



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols Federal 0994-24-18E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263242
 Longitude: -107.830844
 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 (N/E) Reference: Well Nichols Federal 0994-24-18E, 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 0994-24-18E

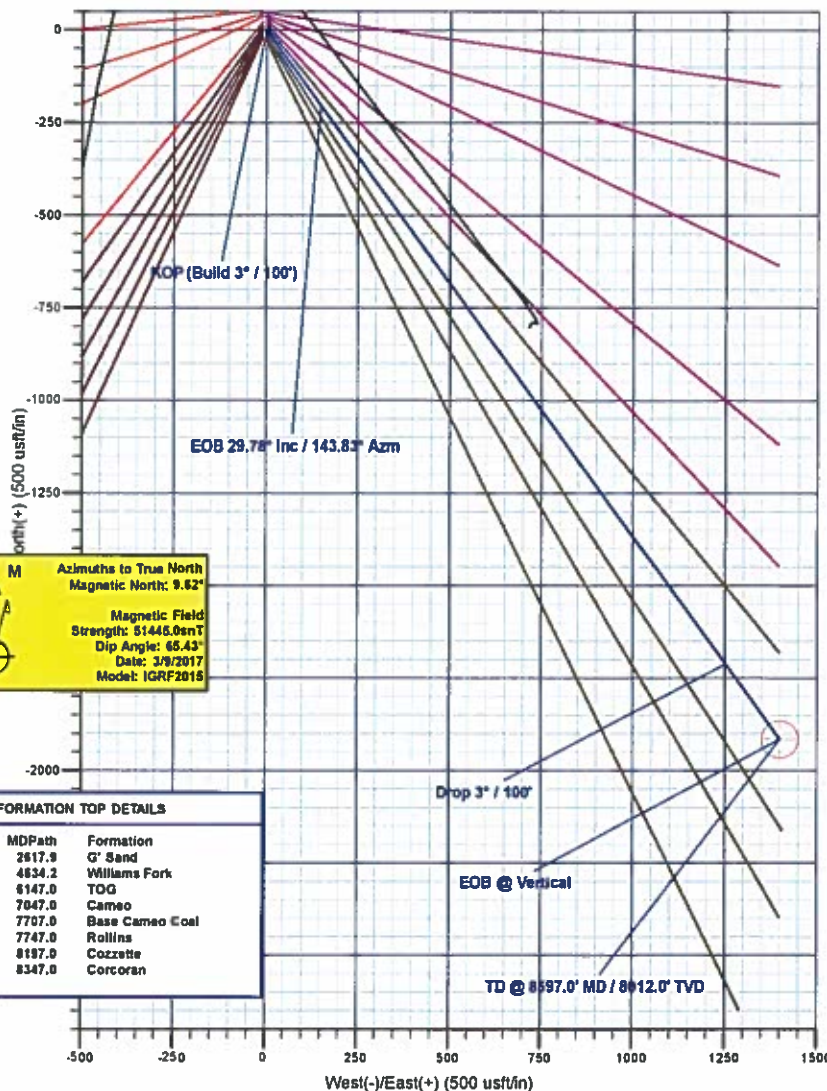
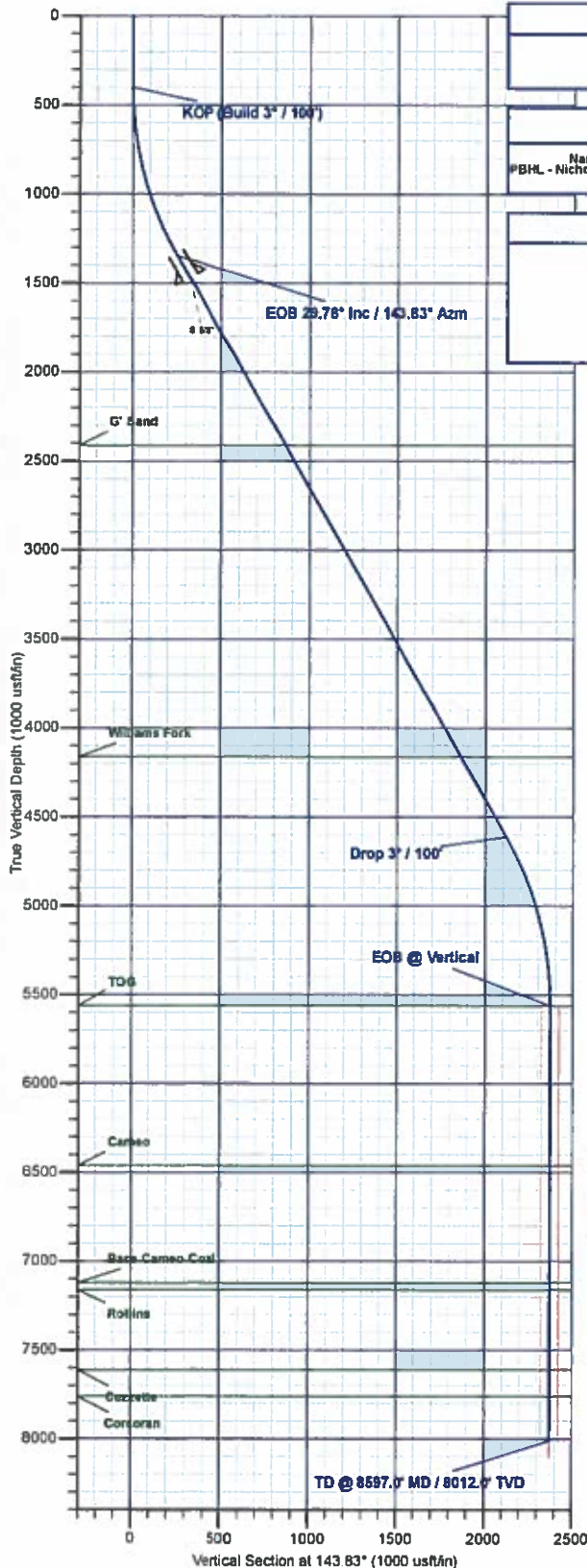
+N-S	+E-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529235.37	2340132.00	39.263242	-107.830844

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols Federal 0994-24-18E	8012.0	-1915.4	1400.5	1527284.70	2341482.89	39.257863	-107.825498

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1392.7	29.78	143.83	1348.6	-203.6	148.9	3.00	143.83	252.2	EOB 29.78° Inc / 143.83° Azm
5164.3	29.78	143.83	4613.4	-1711.8	1281.6	0.00	0.00	2120.8	Drop 3° / 100'
6147.0	0.00	0.00	5562.0	-1915.4	1400.5	3.00	180.00	2372.8	EOB @ Vertical
8597.0	0.00	0.00	8012.0	-1915.4	1400.5	0.00	0.00	2372.8	TD @ 8597.0' MD / 8012.0' TVD



Azimuths to True North
 Magnetic North: 9.62°
 Magnetic Field
 Strength: 51448.0nT
 Dip Angle: 65.43°
 Date: 3/8/2017
 Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2412.0	2617.9	G' Sand
4182.0	4634.2	Williams Fork
5562.0	6147.0	TOG
6462.0	7047.0	Cameo
7122.0	7707.0	Base Cameo Coal
7162.0	7747.0	Rollins
7612.0	8197.0	Cozette
7762.0	8347.0	Corcoran

Plan: Design #1 (Nichols Federal 0994-24-18E/Wellbore #1)

Created By: Will Jircik Date: 16:30, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols Federal 0994-24-18E

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-18E
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 0994-24-18E	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 0994-24-18E					
Well Position	+N/-S	22.4 usft	Northing:	1,529,235.37 usft	Latitude:	39.263242
	+E/-W	2.5 usft	Easting:	2,340,132.00 usft	Longitude:	-107.830844
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	143.83

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,392.7	29.78	143.83	1,348.6	-203.6	148.9	3.00	3.00	0.00	143.83	
5,154.3	29.78	143.83	4,613.4	-1,711.8	1,251.6	0.00	0.00	0.00	0.00	
6,147.0	0.00	0.00	5,562.0	-1,915.4	1,400.5	3.00	-3.00	0.00	180.00	
8,597.0	0.00	0.00	8,012.0	-1,915.4	1,400.5	0.00	0.00	0.00	0.00	PBHL - Nichols Feder



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-18E
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 0994-24-18E	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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	3.00	143.83	500.0	-2.1	1.5	2.6	3.00	3.00	0.00
600.0	6.00	143.83	599.6	-8.4	6.2	10.5	3.00	3.00	0.00
700.0	9.00	143.83	698.8	-19.0	13.9	23.5	3.00	3.00	0.00
800.0	12.00	143.83	797.1	-33.7	24.6	41.7	3.00	3.00	0.00
900.0	15.00	143.83	894.3	-52.5	38.4	65.1	3.00	3.00	0.00
1,000.0	18.00	143.83	990.2	-75.5	55.2	93.5	3.00	3.00	0.00
1,100.0	21.00	143.83	1,084.4	-102.4	74.9	126.9	3.00	3.00	0.00
1,200.0	24.00	143.83	1,176.8	-133.3	97.5	165.1	3.00	3.00	0.00
1,300.0	27.00	143.83	1,267.1	-168.0	122.9	208.2	3.00	3.00	0.00
EOB 29.78° Inc / 143.83° Azm									
1,392.7	29.78	143.83	1,348.6	-203.6	148.9	252.2	3.00	3.00	0.00
1,400.0	29.78	143.83	1,354.9	-206.5	151.0	255.9	0.00	0.00	0.00
1,500.0	29.78	143.83	1,441.7	-246.6	180.3	305.5	0.00	0.00	0.00
8 5/8"									
1,530.0	29.78	143.83	1,467.8	-258.7	189.1	320.4	0.00	0.00	0.00
1,600.0	29.78	143.83	1,528.5	-286.7	209.6	355.2	0.00	0.00	0.00
1,700.0	29.78	143.83	1,615.3	-326.8	239.0	404.8	0.00	0.00	0.00
1,800.0	29.78	143.83	1,702.1	-366.9	268.3	454.5	0.00	0.00	0.00
1,900.0	29.78	143.83	1,788.9	-407.0	297.6	504.2	0.00	0.00	0.00
2,000.0	29.78	143.83	1,875.7	-447.1	326.9	553.9	0.00	0.00	0.00
2,100.0	29.78	143.83	1,962.5	-487.2	356.2	603.5	0.00	0.00	0.00
2,200.0	29.78	143.83	2,049.3	-527.3	385.5	653.2	0.00	0.00	0.00
2,300.0	29.78	143.83	2,136.1	-567.4	414.9	702.9	0.00	0.00	0.00
2,400.0	29.78	143.83	2,222.9	-607.5	444.2	752.5	0.00	0.00	0.00
2,500.0	29.78	143.83	2,309.7	-647.6	473.5	802.2	0.00	0.00	0.00
2,600.0	29.78	143.83	2,396.5	-687.7	502.8	851.9	0.00	0.00	0.00
G ⁺ Sand									
2,617.9	29.78	143.83	2,412.0	-694.8	508.1	860.8	0.00	0.00	0.00
2,700.0	29.78	143.83	2,483.3	-727.8	532.1	901.5	0.00	0.00	0.00
2,800.0	29.78	143.83	2,570.0	-767.8	561.4	951.2	0.00	0.00	0.00
2,900.0	29.78	143.83	2,656.8	-807.9	590.8	1,000.9	0.00	0.00	0.00
3,000.0	29.78	143.83	2,743.6	-848.0	620.1	1,050.5	0.00	0.00	0.00
3,100.0	29.78	143.83	2,830.4	-888.1	649.4	1,100.2	0.00	0.00	0.00
3,200.0	29.78	143.83	2,917.2	-928.2	678.7	1,149.9	0.00	0.00	0.00
3,300.0	29.78	143.83	3,004.0	-968.3	708.0	1,199.6	0.00	0.00	0.00
3,400.0	29.78	143.83	3,090.8	-1,008.4	737.3	1,249.2	0.00	0.00	0.00
3,500.0	29.78	143.83	3,177.6	-1,048.5	766.6	1,298.9	0.00	0.00	0.00
3,600.0	29.78	143.83	3,264.4	-1,088.6	796.0	1,348.6	0.00	0.00	0.00
3,700.0	29.78	143.83	3,351.2	-1,128.7	825.3	1,398.2	0.00	0.00	0.00
3,800.0	29.78	143.83	3,438.0	-1,168.8	854.6	1,447.9	0.00	0.00	0.00
3,900.0	29.78	143.83	3,524.8	-1,208.9	883.9	1,497.6	0.00	0.00	0.00
4,000.0	29.78	143.83	3,611.6	-1,249.0	913.2	1,547.2	0.00	0.00	0.00
4,100.0	29.78	143.83	3,698.4	-1,289.1	942.5	1,596.9	0.00	0.00	0.00
4,200.0	29.78	143.83	3,785.2	-1,329.2	971.9	1,646.6	0.00	0.00	0.00
4,300.0	29.78	143.83	3,871.9	-1,369.3	1,001.2	1,696.2	0.00	0.00	0.00
4,400.0	29.78	143.83	3,958.7	-1,409.3	1,030.5	1,745.9	0.00	0.00	0.00
4,500.0	29.78	143.83	4,045.5	-1,449.4	1,059.8	1,795.6	0.00	0.00	0.00
4,600.0	29.78	143.83	4,132.3	-1,489.5	1,089.1	1,845.2	0.00	0.00	0.00



Well Planning Report



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Project:	Mesa County, CO	MD Reference:	well @ 7242.0usft (H&P #522)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols Federal 0994-24-18E	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)
Williams Fork									
4,634.2	29.78	143.83	4,162.0	-1,503.2	1,099.1	1,862.2	0.00	0.00	0.00
4,700.0	29.78	143.83	4,219.1	-1,529.6	1,118.4	1,894.9	0.00	0.00	0.00
4,800.0	29.78	143.83	4,305.9	-1,569.7	1,147.7	1,944.6	0.00	0.00	0.00
4,900.0	29.78	143.83	4,392.7	-1,609.8	1,177.1	1,994.2	0.00	0.00	0.00
5,000.0	29.78	143.83	4,479.5	-1,649.9	1,206.4	2,043.9	0.00	0.00	0.00
5,100.0	29.78	143.83	4,566.3	-1,690.0	1,235.7	2,093.6	0.00	0.00	0.00
Drop 3° / 100'									
5,154.3	29.78	143.83	4,613.4	-1,711.8	1,251.6	2,120.5	0.00	0.00	0.00
5,200.0	28.41	143.83	4,653.4	-1,729.7	1,264.7	2,142.8	3.00	-3.00	0.00
5,300.0	25.41	143.83	4,742.5	-1,766.2	1,291.4	2,188.0	3.00	-3.00	0.00
5,400.0	22.41	143.83	4,833.9	-1,799.0	1,315.4	2,228.5	3.00	-3.00	0.00
5,500.0	19.41	143.83	4,927.3	-1,827.8	1,336.4	2,264.2	3.00	-3.00	0.00
5,600.0	16.41	143.83	5,022.5	-1,852.6	1,354.6	2,295.0	3.00	-3.00	0.00
5,700.0	13.41	143.83	5,119.1	-1,873.3	1,369.8	2,320.7	3.00	-3.00	0.00
5,800.0	10.41	143.83	5,216.9	-1,890.0	1,381.9	2,341.3	3.00	-3.00	0.00
5,900.0	7.41	143.83	5,315.7	-1,902.5	1,391.1	2,356.8	3.00	-3.00	0.00
6,000.0	4.41	143.83	5,415.2	-1,910.8	1,397.1	2,367.1	3.00	-3.00	0.00
6,100.0	1.41	143.83	5,515.0	-1,914.9	1,400.1	2,372.2	3.00	-3.00	0.00
EOB @ Vertical - TOG									
6,147.0	0.00	0.00	5,562.0	-1,915.4	1,400.5	2,372.8	3.00	-3.00	0.00
6,200.0	0.00	0.00	5,615.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,300.0	0.00	0.00	5,715.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,400.0	0.00	0.00	5,815.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,500.0	0.00	0.00	5,915.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,600.0	0.00	0.00	6,015.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,700.0	0.00	0.00	6,115.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,800.0	0.00	0.00	6,215.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
6,900.0	0.00	0.00	6,315.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,000.0	0.00	0.00	6,415.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
Cameo									
7,047.0	0.00	0.00	6,462.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,100.0	0.00	0.00	6,515.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,200.0	0.00	0.00	6,615.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,300.0	0.00	0.00	6,715.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,400.0	0.00	0.00	6,815.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,500.0	0.00	0.00	6,915.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,600.0	0.00	0.00	7,015.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,700.0	0.00	0.00	7,115.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
Base Cameo Coal									
7,707.0	0.00	0.00	7,122.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
Rollins									
7,747.0	0.00	0.00	7,162.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,800.0	0.00	0.00	7,215.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
7,900.0	0.00	0.00	7,315.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
8,000.0	0.00	0.00	7,415.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
8,100.0	0.00	0.00	7,515.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
Cozzetta									
8,197.0	0.00	0.00	7,612.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
8,200.0	0.00	0.00	7,615.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
8,300.0	0.00	0.00	7,715.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
Corcoran									
8,347.0	0.00	0.00	7,762.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00



Well Planning Report



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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 0994-24-18E	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)
8,400.0	0.00	0.00	7,815.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
8,500.0	0.00	0.00	7,915.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00
TD @ 8597.0' MD / 8012.0' TVD									
8,597.0	0.00	0.00	8,012.0	-1,915.4	1,400.5	2,372.8	0.00	0.00	0.00

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	8,012.0	-1,915.4	1,400.5	1,527,284.70	2,341,482.89	39 257983	-107 825898
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,467.8	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,617.9	2,412.0	G' Sand			
4,634.2	4,162.0	Williams Fork			
6,147.0	5,562.0	TOG			
7,047.0	6,462.0	Cameo			
7,707.0	7,122.0	Base Cameo Coal			
7,747.0	7,162.0	Rollins			
8,197.0	7,612.0	Cozzette			
8,347.0	7,762.0	Corcoran			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.0	400.0	0.0	0.0	KOP (Build 3° / 100')
1,392.7	1,348.6	-203.6	148.9	EOB 29.78° Inc / 143.83° Azm
5,154.3	4,613.4	-1,711.8	1,251.6	Drop 3° / 100'
6,147.0	5,562.0	-1,915.4	1,400.5	EOB @ Vertical
8,597.0	8,012.0	-1,915.4	1,400.5	TD @ 8597.0' MD / 8012.0' TVD