



Project: Mesa County, CO  
 Site: Nichols 24-07 Pad  
 Well: Nichols Federal 0994-24-20E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.263203  
 Longitude: -107.830850  
 Ground Level: 7212.0  
 well @ 7242.0usft (H&P #522)



**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

**REFERENCE INFORMATION**

Co-ordinate (NE) Reference: Well Nichols Federal 0994-24-20E, True North  
 Vertical (TVD) Reference: well @ 7242.0usft (H&P #522)  
 Section (VS) Reference: Spot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7242.0usft (H&P #522)  
 Calculation Method: Minimum Curvature

**WELL DETAILS: Nichols Federal 0994-24-20E**

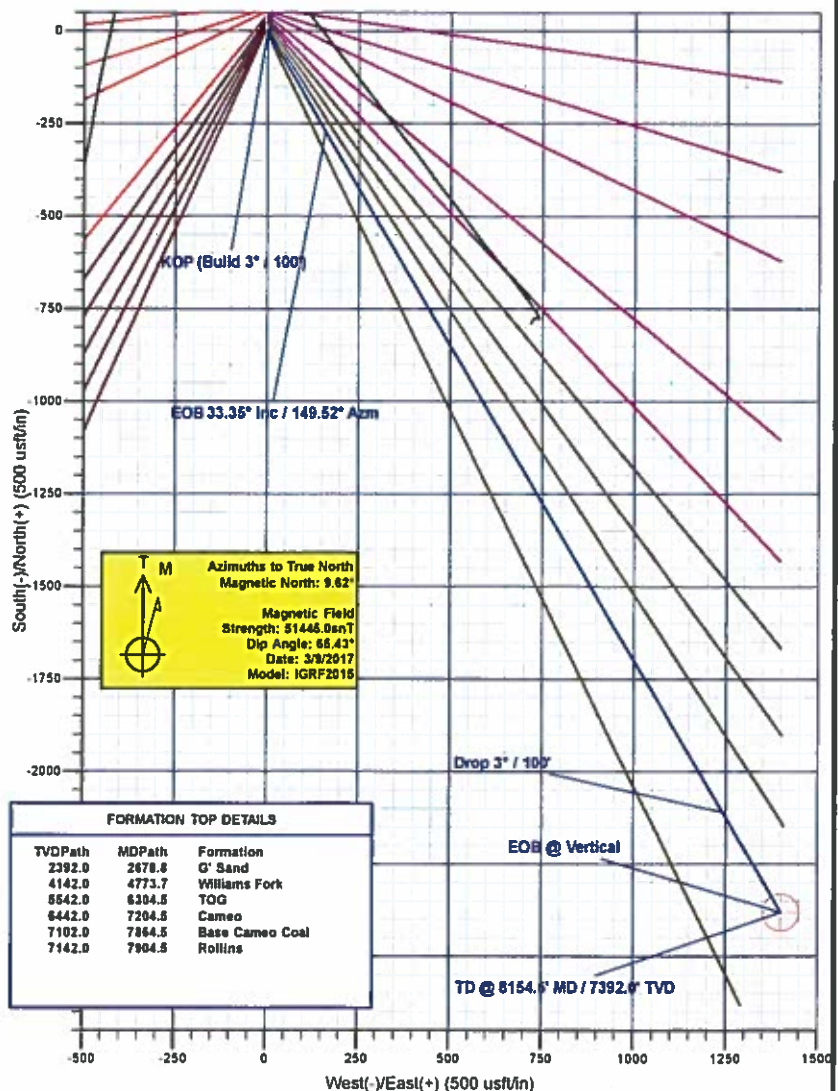
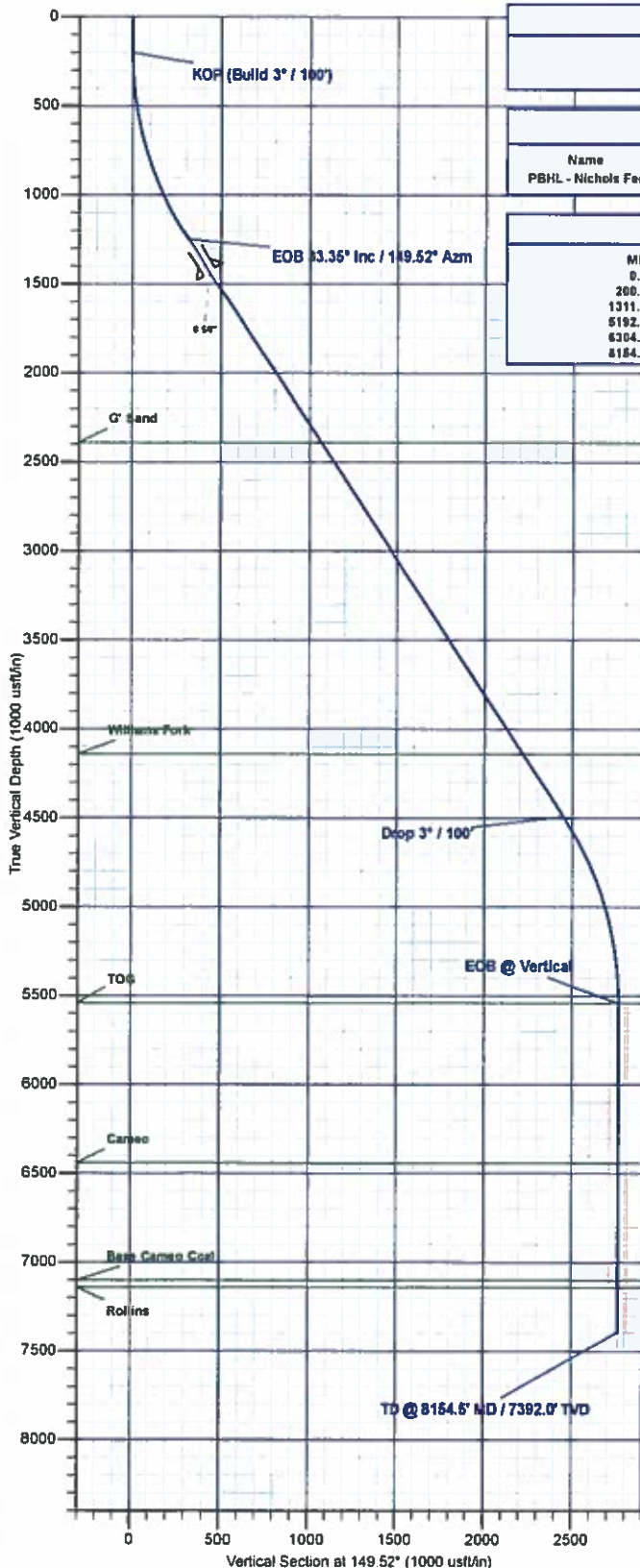
+N/-S	+E/-W	Northing	Ground Level:	7212.0	Latitude	Longitude
0.0	0.0	1529221.21	Easting	2340129.94	39.263203	-107.830850

**WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)**

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols Federal 0994-24-20E	7392.0	-2380.8	1401.1	1526805.21	2341469.47	39.256666	-107.825902

**SECTION DETAILS**

MD	Inc	Azi	TVD	+N/-S	+E/-W	Diag	TFace	VFace	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')
1311.6	33.35	149.52	1248.9	-271.0	159.5	3.00	149.52	314.5	EOB 33.35° Inc / 149.52° Azm
5192.9	33.35	149.52	4492.1	-2109.8	1241.5	0.00	0.00	2448.1	Drop 3° / 100'
6304.5	0.00	0.00	5542.0	-2380.8	1401.1	3.00	180.00	2762.5	EOB @ Vertical
8154.5	0.00	0.00	7392.0	-2380.8	1401.1	0.00	0.00	2762.5	TD @ 8154.5' MD / 7392.0' TVD



**FORMATION TOP DETAILS**

TVDPath	MDPath	Formation
2392.0	2678.8	G' Sand
4142.0	4773.7	Williams Fork
5542.0	6304.5	TQG
6442.0	7204.5	Cameo
7102.0	7864.5	Base Cameo Coal
7142.0	7904.5	Rollins

Plan: Design #1 (Nichols Federal 0994-24-20E/Wellbore #1)

Created By: Will Jircik Date: 16:43, March 10 2017



# **Laramie Energy, LLC**

**Mesa County, CO**

**Nichols 24-07 Pad**

**Nichols Federal 0994-24-20E**

**Wellbore #1**

**Plan: Design #1**

## **QES Well Planning Report**

**10 March, 2017**





## Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-20E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7242.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7242.0usft (H&P #522)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols Federal 0994-24-20E	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	Nichols 24-07 Pad		
Site Position:		Northing:	1,529,213.07 usft
From:	Lat/Long	Easting:	2,340,128.94 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Grid Convergence:	-1.47°

Well	Nichols Federal 0994-24-20E		
Well Position	+N/-S	8.2 usft	Northing:
	+E/-W	0.8 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Ground Level:	7,212.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	3/9/2017	9.63
			Dip Angle (°)
			65.43
			Field Strength (nT)
			51,445

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction (°)
			149.52

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	
1,311.6	33.35	149.52	1,249.9	-271.0	159.5	3.00	3.00	0.00	149.52	
5,192.9	33.35	149.52	4,492.1	-2,109.8	1,241.6	0.00	0.00	0.00	0.00	
6,304.5	0.00	0.00	5,542.0	-2,380.8	1,401.1	3.00	-3.00	0.00	180.00	
8,154.5	0.00	0.00	7,392.0	-2,380.8	1,401.1	0.00	0.00	0.00	0.00	PBHL - Nichols Feder





## Well Planning Report



<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols Federal 0994-24-20E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7242.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7242.0usft (H&P #522)
<b>Site:</b>	Nichols 24-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Nichols Federal 0994-24-20E	<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)
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	149.52	300.0	-2.3	1.3	2.6	3.00	3.00	0.00
400.0	6.00	149.52	399.6	-9.0	5.3	10.5	3.00	3.00	0.00
500.0	9.00	149.52	498.8	-20.3	11.9	23.5	3.00	3.00	0.00
600.0	12.00	149.52	597.1	-36.0	21.2	41.7	3.00	3.00	0.00
700.0	15.00	149.52	694.3	-56.1	33.0	65.1	3.00	3.00	0.00
800.0	18.00	149.52	790.2	-80.6	47.4	93.5	3.00	3.00	0.00
900.0	21.00	149.52	884.4	-109.3	64.3	126.9	3.00	3.00	0.00
1,000.0	24.00	149.52	976.8	-142.3	83.7	165.1	3.00	3.00	0.00
1,100.0	27.00	149.52	1,067.1	-179.4	105.6	208.2	3.00	3.00	0.00
1,200.0	30.00	149.52	1,154.9	-220.5	129.8	255.9	3.00	3.00	0.00
1,300.0	33.00	149.52	1,240.2	-265.5	156.3	308.1	3.00	3.00	0.00
<b>EOB 33.35° Inc / 149.52° Azm</b>									
1,311.6	33.35	149.52	1,249.9	-271.0	159.5	314.5	3.00	3.00	0.00
1,400.0	33.35	149.52	1,323.7	-312.9	184.1	363.1	0.00	0.00	0.00
1,500.0	33.35	149.52	1,407.3	-360.3	212.0	418.0	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	33.35	149.52	1,432.3	-374.5	220.4	434.5	0.00	0.00	0.00
1,600.0	33.35	149.52	1,490.8	-407.7	239.9	473.0	0.00	0.00	0.00
1,700.0	33.35	149.52	1,574.3	-455.0	267.8	528.0	0.00	0.00	0.00
1,800.0	33.35	149.52	1,657.9	-502.4	295.7	582.9	0.00	0.00	0.00
1,900.0	33.35	149.52	1,741.4	-549.8	323.5	637.9	0.00	0.00	0.00
2,000.0	33.35	149.52	1,824.9	-597.2	351.4	692.9	0.00	0.00	0.00
2,100.0	33.35	149.52	1,908.5	-644.5	379.3	747.9	0.00	0.00	0.00
2,200.0	33.35	149.52	1,992.0	-691.9	407.2	802.8	0.00	0.00	0.00
2,300.0	33.35	149.52	2,075.6	-739.3	435.1	857.8	0.00	0.00	0.00
2,400.0	33.35	149.52	2,159.1	-786.7	462.9	912.8	0.00	0.00	0.00
2,500.0	33.35	149.52	2,242.6	-834.0	490.8	967.7	0.00	0.00	0.00
2,600.0	33.35	149.52	2,326.2	-881.4	518.7	1,022.7	0.00	0.00	0.00
<b>G' Sand</b>									
2,678.8	33.35	149.52	2,392.0	-918.8	540.7	1,066.0	0.00	0.00	0.00
2,700.0	33.35	149.52	2,409.7	-928.8	546.6	1,077.7	0.00	0.00	0.00
2,800.0	33.35	149.52	2,493.2	-976.2	574.5	1,132.7	0.00	0.00	0.00
2,900.0	33.35	149.52	2,576.8	-1,023.6	602.3	1,187.6	0.00	0.00	0.00
3,000.0	33.35	149.52	2,660.3	-1,070.9	630.2	1,242.6	0.00	0.00	0.00
3,100.0	33.35	149.52	2,743.8	-1,118.3	658.1	1,297.6	0.00	0.00	0.00
3,200.0	33.35	149.52	2,827.4	-1,165.7	686.0	1,352.5	0.00	0.00	0.00
3,300.0	33.35	149.52	2,910.9	-1,213.1	713.9	1,407.5	0.00	0.00	0.00
3,400.0	33.35	149.52	2,994.4	-1,260.4	741.7	1,462.5	0.00	0.00	0.00
3,500.0	33.35	149.52	3,078.0	-1,307.8	769.6	1,517.5	0.00	0.00	0.00
3,600.0	33.35	149.52	3,161.5	-1,355.2	797.5	1,572.4	0.00	0.00	0.00
3,700.0	33.35	149.52	3,245.0	-1,402.6	825.4	1,627.4	0.00	0.00	0.00
3,800.0	33.35	149.52	3,328.6	-1,449.9	853.3	1,682.4	0.00	0.00	0.00
3,900.0	33.35	149.52	3,412.1	-1,497.3	881.1	1,737.3	0.00	0.00	0.00
4,000.0	33.35	149.52	3,495.7	-1,544.7	909.0	1,792.3	0.00	0.00	0.00
4,100.0	33.35	149.52	3,579.2	-1,592.1	936.9	1,847.3	0.00	0.00	0.00
4,200.0	33.35	149.52	3,662.7	-1,639.4	964.8	1,902.3	0.00	0.00	0.00
4,300.0	33.35	149.52	3,746.3	-1,686.8	992.7	1,957.2	0.00	0.00	0.00
4,400.0	33.35	149.52	3,829.8	-1,734.2	1,020.5	2,012.2	0.00	0.00	0.00
4,500.0	33.35	149.52	3,913.3	-1,781.6	1,048.4	2,067.2	0.00	0.00	0.00
4,600.0	33.35	149.52	3,996.9	-1,829.0	1,076.3	2,122.1	0.00	0.00	0.00



## Well Planning Report



<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols Federal 0994-24-20E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7242 0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7242 0usft (H&P #522)
<b>Site:</b>	Nichols 24-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Nichols Federal 0994-24-20E	<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)
4,700.0	33.35	149.52	4,080.4	-1,876.3	1,104.2	2,177.1	0.00	0.00	0.00
<b>Williams Fork</b>									
4,773.7	33.35	149.52	4,142.0	-1,911.3	1,124.7	2,217.7	0.00	0.00	0.00
4,800.0	33.35	149.52	4,163.9	-1,923.7	1,132.1	2,232.1	0.00	0.00	0.00
4,900.0	33.35	149.52	4,247.5	-1,971.1	1,159.9	2,287.1	0.00	0.00	0.00
5,000.0	33.35	149.52	4,331.0	-2,018.5	1,187.8	2,342.0	0.00	0.00	0.00
5,100.0	33.35	149.52	4,414.5	-2,065.8	1,215.7	2,397.0	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,192.9	33.35	149.52	4,492.1	-2,109.8	1,241.6	2,448.1	0.00	0.00	0.00
5,200.0	33.13	149.52	4,498.1	-2,113.2	1,243.6	2,452.0	3.00	-3.00	0.00
5,300.0	30.13	149.52	4,583.2	-2,158.4	1,270.2	2,504.4	3.00	-3.00	0.00
5,400.0	27.13	149.52	4,671.0	-2,199.7	1,294.5	2,552.3	3.00	-3.00	0.00
5,500.0	24.13	149.52	4,761.1	-2,237.0	1,316.4	2,595.6	3.00	-3.00	0.00
5,600.0	21.13	149.52	4,853.4	-2,270.1	1,335.9	2,634.1	3.00	-3.00	0.00
5,700.0	18.13	149.52	4,947.6	-2,299.1	1,353.0	2,667.7	3.00	-3.00	0.00
5,800.0	15.13	149.52	5,043.4	-2,323.8	1,367.5	2,696.3	3.00	-3.00	0.00
5,900.0	12.13	149.52	5,140.6	-2,344.1	1,379.4	2,719.8	3.00	-3.00	0.00
6,000.0	9.13	149.52	5,238.8	-2,360.0	1,388.8	2,738.3	3.00	-3.00	0.00
6,100.0	6.13	149.52	5,337.9	-2,371.4	1,395.5	2,751.6	3.00	-3.00	0.00
6,200.0	3.13	149.52	5,437.6	-2,378.4	1,399.6	2,759.7	3.00	-3.00	0.00
6,300.0	0.13	149.52	5,537.5	-2,380.8	1,401.1	2,762.5	3.00	-3.00	0.00
<b>EOB @ Vertical - TDG</b>									
6,304.5	0.00	0.00	5,542.0	-2,380.8	1,401.1	2,762.5	3.00	-3.00	-3,358.94
6,400.0	0.00	0.00	5,637.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
6,500.0	0.00	0.00	5,737.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
6,600.0	0.00	0.00	5,837.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
6,700.0	0.00	0.00	5,937.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
6,800.0	0.00	0.00	6,037.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
6,900.0	0.00	0.00	6,137.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,000.0	0.00	0.00	6,237.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,100.0	0.00	0.00	6,337.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,200.0	0.00	0.00	6,437.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
<b>Cameo</b>									
7,204.5	0.00	0.00	6,442.0	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,300.0	0.00	0.00	6,537.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,400.0	0.00	0.00	6,637.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,500.0	0.00	0.00	6,737.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,600.0	0.00	0.00	6,837.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,700.0	0.00	0.00	6,937.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,800.0	0.00	0.00	7,037.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
7,864.5	0.00	0.00	7,102.0	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,137.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
<b>Rollins</b>									
7,904.5	0.00	0.00	7,142.0	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,237.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
8,100.0	0.00	0.00	7,337.5	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00
<b>TD @ 8154.5' MD / 7392.0' TVD</b>									
8,154.5	0.00	0.00	7,392.0	-2,380.8	1,401.1	2,762.5	0.00	0.00	0.00



## Well Planning Report



DIRECTIONAL DRILLING

<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols Federal 0994-24-20E
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7242 0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7242 0usft (H&P #522)
<b>Site:</b>	Nichols 24-07 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Nichols Federal 0994-24-20E	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

## Design Targets

## Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
PBHL - Nichols Federal - plan hits target center - Point	0.00	0.00	7,392.0	-2,380.8	1,401.1	1,526,805.21	2,341,469.48	39 256666	-107.825902

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,432.3	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,678.8	2,392.0	G' Sand			
4,773.7	4,142.0	Williams Fork			
6,304.5	5,542.0	TOG			
7,204.5	6,442.0	Cameo			
7,864.5	7,102.0	Base Cameo Coal			
7,904.5	7,142.0	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')
1,311.6	1,249.9	-271.0	159.5	EOB 33 35" Inc / 149.52" Azm
5,192.9	4,492.1	-2,109.8	1,241.6	Drop 3" / 100'
6,304.5	5,542.0	-2,380.8	1,401.1	EOB @ Vertical
8,154.5	7,392.0	-2,380.8	1,401.1	TD @ 8154.5' MD / 7392.0' TVD