



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols Federal 0994-24-21E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263181
 Longitude: -107.830853
 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 1960
 Zone: Colorado Central Zone
 System Datum: Mean Sea Level

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Nichols Federal 0994-24-21E, True North
 Vertical (TVD) Reference: well @ 7242.0usft (H&P #522)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7242.0usft (H&P #522)
 Calculation Method: Minimum Curvature

WELL DETAILS: Nichols Federal 0994-24-21E

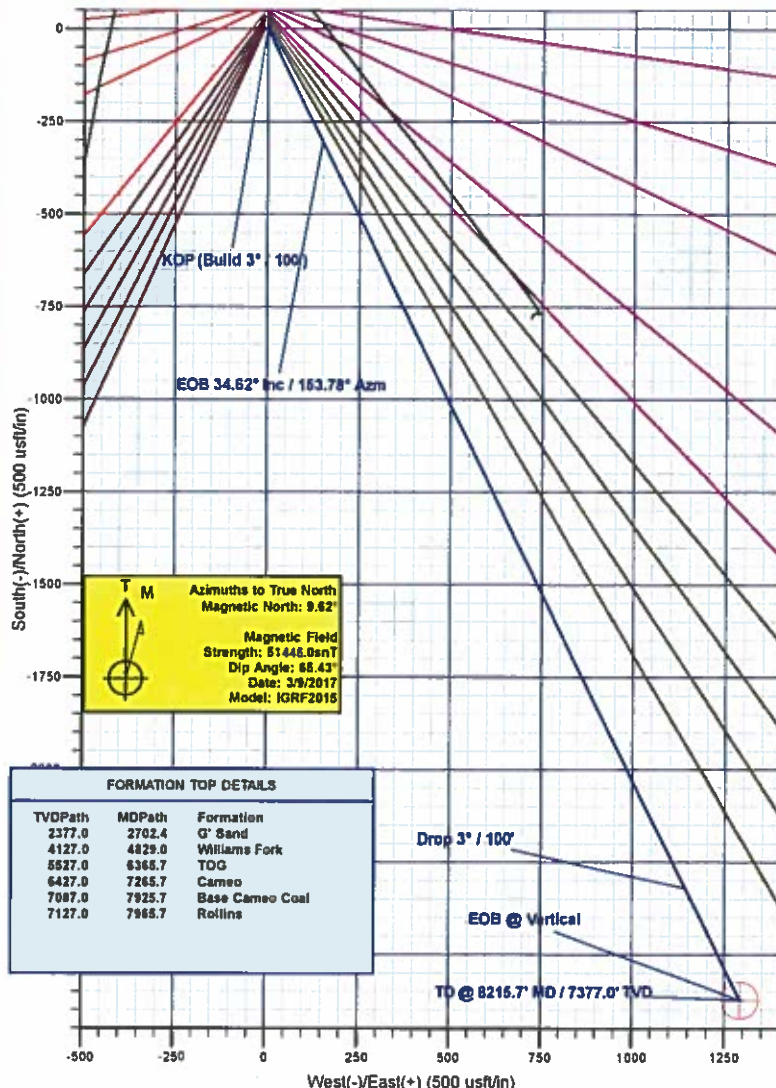
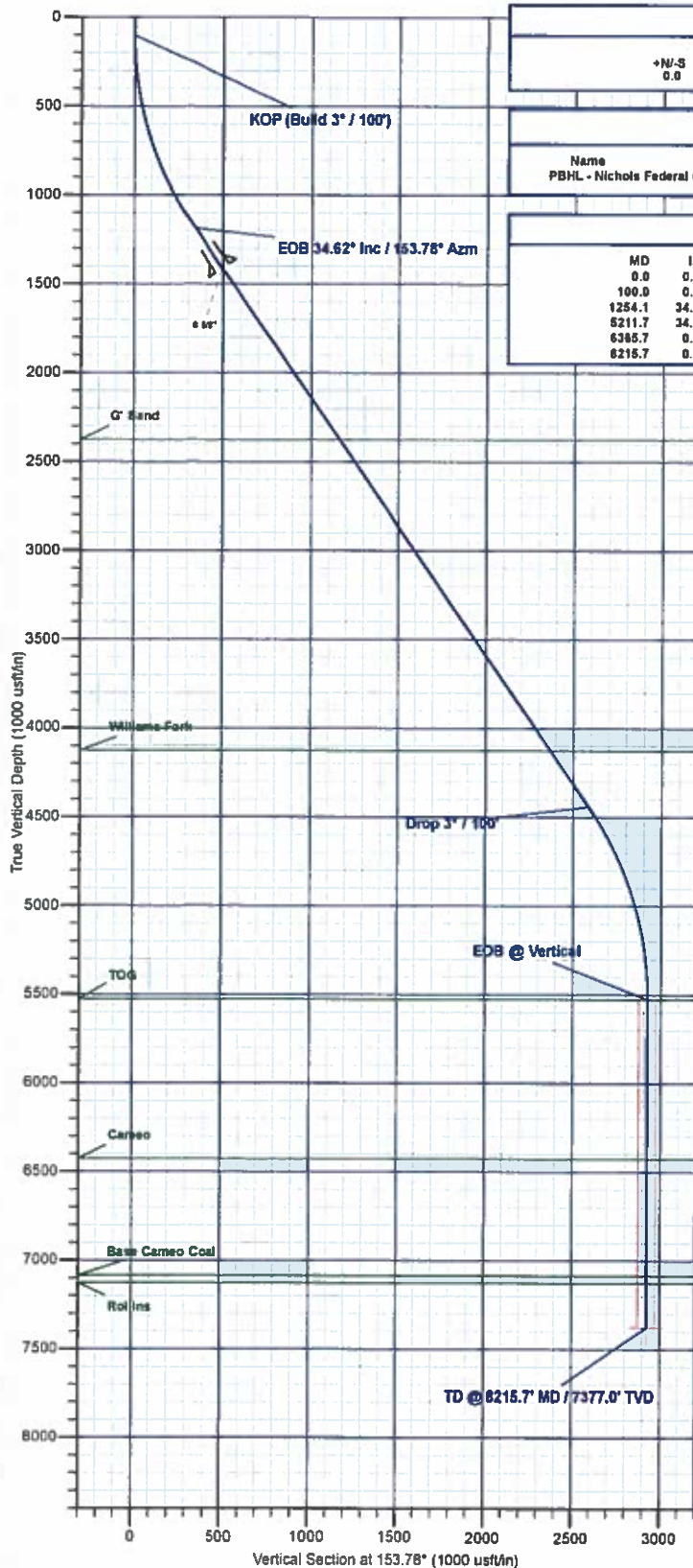
+N/-S	+E/-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529213.06	2340128.84	39.263181	-107.830853

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols Federal 0994-24-21E	7377.0	-2624.0	1292.3	1526556.78	2341353.49	39.255976	-107.826289

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	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	KOP (Build 3' / 100')
1254.1	34.62	153.78	1185.1	-303.4	149.4	3.00	153.78	338.2	EOB 34.62° Inc / 153.78° Azm
5211.7	34.62	153.78	4441.9	-2320.6	1142.9	0.00	0.00	2586.8	Drop 3' / 100'
6365.7	0.00	0.00	5527.0	-2624.0	1292.3	3.00	180.00	2925.0	EOB @ Vertical
8215.7	0.00	0.00	7377.0	-2624.0	1292.3	0.00	0.00	2925.0	TD @ 8215.7' MD / 7377.0' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2377.0	2702.4	G' Sand
4127.0	4829.0	Williams Fork
5527.0	6365.7	TOG
6427.0	7265.7	Cameo
7087.0	7925.7	Base Cameo Coal
7127.0	7965.7	Rollins

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

Created By: Will Jircik Date: 16:46, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols Federal 0994-24-21E

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-21E
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 0994-24-21E	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	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 Federal 0994-24-21E			
Well Position	+N/-S	0.0 usft	Northing: 1,529,213.07 usft	Latitude: 39.263181
	+E/-W	0.0 usft	Easting: 2,340,128.94 usft	Longitude: -107.830853
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	153.78

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	
1,254.1	34.62	153.78	1,185.1	-303.4	149.4	3.00	3.00	0.00	153.78	
5,211.7	34.62	153.78	4,441.9	-2,320.6	1,142.9	0.00	0.00	0.00	0.00	
6,365.7	0.00	0.00	5,527.0	-2,624.0	1,292.3	3.00	-3.00	0.00	180.00	
8,215.7	0.00	0.00	7,377.0	-2,624.0	1,292.3	0.00	0.00	0.00	0.00	PBHL - Nichols Feder



Well Planning Report



Database: EDM5002
 Company: Laramie Energy, LLC
 Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols Federal 0994-24-21E
 Wellbore: Wellbore #1
 Design: Design #1

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

Well Nichols Federal 0994-24-21E
 well @ 7242.0usft (H&P #522)
 well @ 7242.0usft (H&P #522)
 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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	3.00	153.78	200.0	-2.3	1.2	2.6	3.00	3.00	0.00
300.0	6.00	153.78	299.6	-9.4	4.6	10.5	3.00	3.00	0.00
400.0	9.00	153.78	398.8	-21.1	10.4	23.5	3.00	3.00	0.00
500.0	12.00	153.78	497.1	-37.4	18.4	41.7	3.00	3.00	0.00
600.0	15.00	153.78	594.3	-58.4	28.8	65.1	3.00	3.00	0.00
700.0	18.00	153.78	690.2	-83.9	41.3	93.5	3.00	3.00	0.00
800.0	21.00	153.78	784.4	-113.8	58.0	126.9	3.00	3.00	0.00
900.0	24.00	153.78	876.8	-148.1	73.0	165.1	3.00	3.00	0.00
1,000.0	27.00	153.78	967.1	-186.7	92.0	208.2	3.00	3.00	0.00
1,100.0	30.00	153.78	1,054.9	-229.5	113.0	255.9	3.00	3.00	0.00
1,200.0	33.00	153.78	1,140.2	-276.4	136.1	308.1	3.00	3.00	0.00
EOB 34.62° Inc / 153.78° Azm									
1,254.1	34.62	153.78	1,185.1	-303.4	149.4	338.2	3.00	3.00	0.00
1,300.0	34.62	153.78	1,222.9	-326.8	161.0	364.3	0.00	0.00	0.00
1,400.0	34.62	153.78	1,305.2	-377.8	186.1	421.1	0.00	0.00	0.00
1,500.0	34.62	153.78	1,387.5	-428.8	211.2	477.9	0.00	0.00	0.00
8 5/8"									
1,530.0	34.62	153.78	1,412.2	-444.0	218.7	495.0	0.00	0.00	0.00
1,600.0	34.62	153.78	1,469.8	-479.7	236.3	534.7	0.00	0.00	0.00
1,700.0	34.62	153.78	1,552.1	-530.7	261.4	591.6	0.00	0.00	0.00
1,800.0	34.62	153.78	1,634.4	-581.7	286.5	648.4	0.00	0.00	0.00
1,900.0	34.62	153.78	1,716.7	-632.6	311.6	705.2	0.00	0.00	0.00
2,000.0	34.62	153.78	1,798.9	-683.6	336.7	762.0	0.00	0.00	0.00
2,100.0	34.62	153.78	1,881.2	-734.6	361.8	818.8	0.00	0.00	0.00
2,200.0	34.62	153.78	1,963.5	-785.5	386.9	875.6	0.00	0.00	0.00
2,300.0	34.62	153.78	2,045.8	-836.5	412.0	932.5	0.00	0.00	0.00
2,400.0	34.62	153.78	2,128.1	-887.5	437.1	989.3	0.00	0.00	0.00
2,500.0	34.62	153.78	2,210.4	-938.5	462.2	1,046.1	0.00	0.00	0.00
2,600.0	34.62	153.78	2,292.7	-989.4	487.3	1,102.9	0.00	0.00	0.00
2,700.0	34.62	153.78	2,375.0	-1,040.4	512.4	1,159.7	0.00	0.00	0.00
G' Sand									
2,702.4	34.62	153.78	2,377.0	-1,041.6	513.0	1,161.1	0.00	0.00	0.00
2,800.0	34.62	153.78	2,457.3	-1,091.4	537.5	1,216.5	0.00	0.00	0.00
2,900.0	34.62	153.78	2,539.6	-1,142.3	562.6	1,273.4	0.00	0.00	0.00
3,000.0	34.62	153.78	2,621.9	-1,193.3	587.7	1,330.2	0.00	0.00	0.00
3,100.0	34.62	153.78	2,704.2	-1,244.3	612.8	1,387.0	0.00	0.00	0.00
3,200.0	34.62	153.78	2,786.5	-1,295.2	637.9	1,443.8	0.00	0.00	0.00
3,300.0	34.62	153.78	2,868.7	-1,346.2	663.0	1,500.6	0.00	0.00	0.00
3,400.0	34.62	153.78	2,951.0	-1,397.2	688.1	1,557.4	0.00	0.00	0.00
3,500.0	34.62	153.78	3,033.3	-1,448.2	713.2	1,614.2	0.00	0.00	0.00
3,600.0	34.62	153.78	3,115.6	-1,499.1	738.3	1,671.1	0.00	0.00	0.00
3,700.0	34.62	153.78	3,197.9	-1,550.1	763.4	1,727.9	0.00	0.00	0.00
3,800.0	34.62	153.78	3,280.2	-1,601.1	788.5	1,784.7	0.00	0.00	0.00
3,900.0	34.62	153.78	3,362.5	-1,652.0	813.6	1,841.5	0.00	0.00	0.00
4,000.0	34.62	153.78	3,444.8	-1,703.0	838.7	1,898.3	0.00	0.00	0.00
4,100.0	34.62	153.78	3,527.1	-1,754.0	863.8	1,955.1	0.00	0.00	0.00
4,200.0	34.62	153.78	3,609.4	-1,804.9	888.9	2,012.0	0.00	0.00	0.00
4,300.0	34.62	153.78	3,691.7	-1,855.9	914.0	2,068.8	0.00	0.00	0.00
4,400.0	34.62	153.78	3,774.0	-1,906.9	939.1	2,125.6	0.00	0.00	0.00
4,500.0	34.62	153.78	3,856.2	-1,957.8	964.2	2,182.4	0.00	0.00	0.00
4,600.0	34.62	153.78	3,938.5	-2,008.8	989.3	2,239.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-21E
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 0994-24-21E	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)
4,700.0	34.62	153.78	4,020.8	-2,059.8	1,014.4	2,296.0	0.00	0.00	0.00
4,800.0	34.62	153.78	4,103.1	-2,110.8	1,039.5	2,352.9	0.00	0.00	0.00
Williams Fork									
4,829.0	34.62	153.78	4,127.0	-2,125.5	1,046.8	2,369.3	0.00	0.00	0.00
4,900.0	34.62	153.78	4,185.4	-2,161.7	1,064.6	2,409.7	0.00	0.00	0.00
5,000.0	34.62	153.78	4,267.7	-2,212.7	1,089.7	2,466.5	0.00	0.00	0.00
5,100.0	34.62	153.78	4,350.0	-2,263.7	1,114.8	2,523.3	0.00	0.00	0.00
5,200.0	34.62	153.78	4,432.3	-2,314.6	1,139.9	2,580.1	0.00	0.00	0.00
Drop 3° / 100'									
5,211.7	34.62	153.78	4,441.9	-2,320.6	1,142.9	2,586.8	0.00	0.00	0.00
5,300.0	31.97	153.78	4,515.7	-2,364.1	1,164.3	2,635.2	3.00	-3.00	0.00
5,400.0	28.97	153.78	4,601.9	-2,409.6	1,186.7	2,685.9	3.00	-3.00	0.00
5,500.0	25.97	153.78	4,690.6	-2,451.0	1,207.1	2,732.1	3.00	-3.00	0.00
5,600.0	22.97	153.78	4,781.6	-2,488.1	1,225.4	2,773.5	3.00	-3.00	0.00
5,700.0	19.97	153.78	4,874.7	-2,520.9	1,241.5	2,810.1	3.00	-3.00	0.00
5,800.0	16.97	153.78	4,969.5	-2,549.4	1,255.5	2,841.8	3.00	-3.00	0.00
5,900.0	13.97	153.78	5,065.9	-2,573.3	1,267.3	2,868.4	3.00	-3.00	0.00
6,000.0	10.97	153.78	5,163.5	-2,592.7	1,276.9	2,890.0	3.00	-3.00	0.00
6,100.0	7.97	153.78	5,262.1	-2,607.4	1,284.1	2,906.5	3.00	-3.00	0.00
6,200.0	4.97	153.78	5,361.5	-2,617.5	1,289.1	2,917.8	3.00	-3.00	0.00
6,300.0	1.97	153.78	5,461.3	-2,623.0	1,291.8	2,923.8	3.00	-3.00	0.00
EOB @ Vertical - TOG									
6,365.7	0.00	0.00	5,527.0	-2,624.0	1,292.3	2,925.0	3.00	-3.00	-233.92
6,400.0	0.00	0.00	5,561.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
6,500.0	0.00	0.00	5,661.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
6,600.0	0.00	0.00	5,761.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
6,700.0	0.00	0.00	5,861.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
6,800.0	0.00	0.00	5,961.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,061.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,000.0	0.00	0.00	6,161.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,100.0	0.00	0.00	6,261.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,200.0	0.00	0.00	6,361.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
Cameo									
7,265.7	0.00	0.00	6,427.0	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,300.0	0.00	0.00	6,461.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,400.0	0.00	0.00	6,561.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,500.0	0.00	0.00	6,661.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,600.0	0.00	0.00	6,761.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,700.0	0.00	0.00	6,861.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,800.0	0.00	0.00	6,961.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,061.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
Base Cameo Coal									
7,925.7	0.00	0.00	7,087.0	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
Rollins									
7,965.7	0.00	0.00	7,127.0	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
8,000.0	0.00	0.00	7,161.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
8,100.0	0.00	0.00	7,261.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
8,200.0	0.00	0.00	7,361.3	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00
TD @ 8215.7' MD / 7377.0' TVD									
8,215.7	0.00	0.00	7,377.0	-2,624.0	1,292.3	2,925.0	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-21E
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 0994-24-21E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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 Federal	0.00	0.00	7,377.0	-2,624.0	1,292.3	1,526,556.79	2,341,353.49	39.255976	-107.826289
- plan hits target center									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,412.2	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,702.4	2,377.0	G' Sand			
4,829.0	4,127.0	Williams Fork			
6,365.7	5,527.0	TOG			
7,265.7	6,427.0	Cameo			
7,925.7	7,087.0	Base Cameo Coal			
7,965.7	7,127.0	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')
1,254.1	1,185.1	-303.4	149.4	EOB 34.62° Inc / 153.78° Azm
5,211.7	4,441.9	-2,320.6	1,142.9	Drop 3" / 100'
6,365.7	5,527.0	-2,624.0	1,292.3	EOB @ Vertical
8,215.7	7,377.0	-2,624.0	1,292.3	TD @ 8215.7' MD / 7377.0' TVD