



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols Federal 0994-24-19E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263222
 Longitude: -107.830847
 Ground Level: 7212.0
 well @ 7242.0usft (H&P #522)

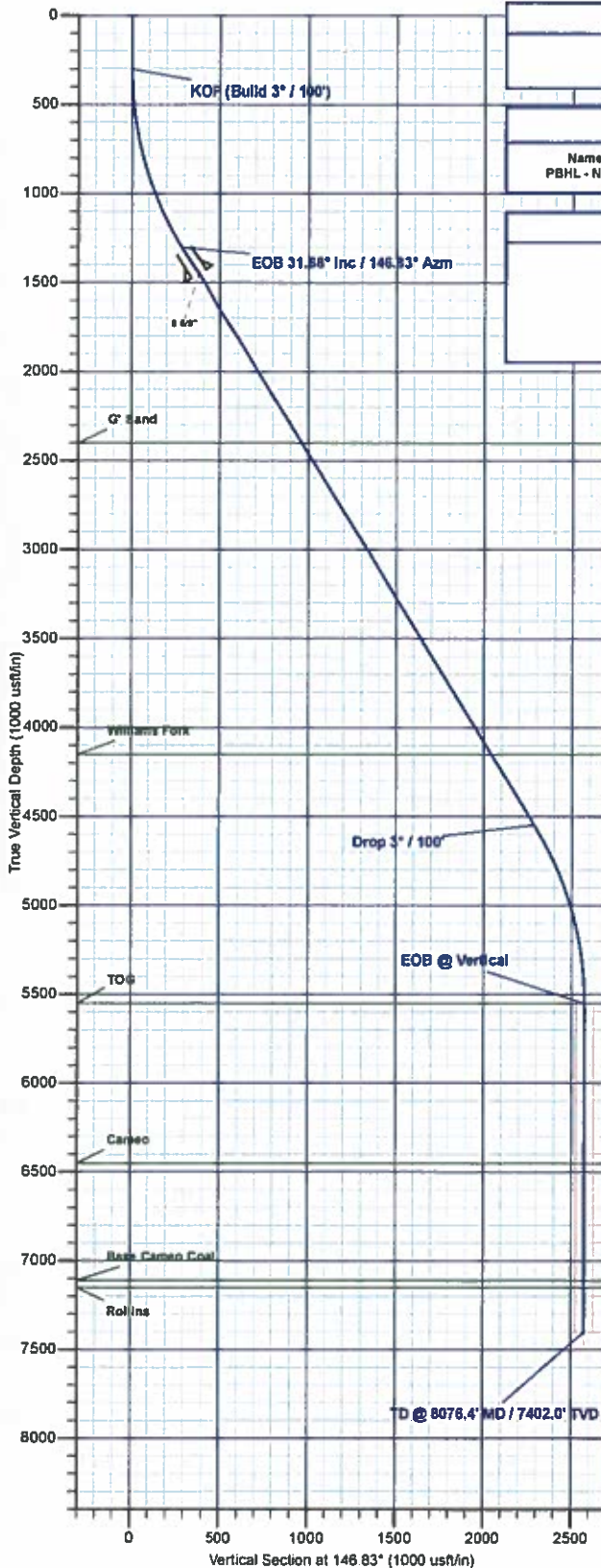


PROJECT DETAILS: Mesa County, CO

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 0994-24-19E, True North
 Vertical (TVD) Reference: well @ 7242.0usft (H&P #522)
 Section (VS) Reference: Slot - (0.5N, 0.0E)
 Measured Depth Reference: well @ 7242.0usft (H&P #522)
 Calculation Method: Minimum Curvature



WELL DETAILS: Nichols Federal 0994-24-19E

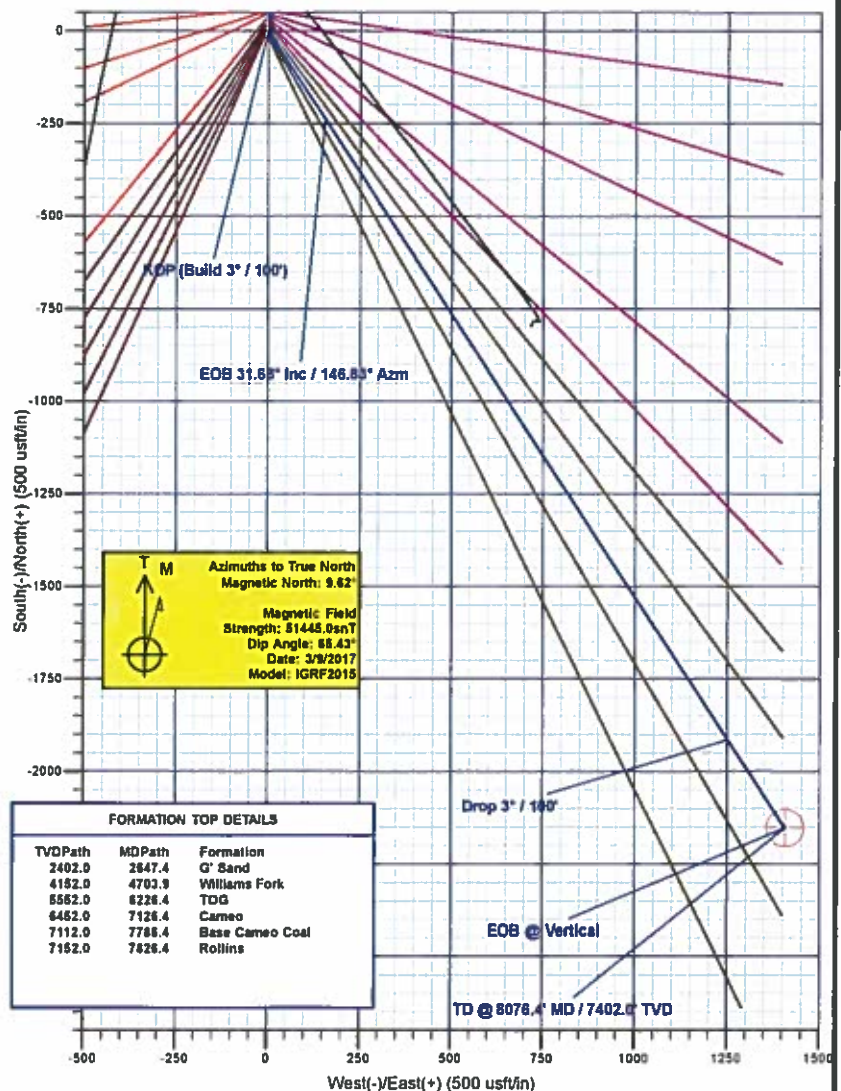
+N/-S	+E/-W	North	Ground Level:	7212.0	Latitude	Longitude
0.0	0.0	1529228.11	Easting	2340130.95	39.263222	-107.830847

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

Name	TVD	+N/-S	+E/-W	North	Easting	Latitude	Longitude
PBHL - Nichols Federal 0994-24-19E	7402.0	-2153.2	1407.6	1527039.50	2341482.84	39.257310	-107.825876

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1358.0	31.68	146.83	1303.0	-238.2	185.7	3.00	146.83	284.6	EOB 31.88° Inc / 146.83° Azm
6170.3	31.68	146.83	4549.0	-1918.0	1251.8	0.00	0.00	2287.9	Drop 3° / 100'
8226.4	0.00	0.00	5552.0	-2153.2	1407.6	3.00	180.00	2572.5	EOB @ Vertical
8076.4	0.00	0.00	7402.0	-2153.2	1407.6	0.00	0.00	2572.5	TD @ 8076.4' MD / 7402.0' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2402.0	2647.4	G' Sand
4152.0	4703.9	Williams Fork
5552.0	6226.4	TOG
6452.0	7126.4	Cameo
7112.0	7786.4	Base Cameo Coal
7152.0	7826.4	Rollins

Plan: Design #1 (Nichols Federal 0994-24-19E/Wellbore #1)

Created By: Will Jircik Date: 16:37, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols Federal 0994-24-19E

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-19E
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 0994-24-19E	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 0994-24-19E			
Well Position	+N/-S	15.1 usft	Northing:	1,529,228.11 usft
	+E/-W	1.6 usft	Easting:	2,340,130.97 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	51,445

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	146.83

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	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,356.0	31.68	146.83	1,303.0	-238.2	155.7	3.00	3.00	0.00	146.83	
5,170.3	31.68	146.83	4,548.9	-1,915.0	1,251.8	0.00	0.00	0.00	0.00	
6,226.4	0.00	0.00	5,552.0	-2,153.2	1,407.6	3.00	-3.00	0.00	180.00	
8,076.4	0.00	0.00	7,402.0	-2,153.2	1,407.6	0.00	0.00	0.00	0.00	PBHL - Nichols Feder



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-19E
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 0994-24-19E	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
KOP (Build 3° / 100')									
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	3.00	146.83	400.0	-2.2	1.4	2.6	3.00	3.00	0.00
500.0	6.00	146.83	499.6	-8.8	5.7	10.5	3.00	3.00	0.00
600.0	9.00	146.83	598.8	-19.7	12.9	23.5	3.00	3.00	0.00
700.0	12.00	146.83	697.1	-34.9	22.8	41.7	3.00	3.00	0.00
800.0	15.00	146.83	794.3	-54.5	35.6	65.1	3.00	3.00	0.00
900.0	18.00	146.83	890.2	-78.2	51.1	93.5	3.00	3.00	0.00
1,000.0	21.00	146.83	984.4	-106.2	69.4	126.9	3.00	3.00	0.00
1,100.0	24.00	146.83	1,076.8	-138.2	90.3	165.1	3.00	3.00	0.00
1,200.0	27.00	146.83	1,167.1	-174.2	113.9	208.2	3.00	3.00	0.00
1,300.0	30.00	146.83	1,254.9	-214.2	140.0	255.9	3.00	3.00	0.00
EOB 31.68° Inc / 146.83° Azm									
1,356.0	31.68	146.83	1,303.0	-238.2	155.7	284.6	3.00	3.00	0.00
1,400.0	31.68	146.83	1,340.5	-257.5	168.4	307.7	0.00	0.00	0.00
1,500.0	31.68	146.83	1,425.6	-301.5	197.1	360.2	0.00	0.00	0.00
8 5/8"									
1,530.0	31.68	146.83	1,451.1	-314.7	205.7	376.0	0.00	0.00	0.00
1,600.0	31.68	146.83	1,510.6	-345.5	225.8	412.7	0.00	0.00	0.00
1,700.0	31.68	146.83	1,595.7	-389.4	254.6	465.2	0.00	0.00	0.00
1,800.0	31.68	146.83	1,680.8	-433.4	283.3	517.8	0.00	0.00	0.00
1,900.0	31.68	146.83	1,765.9	-477.3	312.0	570.3	0.00	0.00	0.00
2,000.0	31.68	146.83	1,851.0	-521.3	340.8	622.8	0.00	0.00	0.00
2,100.0	31.68	146.83	1,936.1	-565.3	369.5	675.3	0.00	0.00	0.00
2,200.0	31.68	146.83	2,021.2	-609.2	398.3	727.8	0.00	0.00	0.00
2,300.0	31.68	146.83	2,106.3	-653.2	427.0	780.4	0.00	0.00	0.00
2,400.0	31.68	146.83	2,191.4	-697.1	455.7	832.9	0.00	0.00	0.00
2,500.0	31.68	146.83	2,276.5	-741.1	484.5	885.4	0.00	0.00	0.00
2,600.0	31.68	146.83	2,361.6	-785.1	513.2	937.9	0.00	0.00	0.00
G' Sand									
2,647.4	31.68	146.83	2,402.0	-805.9	526.8	962.8	0.00	0.00	0.00
2,700.0	31.68	146.83	2,446.7	-829.0	541.9	990.4	0.00	0.00	0.00
2,800.0	31.68	146.83	2,531.8	-873.0	570.7	1,043.0	0.00	0.00	0.00
2,900.0	31.68	146.83	2,616.9	-916.9	599.4	1,095.5	0.00	0.00	0.00
3,000.0	31.68	146.83	2,702.0	-960.9	628.2	1,148.0	0.00	0.00	0.00
3,100.0	31.68	146.83	2,787.1	-1,004.9	656.9	1,200.5	0.00	0.00	0.00
3,200.0	31.68	146.83	2,872.2	-1,048.8	685.6	1,253.0	0.00	0.00	0.00
3,300.0	31.68	146.83	2,957.3	-1,092.8	714.4	1,305.6	0.00	0.00	0.00
3,400.0	31.68	146.83	3,042.4	-1,136.7	743.1	1,358.1	0.00	0.00	0.00
3,500.0	31.68	146.83	3,127.5	-1,180.7	771.8	1,410.6	0.00	0.00	0.00
3,600.0	31.68	146.83	3,212.6	-1,224.7	800.6	1,463.1	0.00	0.00	0.00
3,700.0	31.68	146.83	3,297.7	-1,268.6	829.3	1,515.6	0.00	0.00	0.00
3,800.0	31.68	146.83	3,382.8	-1,312.6	858.0	1,568.2	0.00	0.00	0.00
3,900.0	31.68	146.83	3,467.9	-1,356.5	886.8	1,620.7	0.00	0.00	0.00
4,000.0	31.68	146.83	3,553.0	-1,400.5	915.5	1,673.2	0.00	0.00	0.00
4,100.0	31.68	146.83	3,638.1	-1,444.5	944.3	1,725.7	0.00	0.00	0.00
4,200.0	31.68	146.83	3,723.2	-1,488.4	973.0	1,778.2	0.00	0.00	0.00
4,300.0	31.68	146.83	3,808.3	-1,532.4	1,001.7	1,830.8	0.00	0.00	0.00
4,400.0	31.68	146.83	3,893.4	-1,576.3	1,030.5	1,883.3	0.00	0.00	0.00
4,500.0	31.68	146.83	3,978.5	-1,620.3	1,059.2	1,935.8	0.00	0.00	0.00
4,600.0	31.68	146.83	4,063.6	-1,664.3	1,087.9	1,988.3	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 0994-24-19E	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	31.68	146.83	4,148.7	-1,708.2	1,116.7	2,040.8	0.00	0.00	0.00
Williams Fork									
4,703.9	31.68	146.83	4,152.0	-1,709.9	1,117.8	2,042.9	0.00	0.00	0.00
4,800.0	31.68	146.83	4,233.8	-1,752.2	1,145.4	2,093.4	0.00	0.00	0.00
4,900.0	31.68	146.83	4,318.9	-1,796.1	1,174.2	2,145.9	0.00	0.00	0.00
5,000.0	31.68	146.83	4,404.0	-1,840.1	1,202.9	2,198.4	0.00	0.00	0.00
5,100.0	31.68	146.83	4,489.1	-1,884.1	1,231.6	2,250.9	0.00	0.00	0.00
Drop 3" / 100'									
5,170.3	31.68	146.83	4,548.9	-1,915.0	1,251.8	2,287.9	0.00	0.00	0.00
5,200.0	30.79	146.83	4,574.3	-1,927.9	1,260.3	2,303.2	3.00	-3.00	0.00
5,300.0	27.79	146.83	4,661.5	-1,968.8	1,287.0	2,352.2	3.00	-3.00	0.00
5,400.0	24.79	146.83	4,751.2	-2,005.9	1,311.3	2,396.4	3.00	-3.00	0.00
5,500.0	21.79	146.83	4,843.0	-2,039.0	1,332.9	2,436.0	3.00	-3.00	0.00
5,600.0	18.79	146.83	4,936.8	-2,068.0	1,351.9	2,470.7	3.00	-3.00	0.00
5,700.0	15.79	146.83	5,032.2	-2,092.9	1,368.1	2,500.4	3.00	-3.00	0.00
5,800.0	12.79	146.83	5,129.1	-2,113.5	1,381.6	2,525.1	3.00	-3.00	0.00
5,900.0	9.79	146.83	5,227.2	-2,129.9	1,392.4	2,544.6	3.00	-3.00	0.00
6,000.0	6.79	146.83	5,326.1	-2,142.0	1,400.2	2,559.1	3.00	-3.00	0.00
6,100.0	3.79	146.83	5,425.7	-2,149.7	1,405.3	2,568.3	3.00	-3.00	0.00
6,200.0	0.79	146.83	5,525.6	-2,153.1	1,407.5	2,572.3	3.00	-3.00	0.00
EOB @ Vertical - TOG									
6,226.4	0.00	0.00	5,552.0	-2,153.2	1,407.6	2,572.5	3.00	-3.00	0.00
6,300.0	0.00	0.00	5,625.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
6,400.0	0.00	0.00	5,725.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
6,500.0	0.00	0.00	5,825.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
6,600.0	0.00	0.00	5,925.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
6,700.0	0.00	0.00	6,025.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
6,800.0	0.00	0.00	6,125.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
6,900.0	0.00	0.00	6,225.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,000.0	0.00	0.00	6,325.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,100.0	0.00	0.00	6,425.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
Cameo									
7,126.4	0.00	0.00	6,452.0	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,200.0	0.00	0.00	6,525.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,300.0	0.00	0.00	6,625.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,400.0	0.00	0.00	6,725.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,500.0	0.00	0.00	6,825.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,600.0	0.00	0.00	6,925.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,700.0	0.00	0.00	7,025.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
Base Cameo Coal									
7,786.4	0.00	0.00	7,112.0	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,800.0	0.00	0.00	7,125.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
Rollins									
7,826.4	0.00	0.00	7,152.0	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,225.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,325.6	-2,153.2	1,407.6	2,572.5	0.00	0.00	0.00
TD @ 8076.4' MD / 7402.0' TVD									
8,076.4	0.00	0.00	7,402.0	-2,153.2	1,407.6	2,572.5	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 0994-24-19E	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	7,402.0	-2,153.2	1,407.6	1,527,039.50	2,341,482.84	39 257310	-107.825876
- plan hits target center									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,451.1	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,647.4	2,402.0	G' Sand			
4,703.9	4,152.0	Williams Fork			
6,226.4	5,552.0	TOG			
7,126.4	6,452.0	Cameo			
7,786.4	7,112.0	Base Cameo Coal			
7,826.4	7,152.0	Rollins			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.0	300.0	0.0	0.0	KOP (Build 3" / 100')
1,356.0	1,303.0	-238.2	155.7	EOB 31.68° Inc / 146.83° Azm
5,170.3	4,548.9	-1,915.0	1,251.8	Drop 3" / 100'
6,226.4	5,552.0	-2,153.2	1,407.6	EOB @ Vertical
8,076.4	7,402.0	-2,153.2	1,407.6	TD @ 8076.4' MD / 7402.0' TVD