



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-21W
 Wellbore: Wellbore #1
 Design: Design #2
 Latitude: 39.263183
 Longitude: -107.830889
 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	Diag	TFace	VSecl	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')
1246.0	34.56	200.57	1177.4	-315.5	-118.4	3.00	200.57	337.0	EOB @ 34.56° Inc. / 200.57° Azm
5107.6	34.56	200.57	4357.6	-2366.5	-888.0	0.00	0.00	2527.6	Drop 3" / 100'
6259.6	0.00	0.00	5441.0	-2682.1	-1006.4	3.00	180.00	2864.7	EOD @ Vertical
8109.6	0.00	0.00	7291.0	-2682.1	-1006.4	0.00	0.00	2864.7	TD @ 8109.7' MD / 7291.0' TVD

DESIGN TARGET DETAILS

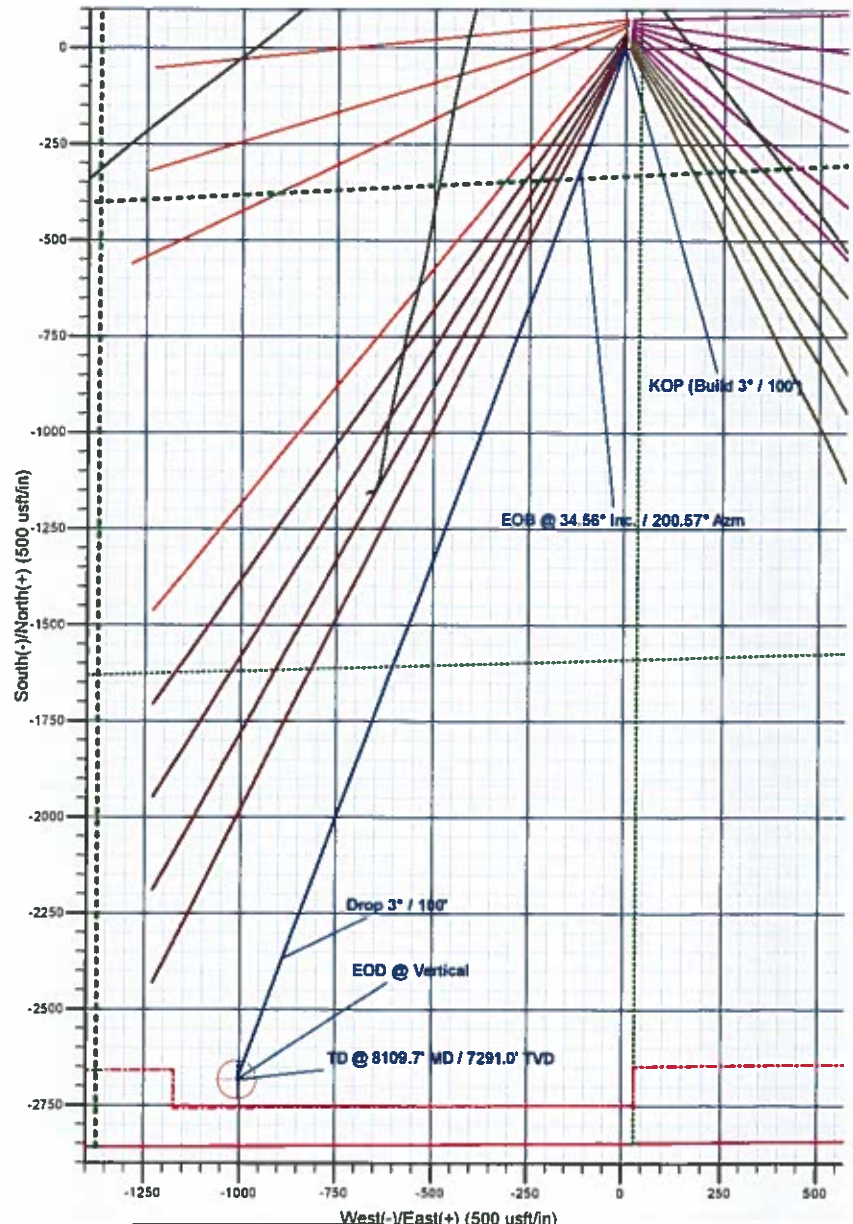
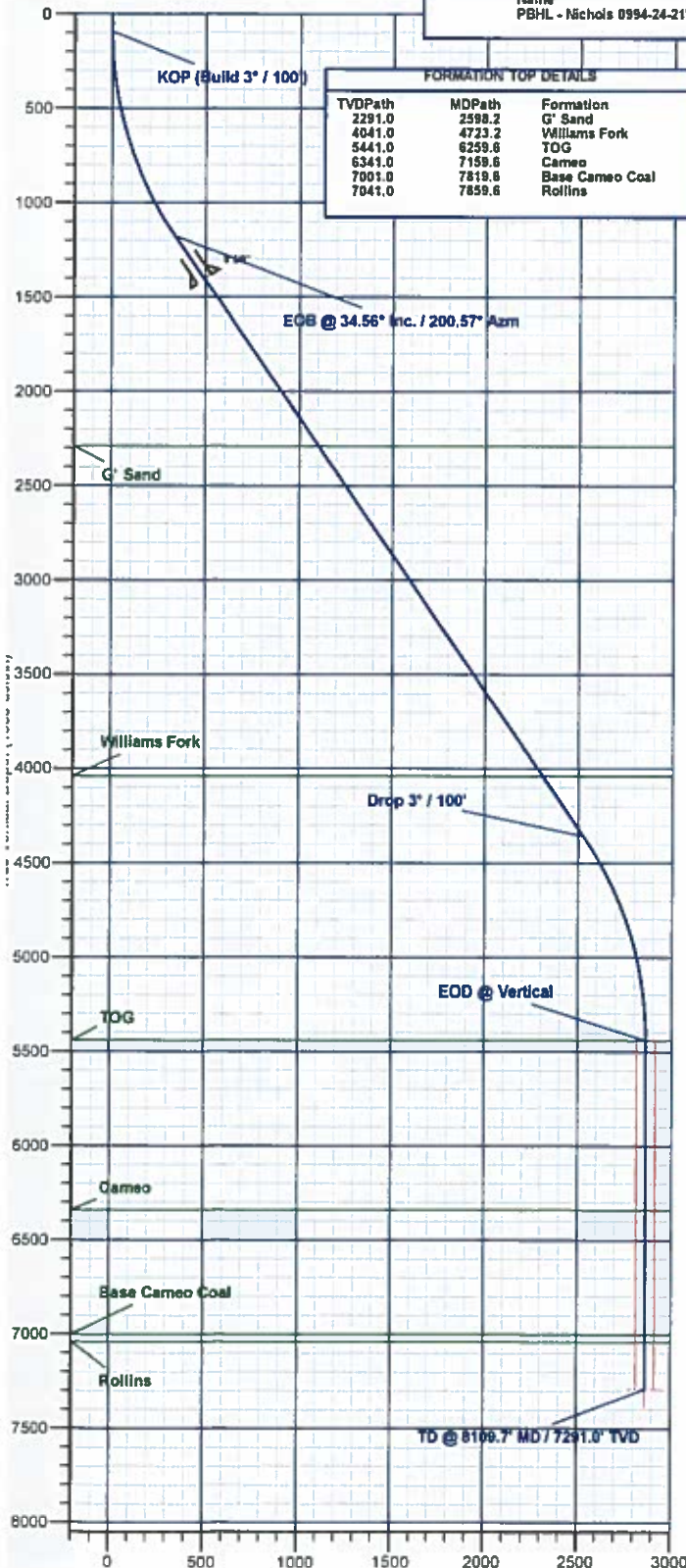
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-21W D#2	7291.0	-2682.1	-1006.4	1526558.84	2339043.87	39.255819	-107.834443

WELL DETAILS: Nichols 0994-24-21W

		Ground Level:		7212.0	
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1529214.19	2340118.74	39.263183	-107.830889

REFERENCE INFORMATION

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



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



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-21W

Wellbore #1

Plan: Design #2

QES Well Planning Report

29 January, 2018





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Nichols 0994-24-21W
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 0994-24-21W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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:	1,529,214.20 usft
	+E/-W	-10.2 usft	Easting:	2,340,118.75 usft
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	51,444.95153038

Design	Design #2			
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	200.57

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	
94.0	0.00	0.00	94.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,248.0	34.56	200.57	1,177.4	-315.5	-118.4	3.00	3.00	0.00	200.57	
5,107.6	34.56	200.57	4,357.6	-2,366.5	-888.0	0.00	0.00	0.00	0.00	
6,259.6	0.00	0.00	5,441.0	-2,682.1	-1,006.4	3.00	-3.00	0.00	180.00	
8,109.6	0.00	0.00	7,291.0	-2,682.1	-1,006.4	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Nichols 0994-24-21W
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 0994-24-21W	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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
94.0	0.00	0.00	94.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.18	200.57	100.0	0.0	0.0	0.0	3.00	3.00	0.00
200.0	3.18	200.57	199.9	-2.8	-1.0	2.9	3.00	3.00	0.00
300.0	6.18	200.57	299.6	-10.4	-3.9	11.1	3.00	3.00	0.00
400.0	9.18	200.57	398.7	-22.9	-8.6	24.5	3.00	3.00	0.00
500.0	12.18	200.57	496.9	-40.3	-15.1	43.0	3.00	3.00	0.00
600.0	15.18	200.57	594.1	-62.4	-23.4	66.6	3.00	3.00	0.00
700.0	18.18	200.57	689.9	-89.3	-33.5	95.3	3.00	3.00	0.00
800.0	21.18	200.57	784.0	-120.8	-45.3	129.0	3.00	3.00	0.00
900.0	24.18	200.57	876.3	-156.9	-58.9	167.6	3.00	3.00	0.00
1,000.0	27.18	200.57	966.4	-197.5	-74.1	210.9	3.00	3.00	0.00
1,100.0	30.18	200.57	1,054.1	-242.4	-90.9	258.9	3.00	3.00	0.00
1,200.0	33.18	200.57	1,139.2	-291.5	-109.4	311.4	3.00	3.00	0.00
EOB @ 34.56° Inc. / 200.57° Azm									
1,248.0	34.56	200.57	1,177.4	-315.5	-118.4	337.0	3.00	3.00	0.00
1,300.0	34.56	200.57	1,221.9	-344.2	-129.2	367.7	0.00	0.00	0.00
1,400.0	34.56	200.57	1,304.2	-397.3	-149.1	424.4	0.00	0.00	0.00
1,500.0	34.56	200.57	1,386.6	-450.4	-169.0	481.1	0.00	0.00	0.00
8 5/8"									
1,524.0	34.56	200.57	1,406.3	-463.2	-173.8	494.7	0.00	0.00	0.00
1,600.0	34.56	200.57	1,468.9	-503.6	-189.0	537.8	0.00	0.00	0.00
1,700.0	34.56	200.57	1,551.3	-556.7	-208.9	594.6	0.00	0.00	0.00
1,800.0	34.56	200.57	1,633.6	-609.8	-228.8	651.3	0.00	0.00	0.00
1,900.0	34.56	200.57	1,716.0	-662.9	-248.7	708.0	0.00	0.00	0.00
2,000.0	34.56	200.57	1,798.3	-716.0	-268.7	764.7	0.00	0.00	0.00
2,100.0	34.56	200.57	1,880.7	-769.1	-288.6	821.5	0.00	0.00	0.00
2,200.0	34.56	200.57	1,963.1	-822.2	-308.5	878.2	0.00	0.00	0.00
2,300.0	34.56	200.57	2,045.4	-875.3	-328.5	934.9	0.00	0.00	0.00
2,400.0	34.56	200.57	2,127.8	-928.4	-348.4	991.7	0.00	0.00	0.00
2,500.0	34.56	200.57	2,210.1	-981.6	-368.3	1,048.4	0.00	0.00	0.00
G' Sand									
2,598.2	34.56	200.57	2,291.0	-1,033.7	-387.9	1,104.1	0.00	0.00	0.00
2,600.0	34.56	200.57	2,292.5	-1,034.7	-388.2	1,105.1	0.00	0.00	0.00
2,700.0	34.56	200.57	2,374.8	-1,087.8	-408.2	1,161.8	0.00	0.00	0.00
2,800.0	34.56	200.57	2,457.2	-1,140.9	-428.1	1,218.6	0.00	0.00	0.00
2,900.0	34.56	200.57	2,539.5	-1,194.0	-448.0	1,275.3	0.00	0.00	0.00
3,000.0	34.56	200.57	2,621.9	-1,247.1	-468.0	1,332.0	0.00	0.00	0.00
3,100.0	34.56	200.57	2,704.2	-1,300.2	-487.9	1,388.7	0.00	0.00	0.00
3,200.0	34.56	200.57	2,786.6	-1,353.3	-507.8	1,445.5	0.00	0.00	0.00
3,300.0	34.56	200.57	2,868.9	-1,406.4	-527.7	1,502.2	0.00	0.00	0.00
3,400.0	34.56	200.57	2,951.3	-1,459.6	-547.7	1,558.9	0.00	0.00	0.00
3,500.0	34.56	200.57	3,033.6	-1,512.7	-567.6	1,615.7	0.00	0.00	0.00
3,600.0	34.56	200.57	3,116.0	-1,565.8	-587.5	1,672.4	0.00	0.00	0.00
3,700.0	34.56	200.57	3,198.4	-1,618.9	-607.5	1,729.1	0.00	0.00	0.00
3,800.0	34.56	200.57	3,280.7	-1,672.0	-627.4	1,785.8	0.00	0.00	0.00
3,900.0	34.56	200.57	3,363.1	-1,725.1	-647.3	1,842.6	0.00	0.00	0.00
4,000.0	34.56	200.57	3,445.4	-1,778.2	-667.2	1,899.3	0.00	0.00	0.00
4,100.0	34.56	200.57	3,527.8	-1,831.3	-687.2	1,956.0	0.00	0.00	0.00
4,200.0	34.56	200.57	3,610.1	-1,884.4	-707.1	2,012.7	0.00	0.00	0.00
4,300.0	34.56	200.57	3,692.5	-1,937.6	-727.0	2,069.5	0.00	0.00	0.00
4,400.0	34.56	200.57	3,774.8	-1,990.7	-747.0	2,126.2	0.00	0.00	0.00
4,500.0	34.56	200.57	3,857.2	-2,043.8	-766.9	2,182.9	0.00	0.00	0.00



Well Planning Report



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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 0994-24-21W	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	34.56	200.57	3,939.5	-2,096.9	-786.8	2,239.7	0.00	0.00	0.00
4,700.0	34.56	200.57	4,021.9	-2,150.0	-806.8	2,296.4	0.00	0.00	0.00
Williams Fork									
4,723.2	34.56	200.57	4,041.0	-2,162.3	-811.4	2,309.5	0.00	0.00	0.00
4,800.0	34.56	200.57	4,104.2	-2,203.1	-826.7	2,353.1	0.00	0.00	0.00
4,900.0	34.56	200.57	4,186.6	-2,256.2	-846.6	2,409.8	0.00	0.00	0.00
5,000.0	34.56	200.57	4,268.9	-2,309.3	-866.5	2,466.6	0.00	0.00	0.00
Drop 3° / 100'									
5,107.6	34.56	200.57	4,357.6	-2,366.5	-888.0	2,527.6	0.00	0.00	0.00
5,200.0	31.79	200.57	4,434.9	-2,413.8	-905.7	2,578.2	3.00	-3.00	0.00
5,300.0	28.79	200.57	4,521.2	-2,461.0	-923.5	2,628.6	3.00	-3.00	0.00
5,400.0	25.79	200.57	4,610.1	-2,504.0	-938.6	2,674.4	3.00	-3.00	0.00
5,500.0	22.79	200.57	4,701.2	-2,542.5	-954.0	2,715.6	3.00	-3.00	0.00
5,600.0	19.79	200.57	4,794.4	-2,576.5	-966.8	2,751.9	3.00	-3.00	0.00
5,700.0	16.79	200.57	4,889.3	-2,605.8	-977.8	2,783.2	3.00	-3.00	0.00
5,800.0	13.79	200.57	4,985.8	-2,630.5	-987.1	2,809.6	3.00	-3.00	0.00
5,900.0	10.79	200.57	5,083.5	-2,650.4	-994.5	2,830.9	3.00	-3.00	0.00
6,000.0	7.79	200.57	5,182.1	-2,665.6	-1,000.2	2,847.0	3.00	-3.00	0.00
6,100.0	4.79	200.57	5,281.5	-2,675.8	-1,004.1	2,858.0	3.00	-3.00	0.00
6,200.0	1.79	200.57	5,381.4	-2,681.2	-1,006.1	2,863.7	3.00	-3.00	0.00
EOD @ Vertical - TOG									
6,259.6	0.00	0.00	5,441.0	-2,682.1	-1,006.4	2,864.7	3.00	-3.00	0.00
6,300.0	0.00	0.00	5,481.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
6,400.0	0.00	0.00	5,581.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
6,500.0	0.00	0.00	5,681.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
6,600.0	0.00	0.00	5,781.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
6,700.0	0.00	0.00	5,881.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
6,800.0	0.00	0.00	5,981.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
6,900.0	0.00	0.00	6,081.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,000.0	0.00	0.00	6,181.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,100.0	0.00	0.00	6,281.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
Cameo									
7,159.6	0.00	0.00	6,341.0	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,200.0	0.00	0.00	6,381.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,300.0	0.00	0.00	6,481.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,400.0	0.00	0.00	6,581.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,500.0	0.00	0.00	6,681.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,600.0	0.00	0.00	6,781.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,700.0	0.00	0.00	6,881.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,800.0	0.00	0.00	6,981.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
Base Cameo Coal									
7,819.6	0.00	0.00	7,001.0	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
Rollins									
7,859.6	0.00	0.00	7,041.0	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
7,900.0	0.00	0.00	7,081.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
8,000.0	0.00	0.00	7,181.4	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00
TD @ 8109.7' MD / 7291.0' TVD									
8,109.6	0.00	0.00	7,291.0	-2,682.1	-1,006.4	2,864.7	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well Nichols 0994-24-21W
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 0994-24-21W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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 0994-24 - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,291.0	-2,682.1	-1,006.4	1,526,558.85	2,339,043.88	39.255819	-107.834443

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,524.0	1,406.3	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,598.2	2,291.0	G' Sand			
4,723.2	4,041.0	Williams Fork			
6,259.6	5,441.0	TOG			
7,159.6	6,341.0	Cameo			
7,819.6	7,001.0	Base Cameo Coal			
7,859.6	7,041.0	Rollins			

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')
1,246.0	1,177.4	-315.5	-118.4	EOB @ 34.56° Inc. / 200.57° Azm
5,107.6	4,357.6	-2,366.5	-888.0	Drop 3" / 100'
6,259.7	5,441.0	-2,682.1	-1,006.4	EOD @ Vertical
8,109.6	7,291.0	-2,682.1	-1,006.4	TD @ 8109.7' MD / 7291.0' TVD