



Project: Mesa County, CO  
 Site: Nichols 24-07 Pad  
 Well: Nichols 0994-24-21W  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.263183  
 Longitude: -107.830886  
 Ground Level: 7212.0  
 well @ 7242.0ustf (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 0994-24-21W, True North  
 Vertical (TVD) Reference: well @ 7242.0ustf (H&P #522)  
 Section (VS) Reference: Slot - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 7242.0ustf (H&P #522)  
 Calculation Method: Minimum Curvature

**WELL DETAILS: Nichols 0994-24-21W**

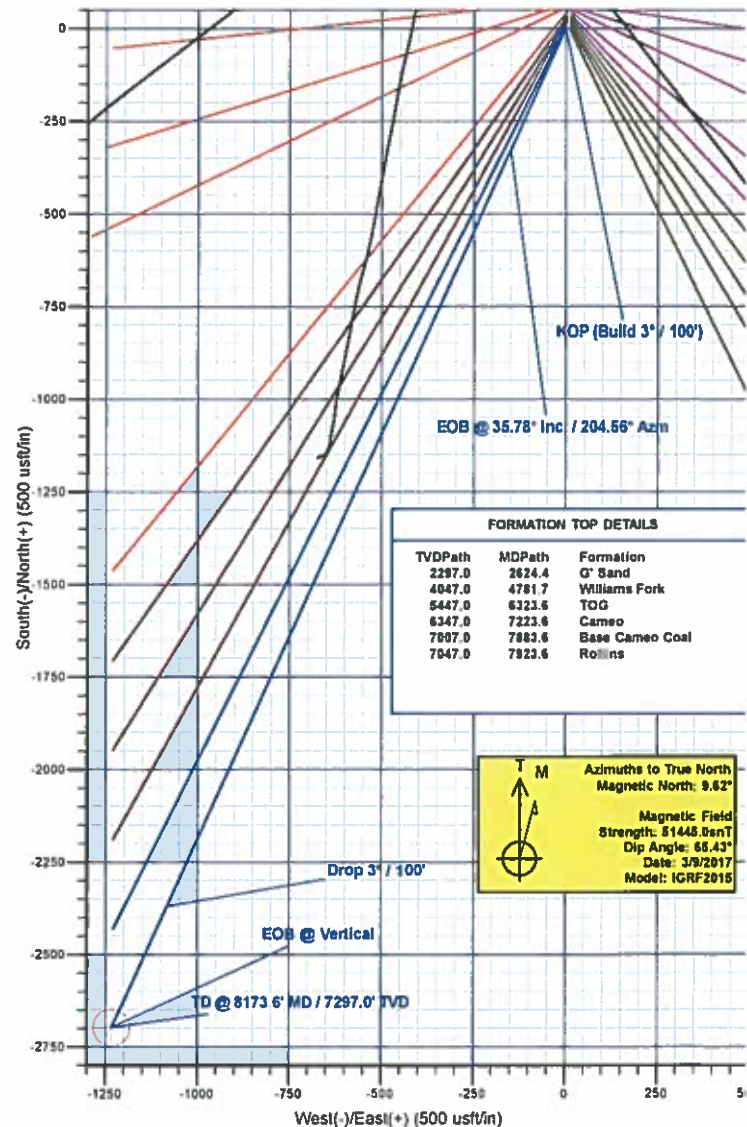
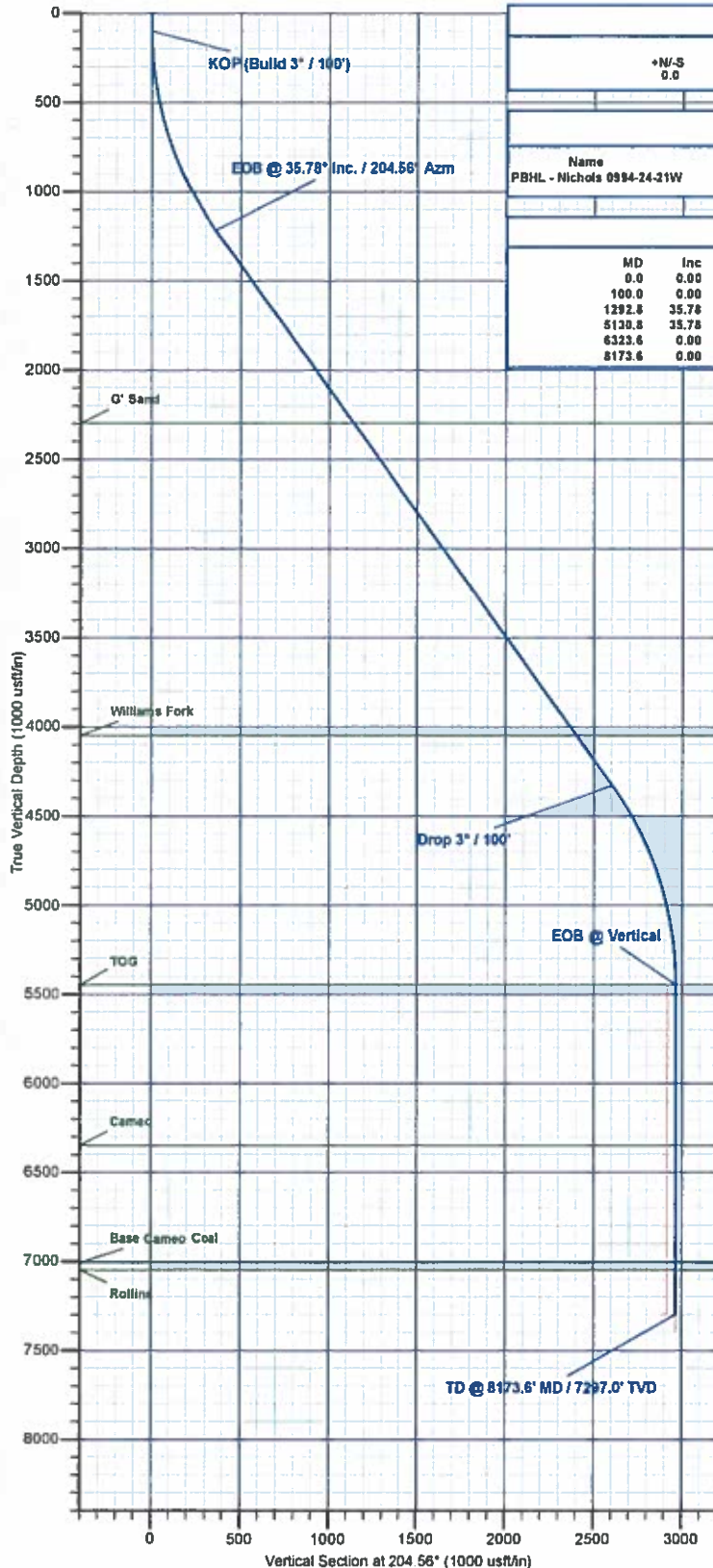
+N/-S	+E/-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529214.19	2340119.56	39.263183	-107.830886

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-21W	7297.0	-2697.0	-1232.6	1526549.71	2336918.17	39.255778	-107.835239

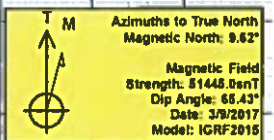
**SECTION DETAILS**

MD	Inc	Azi	TVD	+N/-S	+E/-W	Diag	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.0	
1292.8	35.78	204.56	1216.8	-327.9	-149.9	3.00	204.56	360.5	KOP (Build 3° / 100')
5130.8	35.78	204.56	4330.2	-2369.1	-1082.7	0.00	0.00	2604.8	EOB @ 35.78° Inc. / 204.56° Azm
6323.6	0.00	0.00	5447.0	-2697.0	-1232.6	3.00	180.00	2965.3	Drop 3° / 100'
8173.6	0.00	0.00	7297.0	-2697.0	-1232.6	0.00	0.00	2965.3	EOB @ Vertical
									TD @ 8173.6' MD / 7297.0' TVD



**FORMATION TOP DETAILS**

TVDPath	MDPath	Formation
2297.0	2624.4	O' Sand
4047.0	4781.7	Williams Fork
5447.0	6323.6	TOG
6347.0	7223.6	Cameo
7097.0	7883.6	Base Cameo Coal
7647.0	7923.6	Rollins



Plan: Design #1 (Nichols 0994-24-21W/Wellbore #1)

Created By: Will Jirick Date: 17:34, March 10 2017



## **Laramie Energy, LLC**

**Mesa County, CO**

**Nichols 24-07 Pad**

**Nichols 0994-24-21W**

**Wellbore #1**

**Plan: Design #1**

## **QES Well Planning Report**

**10 March, 2017**





# Well Planning Report



<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols 0994-24-21W
<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 0994-24-21W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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	Latitude:	39.263181
From:	Lat/Long	Easting:	2,340,128.94 usft	Longitude:	-107.830853
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well	Nichols 0994-24-21W					
Well Position	+N/-S	0.9 usft	Northing:	1,529,214.19 usft	Latitude:	39.263183
	+E/-W	-9.4 usft	Easting:	2,340,119.56 usft	Longitude:	-107.830886
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 (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/9/2017	9.63	65.43	51,445

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	204.56

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	
100.0	0.00	0.00	100.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,292.8	35.78	204.56	1,216.8	-327.9	-149.9	3.00	3.00	0.00	204.56	
5,130.8	35.78	204.56	4,330.2	-2,369.1	-1,082.7	0.00	0.00	0.00	0.00	
6,323.6	0.00	0.00	5,447.0	-2,697.0	-1,232.6	3.00	-3.00	0.00	180.00	
8,173.6	0.00	0.00	7,297.0	-2,697.0	-1,232.6	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-





## Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-21W
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 0994-24-21W	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
<b>KOP (Build 3° / 100')</b>									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	3.00	204.56	200.0	-2.4	-1.1	2.6	3.00	3.00	0.00
300.0	6.00	204.56	299.6	-9.5	-4.3	10.5	3.00	3.00	0.00
400.0	9.00	204.56	398.8	-21.4	-9.8	23.5	3.00	3.00	0.00
500.0	12.00	204.56	497.1	-38.0	-17.3	41.7	3.00	3.00	0.00
600.0	15.00	204.56	594.3	-59.2	-27.1	65.1	3.00	3.00	0.00
700.0	18.00	204.56	690.2	-85.0	-38.9	93.5	3.00	3.00	0.00
800.0	21.00	204.56	784.4	-115.4	-52.7	126.9	3.00	3.00	0.00
900.0	24.00	204.56	876.8	-150.2	-68.6	165.1	3.00	3.00	0.00
1,000.0	27.00	204.56	967.1	-189.3	-86.5	208.2	3.00	3.00	0.00
1,100.0	30.00	204.56	1,054.9	-232.7	-106.4	255.9	3.00	3.00	0.00
1,200.0	33.00	204.56	1,140.2	-280.2	-128.1	308.1	3.00	3.00	0.00
<b>EOB @ 35.78° Inc. / 204.56° Azm</b>									
1,292.8	35.78	204.56	1,216.8	-327.9	-149.9	360.5	3.00	3.00	0.00
1,300.0	35.78	204.56	1,222.6	-331.7	-151.6	364.7	0.00	0.00	0.00
1,400.0	35.78	204.56	1,303.7	-384.9	-175.9	423.2	0.00	0.00	0.00
1,500.0	35.78	204.56	1,384.8	-438.1	-200.2	481.7	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	35.78	204.56	1,409.2	-454.1	-207.5	499.2	0.00	0.00	0.00
1,600.0	35.78	204.56	1,466.0	-491.3	-224.5	540.2	0.00	0.00	0.00
1,700.0	35.78	204.56	1,547.1	-544.5	-248.8	598.6	0.00	0.00	0.00
1,800.0	35.78	204.56	1,628.2	-597.7	-273.1	657.1	0.00	0.00	0.00
1,900.0	35.78	204.56	1,709.3	-650.8	-297.5	715.6	0.00	0.00	0.00
2,000.0	35.78	204.56	1,790.4	-704.0	-321.8	774.1	0.00	0.00	0.00
2,100.0	35.78	204.56	1,871.6	-757.2	-346.1	832.5	0.00	0.00	0.00
2,200.0	35.78	204.56	1,952.7	-810.4	-370.4	891.0	0.00	0.00	0.00
2,300.0	35.78	204.56	2,033.8	-863.6	-394.7	949.5	0.00	0.00	0.00
2,400.0	35.78	204.56	2,114.9	-916.7	-419.0	1,008.0	0.00	0.00	0.00
2,500.0	35.78	204.56	2,196.1	-969.9	-443.3	1,066.4	0.00	0.00	0.00
2,600.0	35.78	204.56	2,277.2	-1,023.1	-467.6	1,124.9	0.00	0.00	0.00
<b>G' Sand</b>									
2,624.4	35.78	204.56	2,297.0	-1,036.1	-473.5	1,139.2	0.00	0.00	0.00
2,700.0	35.78	204.56	2,358.3	-1,076.3	-491.9	1,183.4	0.00	0.00	0.00
2,800.0	35.78	204.56	2,439.4	-1,129.5	-516.2	1,241.9	0.00	0.00	0.00
2,900.0	35.78	204.56	2,520.5	-1,182.7	-540.5	1,300.3	0.00	0.00	0.00
3,000.0	35.78	204.56	2,601.7	-1,235.8	-564.8	1,358.8	0.00	0.00	0.00
3,100.0	35.78	204.56	2,682.8	-1,289.0	-589.1	1,417.3	0.00	0.00	0.00
3,200.0	35.78	204.56	2,763.9	-1,342.2	-613.4	1,475.7	0.00	0.00	0.00
3,300.0	35.78	204.56	2,845.0	-1,395.4	-637.7	1,534.2	0.00	0.00	0.00
3,400.0	35.78	204.56	2,926.2	-1,448.6	-662.0	1,592.7	0.00	0.00	0.00
3,500.0	35.78	204.56	3,007.3	-1,501.8	-686.4	1,651.2	0.00	0.00	0.00
3,600.0	35.78	204.56	3,088.4	-1,554.9	-710.7	1,709.6	0.00	0.00	0.00
3,700.0	35.78	204.56	3,169.5	-1,608.1	-735.0	1,768.1	0.00	0.00	0.00
3,800.0	35.78	204.56	3,250.6	-1,661.3	-759.3	1,826.6	0.00	0.00	0.00
3,900.0	35.78	204.56	3,331.8	-1,714.5	-783.6	1,885.1	0.00	0.00	0.00
4,000.0	35.78	204.56	3,412.9	-1,767.7	-807.9	1,943.5	0.00	0.00	0.00
4,100.0	35.78	204.56	3,494.0	-1,820.9	-832.2	2,002.0	0.00	0.00	0.00
4,200.0	35.78	204.56	3,575.1	-1,874.0	-856.5	2,060.5	0.00	0.00	0.00
4,300.0	35.78	204.56	3,656.3	-1,927.2	-880.8	2,119.0	0.00	0.00	0.00
4,400.0	35.78	204.56	3,737.4	-1,980.4	-905.1	2,177.4	0.00	0.00	0.00
4,500.0	35.78	204.56	3,818.5	-2,033.6	-929.4	2,235.9	0.00	0.00	0.00
4,600.0	35.78	204.56	3,899.6	-2,086.8	-953.7	2,294.4	0.00	0.00	0.00



# Well Planning Report



<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols 0994-24-21W
<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 0994-24-21W	<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	35.78	204.56	3,980.7	-2,140.0	-978.0	2,352.9	0.00	0.00	0.00
<b>Williams Fork</b>									
4,781.7	35.78	204.56	4,047.0	-2,183.4	-997.9	2,400.6	0.00	0.00	0.00
4,800.0	35.78	204.56	4,061.9	-2,193.1	-1,002.3	2,411.3	0.00	0.00	0.00
4,900.0	35.78	204.56	4,143.0	-2,246.3	-1,026.6	2,469.8	0.00	0.00	0.00
5,000.0	35.78	204.56	4,224.1	-2,299.5	-1,050.9	2,528.3	0.00	0.00	0.00
5,100.0	35.78	204.56	4,305.2	-2,352.7	-1,075.3	2,586.8	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,130.8	35.78	204.56	4,330.2	-2,369.1	-1,082.7	2,604.8	0.00	0.00	0.00
5,200.0	33.71	204.56	4,387.1	-2,404.9	-1,099.1	2,644.2	3.00	-3.00	0.00
5,300.0	30.71	204.56	4,471.7	-2,453.4	-1,121.3	2,697.5	3.00	-3.00	0.00
5,400.0	27.71	204.56	4,558.9	-2,497.8	-1,141.6	2,746.3	3.00	-3.00	0.00
5,500.0	24.71	204.56	4,648.7	-2,538.0	-1,159.9	2,790.5	3.00	-3.00	0.00
5,600.0	21.71	204.56	4,740.6	-2,573.8	-1,176.3	2,829.9	3.00	-3.00	0.00
5,700.0	18.71	204.56	4,834.4	-2,605.2	-1,190.7	2,864.4	3.00	-3.00	0.00
5,800.0	15.71	204.56	4,929.9	-2,632.1	-1,203.0	2,894.0	3.00	-3.00	0.00
5,900.0	12.71	204.56	5,026.8	-2,654.4	-1,213.2	2,918.5	3.00	-3.00	0.00
6,000.0	9.71	204.56	5,124.9	-2,672.1	-1,221.2	2,938.0	3.00	-3.00	0.00
6,100.0	6.71	204.56	5,223.9	-2,685.1	-1,227.2	2,952.2	3.00	-3.00	0.00
6,200.0	3.71	204.56	5,323.5	-2,693.4	-1,230.9	2,961.3	3.00	-3.00	0.00
6,300.0	0.71	204.56	5,423.4	-2,696.9	-1,232.6	2,965.2	3.00	-3.00	0.00
<b>EOB @ Vertical - TOG</b>									
6,323.6	0.00	0.00	5,447.0	-2,697.0	-1,232.6	2,965.3	3.00	-3.00	0.00
6,400.0	0.00	0.00	5,523.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
6,500.0	0.00	0.00	5,623.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
6,600.0	0.00	0.00	5,723.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
6,700.0	0.00	0.00	5,823.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
6,800.0	0.00	0.00	5,923.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
6,900.0	0.00	0.00	6,023.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,000.0	0.00	0.00	6,123.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,100.0	0.00	0.00	6,223.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,200.0	0.00	0.00	6,323.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
<b>Cameo</b>									
7,223.6	0.00	0.00	6,347.0	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,300.0	0.00	0.00	6,423.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,400.0	0.00	0.00	6,523.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,500.0	0.00	0.00	6,623.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,600.0	0.00	0.00	6,723.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,700.0	0.00	0.00	6,823.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,800.0	0.00	0.00	6,923.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
7,883.6	0.00	0.00	7,007.0	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,023.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
<b>Rollins</b>									
7,923.6	0.00	0.00	7,047.0	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,123.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
8,100.0	0.00	0.00	7,223.4	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00
<b>TD @ 8173.6' MD / 7297.0' TVD</b>									
8,173.6	0.00	0.00	7,297.0	-2,697.0	-1,232.6	2,965.3	0.00	0.00	0.00



## Well Planning Report



<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols 0994-24-21W
<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 0994-24-21W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

### 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 - Nichols 0994-24	0.00	0.00	7,297.0	-2,697.0	-1,232.6	1,526,549.71	2,338,818.17	39.255778	-107.835239
- plan hits target center									
- Point									

### Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,409.2	8 5/8"	8-5/8	11

### Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,624.4	2,297.0	G' Sand			
4,781.7	4,047.0	Williams Fork			
6,323.6	5,447.0	TOG			
7,223.6	6,347.0	Cameo			
7,883.6	7,007.0	Base Cameo Coal			
7,923.6	7,047.0	Rollins			

### Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
100.0	100.0	0.0	0.0	KOP (Build 3" / 100')
1,292.8	1,216.8	-327.9	-149.9	EOB @ 35.78° Inc. / 204.56° Azm
5,130.8	4,330.2	-2,369.1	-1,082.7	Drop 3" / 100'
6,323.6	5,447.0	-2,697.0	-1,232.6	EOB @ Vertical
8,173.6	7,297.0	-2,697.0	-1,232.6	TD @ 8173.6' MD / 7297.0' TVD