.0	1,147.8	0.00	0.00	0.00
2,700.0	34.19	153.45	2,380.2	-1,032.3	515.8	1,154.0	0.00	0.00	0.00
2,800.0	34.19	153.45	2,462.9	-1,082.6	540.9	1,210.2	0.00	0.00	0.00
2,900.0	34.19	153.45	2,545.6	-1,132.8	566.0	1,266.4	0.00	0.00	0.00
3,000.0	34.19	153.45	2,628.3	-1,183.1	591.1	1,322.6	0.00	0.00	0.00
3,100.0	34.19	153.45	2,711.1	-1,233.4	616.2	1,378.7	0.00	0.00	0.00
3,200.0	34.19	153.45	2,793.8	-1,283.6	641.3	1,434.9	0.00	0.00	0.00
3,300.0	34.19	153.45	2,876.5	-1,333.9	666.4	1,491.1	0.00	0.00	0.00
3,400.0	34.19	153.45	2,959.2	-1,384.2	691.6	1,547.3	0.00	0.00	0.00
3,500.0	34.19	153.45	3,042.0	-1,434.4	716.7	1,603.5	0.00	0.00	0.00
3,600.0	34.19	153.45	3,124.7	-1,484.7	741.8	1,659.7	0.00	0.00	0.00
3,700.0	34.19	153.45	3,207.4	-1,535.0	766.9	1,715.9	0.00	0.00	0.00
3,800.0	34.19	153.45	3,290.1	-1,585.2	792.0	1,772.1	0.00	0.00	0.00
3,900.0	34.19	153.45	3,372.8	-1,635.5	817.1	1,828.3	0.00	0.00	0.00
4,000.0	34.19	153.45	3,455.6	-1,685.8	842.2	1,884.5	0.00	0.00	0.00
4,100.0	34.19	153.45	3,538.3	-1,736.0	867.4	1,940.6	0.00	0.00	0.00
4,200.0	34.19	153.45	3,621.0	-1,786.3	892.5	1,996.8	0.00	0.00	0.00
4,300.0	34.19	153.45	3,703.7	-1,836.6	917.6	2,053.0	0.00	0.00	0.00
4,400.0	34.19	153.45	3,786.4	-1,886.8	942.7	2,109.2	0.00	0.00	0.00
4,500.0	34.19	153.45	3,869.2	-1,937.1	967.8	2,165.4	0.00	0.00	0.00



## Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-21E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7236 0usft (H&P #290)
Project:	Mesa County, CO	MD Reference:	well @ 7236 0usft (H&P #290)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols Federal 0994-24-21E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

## 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)
4,600.0	34.19	153.45	3,951.9	-1,987.4	992.9	2,221.6	0.00	0.00	0.00
4,700.0	34.19	153.45	4,034.6	-2,037.6	1,018.0	2,277.8	0.00	0.00	0.00
4,800.0	34.19	153.45	4,117.3	-2,087.9	1,043.1	2,334.0	0.00	0.00	0.00
Williams Fork									
4,804.4	34.19	153.45	4,121.0	-2,090.1	1,044.3	2,336.5	0.00	0.00	0.00
4,900.0	34.19	153.45	4,200.0	-2,138.2	1,068.3	2,390.2	0.00	0.00	0.00
5,000.0	34.19	153.45	4,282.8	-2,188.4	1,093.4	2,446.4	0.00	0.00	0.00
5,100.0	34.19	153.45	4,365.5	-2,238.7	1,118.5	2,502.5	0.00	0.00	0.00
Drop 3° / 100'									
5,199.6	34.19	153.45	4,447.9	-2,288.7	1,143.5	2,558.5	0.00	0.00	0.00
5,300.0	31.17	153.45	4,532.4	-2,337.2	1,167.7	2,612.7	3.00	-3.00	0.00
5,400.0	28.17	153.45	4,619.2	-2,381.5	1,189.8	2,662.2	3.00	-3.00	0.00
5,500.0	25.17	153.45	4,708.6	-2,421.7	1,209.9	2,707.1	3.00	-3.00	0.00
5,600.0	22.17	153.45	4,800.2	-2,457.6	1,227.9	2,747.2	3.00	-3.00	0.00
5,700.0	19.17	153.45	4,893.7	-2,489.2	1,243.6	2,782.5	3.00	-3.00	0.00
5,800.0	16.17	153.45	4,989.0	-2,516.3	1,257.2	2,812.9	3.00	-3.00	0.00
5,900.0	13.17	153.45	5,085.7	-2,539.0	1,268.5	2,838.2	3.00	-3.00	0.00
6,000.0	10.17	153.45	5,183.6	-2,557.1	1,277.6	2,858.5	3.00	-3.00	0.00
6,100.0	7.17	153.45	5,282.5	-2,570.6	1,284.3	2,873.5	3.00	-3.00	0.00
6,200.0	4.17	153.45	5,382.0	-2,579.4	1,288.7	2,883.4	3.00	-3.00	0.00
6,300.0	1.17	153.45	5,481.9	-2,583.6	1,290.8	2,888.1	3.00	-3.00	0.00
EOD @ Vertical - TOG									
6,339.1	0.00	0.00	5,521.0	-2,583.9	1,291.0	2,888.5	3.00	-3.00	-392.02
6,400.0	0.00	0.00	5,581.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
6,500.0	0.00	0.00	5,681.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
6,600.0	0.00	0.00	5,781.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
6,700.0	0.00	0.00	5,881.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
6,800.0	0.00	0.00	5,981.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
6,900.0	0.00	0.00	6,081.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,000.0	0.00	0.00	6,181.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,100.0	0.00	0.00	6,281.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,200.0	0.00	0.00	6,381.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
Cameo									
7,239.1	0.00	0.00	6,421.0	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,300.0	0.00	0.00	6,481.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,400.0	0.00	0.00	6,581.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,500.0	0.00	0.00	6,681.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,600.0	0.00	0.00	6,781.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,700.0	0.00	0.00	6,881.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,800.0	0.00	0.00	6,981.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
Base Cameo Coal									
7,899.1	0.00	0.00	7,081.0	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,081.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
Rollins									
7,939.1	0.00	0.00	7,121.0	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,181.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
8,100.0	0.00	0.00	7,281.9	-2,583.9	1,291.0	2,888.5	0.00	0.00	0.00
TD @ 8189.1' MD / 7371.0' TVD - Formation 8									
8,189.1	0.00	0.00	7,371.0	-2,583.9	1,291.0	2,888.5	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 Nichols Federal 0994-24-21E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7236.0usft (H&P #290)
<b>Site:</b>	Nichols 24-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Nichols Federal 0994-24-21E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #2		

## 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 - Nichols Federal - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,371.0	-2,583.9	1,291.0	1,526,596.84	2,341,353.22	39.256086	-107.826294

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,524.0	1,407.4	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,688.9	2,371.0	G' Sand			
4,804.4	4,121.0	Williams Fork			
6,339.1	5,521.0	TOG			
7,239.1	6,421.0	Cameo			
7,899.1	7,081.0	Base Cameo Coal			
7,939.1	7,121.0	Rollins			
8,189.1	7,371.0	Formation 8		0.00	

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
94.0	94.0	0.0	0.0	KOP (Build 3' / 100')
1,233.6	1,167.1	-295.2	147.5	EOB @ 34.19° Inc. / 153.45° Azm
5,199.6	4,447.9	-2,288.7	1,143.5	Drop 3' / 100'
6,339.1	5,521.0	-2,583.9	1,291.0	EOD @ Vertical
8,189.1	7,371.0	-2,583.9	1,291.0	TD @ 8189.1' MD / 7371.0' TVD