



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols Federal 0994-24-17E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263264
 Longitude: -107.830842
 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 0994-24-17E, 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 0994-24-17E

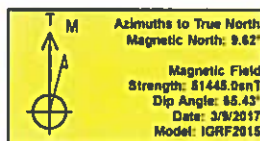
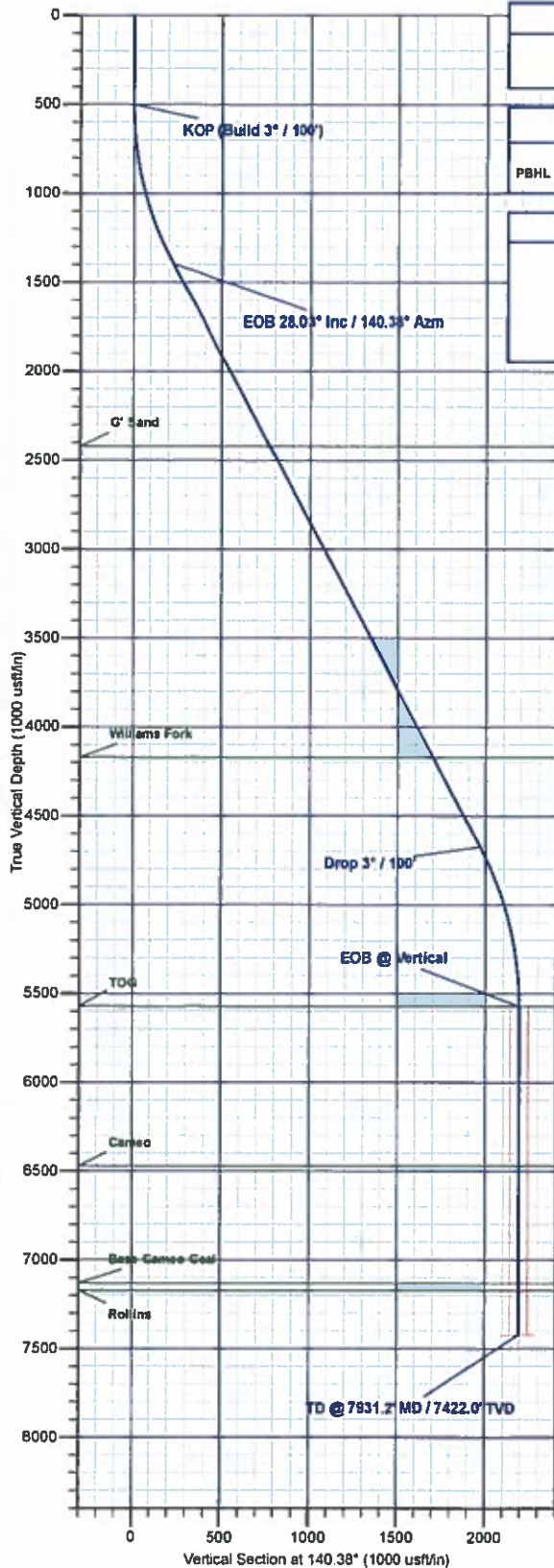
+N/-S	+E/-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529243.38	2340132.77	39.263264	-107.830842

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols Federal 0994-24-17E	7422.0	-1689.2	1398.2	1527518.85	2341487.18	39.258626	-107.825904

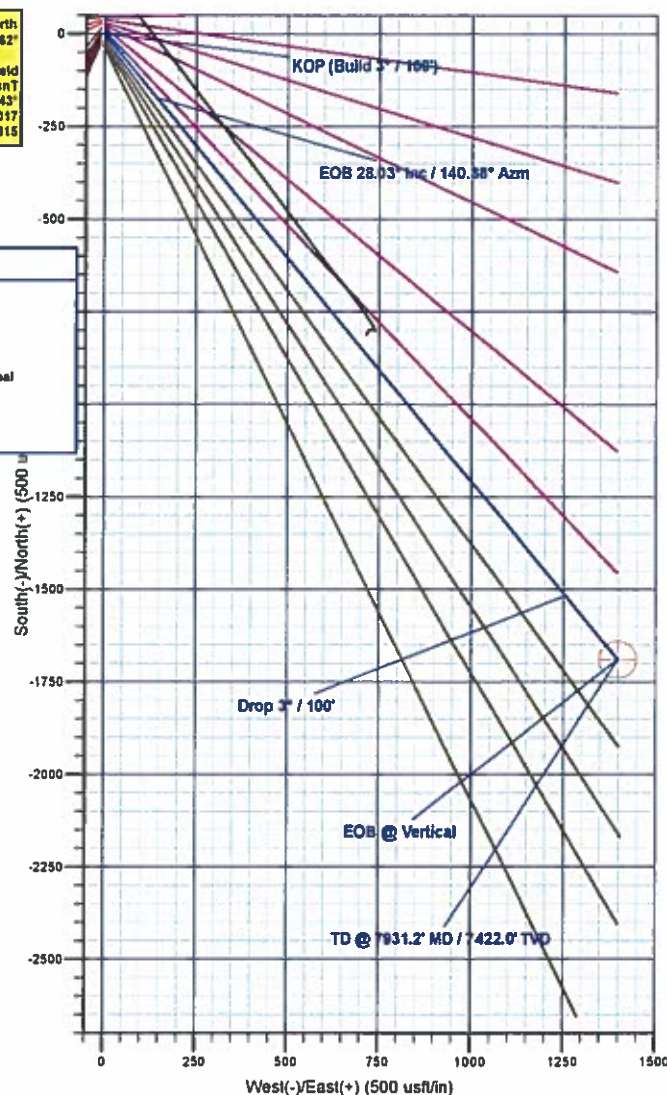
SECTION DETAILS

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	
509.0	0.00	0.00	509.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3" / 100')
1434.4	28.03	140.38	1387.6	-172.6	142.9	3.00	140.38	224.1	EOB 28.03° Inc / 140.38° Azm
5148.8	28.03	140.38	4674.4	-1816.6	1255.3	0.00	0.00	1968.7	Drop 3" / 100'
6061.2	0.00	0.00	5572.0	-1689.2	1398.2	3.00	180.00	2192.8	EOB @ Vertical
7931.2	0.00	0.00	7422.0	-1689.2	1398.2	0.00	0.00	2192.8	TD @ 7931.2' MD / 7422.0' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2422.0	2595.0	G' Sand
4172.0	4577.6	Williams Fork
5572.0	6081.2	TOG
6472.0	6981.2	Cameo
7132.0	7641.2	Base Cameo Coal
7172.0	7681.2	Rollins



Plan: Design #1 (Nichols Federal 0994-24-17E/Wellbore #1)

Created By: Will Jircik Date: 16:19, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols Federal 0994-24-17E

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-17E
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 0994-24-17E	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 0994-24-17E					
Well Position	+N/-S	30.4 usft	Northing:	1,529,243.37 usft	Latitude:	39.263264
	+E/-W	3.1 usft	Easting:	2,340,132.77 usft	Longitude:	-107.830842
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,212.0 usft

Wellbore	Wellbore #1
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/9/2017	9.63	65.43	51,445

Design	Design #1
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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	140.38

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,434.4	28.03	140.38	1,397.6	-172.6	142.9	3.00	3.00	0.00	140.38	
5,146.8	28.03	140.38	4,674.4	-1,516.6	1,255.3	0.00	0.00	0.00	0.00	
6,081.2	0.00	0.00	5,572.0	-1,689.2	1,398.2	3.00	-3.00	0.00	180.00	
7,931.2	0.00	0.00	7,422.0	-1,689.2	1,398.2	0.00	0.00	0.00	0.00	PBHL - Nichols Feder



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-17E
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 0994-24-17E	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
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	3.00	140.38	600.0	-2.0	1.7	2.6	3.00	3.00	0.00
700.0	6.00	140.38	699.6	-8.1	6.7	10.5	3.00	3.00	0.00
800.0	9.00	140.38	798.8	-18.1	15.0	23.5	3.00	3.00	0.00
900.0	12.00	140.38	897.1	-32.2	26.6	41.7	3.00	3.00	0.00
1,000.0	15.00	140.38	994.3	-50.1	41.5	65.1	3.00	3.00	0.00
1,100.0	18.00	140.38	1,090.2	-72.0	59.6	93.5	3.00	3.00	0.00
1,200.0	21.00	140.38	1,184.4	-97.7	80.9	126.9	3.00	3.00	0.00
1,300.0	24.00	140.38	1,276.8	-127.2	105.3	165.1	3.00	3.00	0.00
1,400.0	27.00	140.38	1,367.1	-160.4	132.7	208.2	3.00	3.00	0.00
EOB 28.03° Inc / 140.38° Azm									
1,434.4	28.03	140.38	1,397.6	-172.6	142.9	224.1	3.00	3.00	0.00
1,500.0	28.03	140.38	1,455.5	-196.3	162.5	254.9	0.00	0.00	0.00
8 5/8"									
1,530.0	28.03	140.38	1,482.0	-207.2	171.5	269.0	0.00	0.00	0.00
1,600.0	28.03	140.38	1,543.7	-232.6	192.5	301.9	0.00	0.00	0.00
1,700.0	28.03	140.38	1,632.0	-268.8	222.5	348.9	0.00	0.00	0.00
1,800.0	28.03	140.38	1,720.3	-305.0	252.4	395.9	0.00	0.00	0.00
1,900.0	28.03	140.38	1,808.5	-341.2	282.4	442.9	0.00	0.00	0.00
2,000.0	28.03	140.38	1,896.8	-377.4	312.4	489.9	0.00	0.00	0.00
2,100.0	28.03	140.38	1,985.1	-413.6	342.3	536.9	0.00	0.00	0.00
2,200.0	28.03	140.38	2,073.4	-449.8	372.3	583.9	0.00	0.00	0.00
2,300.0	28.03	140.38	2,161.6	-486.0	402.3	630.9	0.00	0.00	0.00
2,400.0	28.03	140.38	2,249.9	-522.2	432.2	677.9	0.00	0.00	0.00
2,500.0	28.03	140.38	2,338.2	-558.4	462.2	724.8	0.00	0.00	0.00
G' Sand									
2,595.0	28.03	140.38	2,422.0	-592.8	490.7	769.5	0.00	0.00	0.00
2,600.0	28.03	140.38	2,426.4	-594.6	492.2	771.8	0.00	0.00	0.00
2,700.0	28.03	140.38	2,514.7	-630.8	522.1	818.8	0.00	0.00	0.00
2,800.0	28.03	140.38	2,603.0	-667.0	552.1	865.8	0.00	0.00	0.00
2,900.0	28.03	140.38	2,691.2	-703.2	582.1	912.8	0.00	0.00	0.00
3,000.0	28.03	140.38	2,779.5	-739.4	612.0	959.8	0.00	0.00	0.00
3,100.0	28.03	140.38	2,867.8	-775.6	642.0	1,006.8	0.00	0.00	0.00
3,200.0	28.03	140.38	2,956.0	-811.8	672.0	1,053.8	0.00	0.00	0.00
3,300.0	28.03	140.38	3,044.3	-848.0	701.9	1,100.8	0.00	0.00	0.00
3,400.0	28.03	140.38	3,132.6	-884.2	731.9	1,147.8	0.00	0.00	0.00
3,500.0	28.03	140.38	3,220.8	-920.4	761.9	1,194.8	0.00	0.00	0.00
3,600.0	28.03	140.38	3,309.1	-956.6	791.8	1,241.8	0.00	0.00	0.00
3,700.0	28.03	140.38	3,397.4	-992.8	821.8	1,288.8	0.00	0.00	0.00
3,800.0	28.03	140.38	3,485.6	-1,029.0	851.8	1,335.8	0.00	0.00	0.00
3,900.0	28.03	140.38	3,573.9	-1,065.2	881.7	1,382.8	0.00	0.00	0.00
4,000.0	28.03	140.38	3,662.2	-1,101.4	911.7	1,429.8	0.00	0.00	0.00
4,100.0	28.03	140.38	3,750.5	-1,137.6	941.7	1,476.8	0.00	0.00	0.00
4,200.0	28.03	140.38	3,838.7	-1,173.8	971.6	1,523.8	0.00	0.00	0.00
4,300.0	28.03	140.38	3,927.0	-1,210.0	1,001.6	1,570.8	0.00	0.00	0.00
4,400.0	28.03	140.38	4,015.3	-1,246.2	1,031.6	1,617.8	0.00	0.00	0.00
4,500.0	28.03	140.38	4,103.5	-1,282.4	1,061.5	1,664.8	0.00	0.00	0.00
Williams Fork									



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-17E
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 0994-24-17E	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)
4,577.6	28.03	140.38	4,172.0	-1,310.5	1,084.8	1,701.2	0.00	0.00	0.00
4,600.0	28.03	140.38	4,191.8	-1,318.6	1,091.5	1,711.8	0.00	0.00	0.00
4,700.0	28.03	140.38	4,280.1	-1,354.8	1,121.5	1,758.8	0.00	0.00	0.00
4,800.0	28.03	140.38	4,368.3	-1,391.1	1,151.4	1,805.8	0.00	0.00	0.00
4,900.0	28.03	140.38	4,456.6	-1,427.3	1,181.4	1,852.8	0.00	0.00	0.00
5,000.0	28.03	140.38	4,544.9	-1,463.5	1,211.4	1,899.8	0.00	0.00	0.00
5,100.0	28.03	140.38	4,633.1	-1,499.7	1,241.3	1,946.8	0.00	0.00	0.00
Drop 3" / 100'									
5,146.8	28.03	140.38	4,674.4	-1,516.6	1,255.3	1,968.7	0.00	0.00	0.00
5,200.0	26.44	140.38	4,721.7	-1,535.4	1,270.9	1,993.1	3.00	-3.00	0.00
5,300.0	23.44	140.38	4,812.4	-1,567.8	1,297.7	2,035.2	3.00	-3.00	0.00
5,400.0	20.44	140.38	4,905.2	-1,596.6	1,321.6	2,072.6	3.00	-3.00	0.00
5,500.0	17.44	140.38	4,999.7	-1,621.6	1,342.3	2,105.0	3.00	-3.00	0.00
5,600.0	14.44	140.38	5,095.9	-1,642.7	1,359.8	2,132.5	3.00	-3.00	0.00
5,700.0	11.44	140.38	5,193.3	-1,660.0	1,374.0	2,154.9	3.00	-3.00	0.00
5,800.0	8.44	140.38	5,291.8	-1,673.3	1,385.0	2,172.1	3.00	-3.00	0.00
5,900.0	5.44	140.38	5,391.1	-1,682.6	1,392.7	2,184.2	3.00	-3.00	0.00
6,000.0	2.44	140.38	5,490.8	-1,687.9	1,397.1	2,191.1	3.00	-3.00	0.00
EOB @ Vertical - TOG									
6,081.2	0.00	0.00	5,572.0	-1,689.2	1,398.2	2,192.8	3.00	-3.00	-172.92
6,100.0	0.00	0.00	5,590.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,200.0	0.00	0.00	5,690.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,300.0	0.00	0.00	5,790.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,400.0	0.00	0.00	5,890.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,500.0	0.00	0.00	5,990.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,600.0	0.00	0.00	6,090.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,700.0	0.00	0.00	6,190.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,800.0	0.00	0.00	6,290.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
6,900.0	0.00	0.00	6,390.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
Cameo									
6,981.2	0.00	0.00	6,472.0	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,000.0	0.00	0.00	6,490.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,100.0	0.00	0.00	6,590.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,200.0	0.00	0.00	6,690.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,300.0	0.00	0.00	6,790.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,400.0	0.00	0.00	6,890.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,500.0	0.00	0.00	6,990.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,600.0	0.00	0.00	7,090.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
Base Cameo Coal									
7,641.2	0.00	0.00	7,132.0	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
Rollins									
7,681.2	0.00	0.00	7,172.0	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,700.0	0.00	0.00	7,190.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,800.0	0.00	0.00	7,290.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
7,900.0	0.00	0.00	7,390.8	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00
TD @ 7931.2' MD / 7422.0' TVD									
7,931.2	0.00	0.00	7,422.0	-1,689.2	1,398.2	2,192.8	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols Federal 0994-24-17E
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 0994-24-17E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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 Federal - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,422.0	-1,689.2	1,398.2	1,527,518.86	2,341,487.19	39.258626	-107.825904

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,482.0	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,595.0	2,422.0	G' Sand			
4,577.6	4,172.0	Williams Fork			
6,081.2	5,572.0	TOG			
6,981.2	6,472.0	Cameo			
7,641.2	7,132.0	Base Cameo Coal			
7,661.2	7,172.0	Rollins			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.0	500.0	0.0	0.0	KOP (Build 3" / 100')
1,434.4	1,397.6	-172.6	142.9	EOB 28.03° Inc / 140.38° Azm
5,146.8	4,674.4	-1,516.6	1,255.3	Drop 3" / 100'
6,081.2	5,572.0	-1,689.2	1,398.2	EOB @ Vertical
7,931.2	7,422.0	-1,689.2	1,398.2	TD @ 7931.2' MD / 7422.0' TVD