



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-17W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263267
 Longitude: -107.830878
 Ground Level: 7212.0
 well @ 7242.0usft (H&P #522)

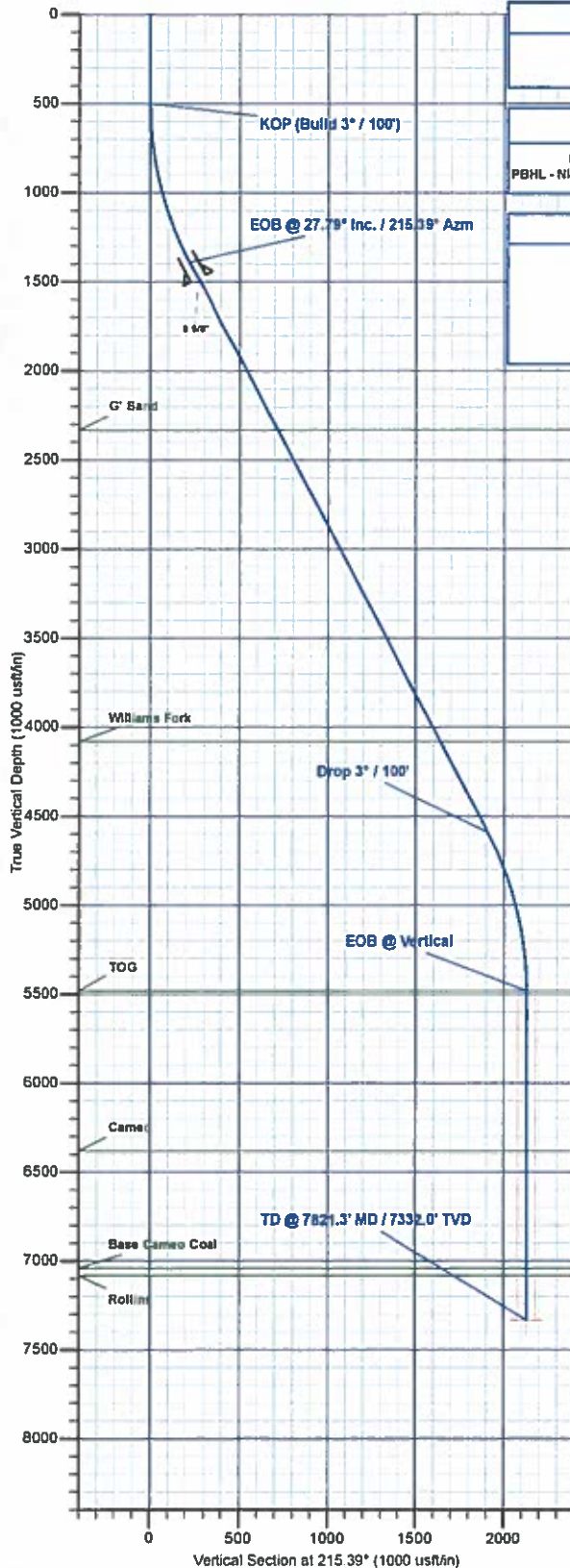


PROJECT DETAILS: Mesa County, CO

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 (NE) Reference: Well Nichols 0994-24-17W, 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 0994-24-17W

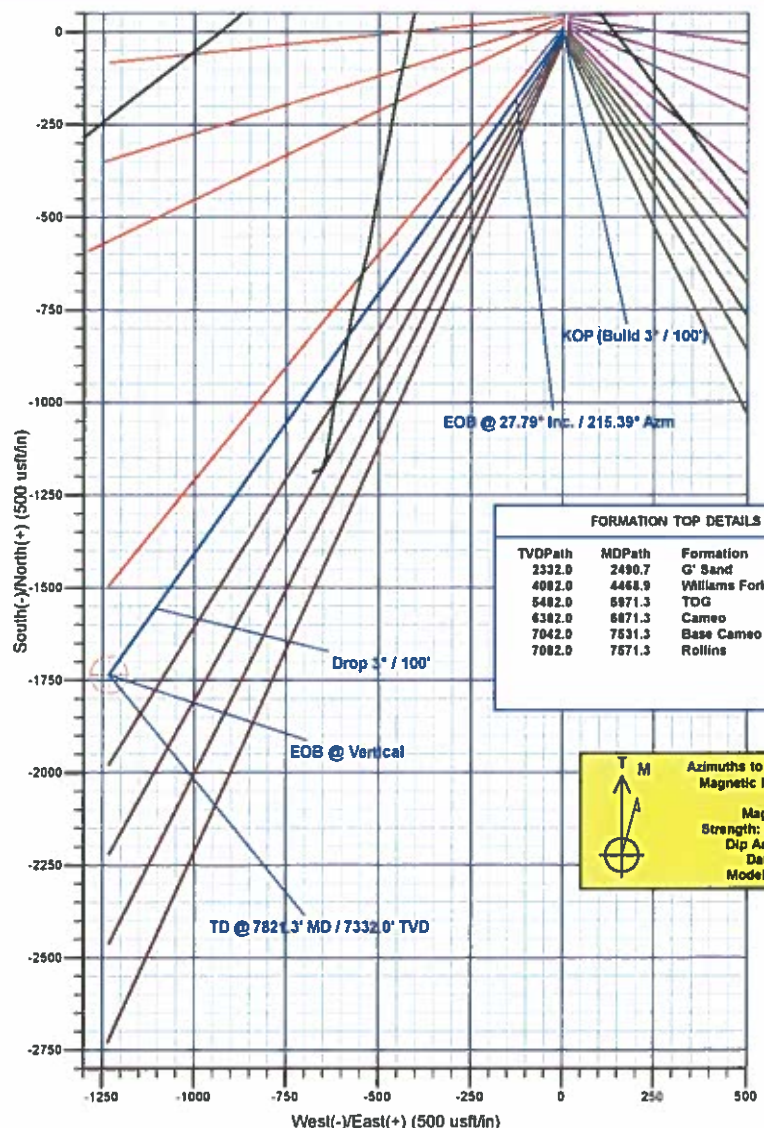
+N/-S	+E/-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529344.72	2340122.61	39.263267	-107.830878

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-17W	7332.0	-1734.7	-1232.3	1527542.17	2338946.23	39.259504	-107.835230

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Diag	TFace	VSeet	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1426.5	27.79	215.39	1390.5	-179.6	-127.6	3.00	215.39	220.3	EOB @ 27.79° Inc. / 215.39° Azm
5044.6	27.79	215.39	4591.5	-1555.1	-1104.7	0.00	0.00	1907.5	Drop 3° / 100'
5971.3	0.00	0.00	5482.0	-1734.7	-1232.3	3.00	180.00	2127.9	EOB @ Vertical
7821.3	0.00	0.00	7332.0	-1734.7	-1232.3	0.00	0.00	2127.9	TD @ 7821.3' MD / 7332.0' TVD



FORMATION TOP DETAILS

TVOPath	MDPath	Formation
2332.0	2490.7	G' Sand
4082.0	4463.9	Williams Fork
5482.0	5971.3	TOG
6382.0	6871.3	Cameo
7042.0	7531.3	Base Cameo Coal
7082.0	7571.3	Rollins

Azimuths to True North
 Magnetic North: 9.62°
 Magnetic Field
 Strength: 51445.0nT
 Dip Angle: 65.43°
 Date: 3/9/2017
 Model: IGRF2015

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

Created By: Will Jircik Date: 17:23, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-17W

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-17W
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 0994-24-17W	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 0994-24-17W					
Well Position	+N/-S	31.5 usft	Northing:	1,529,244.72 usft	Latitude:	39.263267
	+E/-W	-7.1 usft	Easting:	2,340,122.61 usft	Longitude:	-107.830878
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	215.39

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	
1,426.5	27.79	215.39	1,390.5	-179.6	-127.6	3.00	3.00	0.00	215.39	
5,044.8	27.79	215.39	4,591.5	-1,555.1	-1,104.7	0.00	0.00	0.00	0.00	
5,971.3	0.00	0.00	5,482.0	-1,734.7	-1,232.3	3.00	-3.00	0.00	180.00	
7,821.3	0.00	0.00	7,332.0	-1,734.7	-1,232.3	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-17W
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 0994-24-17W	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	215.39	600.0	-2.1	-1.5	2.6	3.00	3.00	0.00
700.0	6.00	215.39	699.6	-8.5	-6.1	10.5	3.00	3.00	0.00
800.0	9.00	215.39	798.8	-19.2	-13.6	23.5	3.00	3.00	0.00
900.0	12.00	215.39	897.1	-34.0	-24.2	41.7	3.00	3.00	0.00
1,000.0	15.00	215.39	994.3	-53.1	-37.7	65.1	3.00	3.00	0.00
1,100.0	18.00	215.39	1,090.2	-76.2	-54.1	93.5	3.00	3.00	0.00
1,200.0	21.00	215.39	1,184.4	-103.4	-73.5	126.9	3.00	3.00	0.00
1,300.0	24.00	215.39	1,276.8	-134.6	-95.6	165.1	3.00	3.00	0.00
1,400.0	27.00	215.39	1,367.1	-169.7	-120.6	208.2	3.00	3.00	0.00
EOB @ 27.79° Inc. / 215.39° Azm									
1,426.5	27.79	215.39	1,390.5	-179.6	-127.6	220.3	3.00	3.00	0.00
1,500.0	27.79	215.39	1,455.6	-207.6	-147.5	254.6	0.00	0.00	0.00
8 5/8"									
1,530.0	27.79	215.39	1,482.1	-219.0	-155.6	268.6	0.00	0.00	0.00
1,600.0	27.79	215.39	1,544.1	-245.6	-174.5	301.3	0.00	0.00	0.00
1,700.0	27.79	215.39	1,632.5	-283.6	-201.5	347.9	0.00	0.00	0.00
1,800.0	27.79	215.39	1,721.0	-321.6	-228.5	394.5	0.00	0.00	0.00
1,900.0	27.79	215.39	1,809.5	-359.6	-255.5	441.1	0.00	0.00	0.00
2,000.0	27.79	215.39	1,897.9	-397.7	-282.5	487.8	0.00	0.00	0.00
2,100.0	27.79	215.39	1,986.4	-435.7	-309.5	534.4	0.00	0.00	0.00
2,200.0	27.79	215.39	2,074.8	-473.7	-336.5	581.0	0.00	0.00	0.00
2,300.0	27.79	215.39	2,163.3	-511.7	-363.5	627.7	0.00	0.00	0.00
2,400.0	27.79	215.39	2,251.8	-549.7	-390.5	674.3	0.00	0.00	0.00
G' Sand									
2,490.7	27.79	215.39	2,332.0	-584.2	-415.0	716.6	0.00	0.00	0.00
2,500.0	27.79	215.39	2,340.2	-587.7	-417.5	720.9	0.00	0.00	0.00
2,600.0	27.79	215.39	2,428.7	-625.7	-444.5	767.5	0.00	0.00	0.00
2,700.0	27.79	215.39	2,517.2	-663.8	-471.5	814.2	0.00	0.00	0.00
2,800.0	27.79	215.39	2,605.6	-701.8	-498.5	860.8	0.00	0.00	0.00
2,900.0	27.79	215.39	2,694.1	-739.8	-525.5	907.4	0.00	0.00	0.00
3,000.0	27.79	215.39	2,782.6	-777.8	-552.5	954.1	0.00	0.00	0.00
3,100.0	27.79	215.39	2,871.0	-815.8	-579.5	1,000.7	0.00	0.00	0.00
3,200.0	27.79	215.39	2,959.5	-853.8	-606.5	1,047.3	0.00	0.00	0.00
3,300.0	27.79	215.39	3,047.9	-891.8	-633.5	1,093.9	0.00	0.00	0.00
3,400.0	27.79	215.39	3,136.4	-929.8	-660.5	1,140.6	0.00	0.00	0.00
3,500.0	27.79	215.39	3,224.9	-967.9	-687.5	1,187.2	0.00	0.00	0.00
3,600.0	27.79	215.39	3,313.3	-1,005.9	-714.5	1,233.8	0.00	0.00	0.00
3,700.0	27.79	215.39	3,401.8	-1,043.9	-741.5	1,280.5	0.00	0.00	0.00
3,800.0	27.79	215.39	3,490.3	-1,081.9	-768.5	1,327.1	0.00	0.00	0.00
3,900.0	27.79	215.39	3,578.7	-1,119.9	-795.5	1,373.7	0.00	0.00	0.00
4,000.0	27.79	215.39	3,667.2	-1,157.9	-822.5	1,420.3	0.00	0.00	0.00
4,100.0	27.79	215.39	3,755.7	-1,195.9	-849.6	1,467.0	0.00	0.00	0.00
4,200.0	27.79	215.39	3,844.1	-1,234.0	-876.6	1,513.6	0.00	0.00	0.00
4,300.0	27.79	215.39	3,932.6	-1,272.0	-903.6	1,560.2	0.00	0.00	0.00
4,400.0	27.79	215.39	4,021.0	-1,310.0	-930.6	1,606.8	0.00	0.00	0.00
Williams Fork									
4,468.9	27.79	215.39	4,082.0	-1,336.2	-949.2	1,639.0	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-17W
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 0994-24-17W	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)
4,500.0	27.79	215.39	4,109.5	-1,348.0	-957.6	1,653.5	0.00	0.00	0.00
4,600.0	27.79	215.39	4,198.0	-1,386.0	-984.6	1,700.1	0.00	0.00	0.00
4,700.0	27.79	215.39	4,286.4	-1,424.0	-1,011.6	1,746.8	0.00	0.00	0.00
4,800.0	27.79	215.39	4,374.9	-1,462.0	-1,038.6	1,793.4	0.00	0.00	0.00
4,900.0	27.79	215.39	4,463.4	-1,500.1	-1,065.6	1,840.0	0.00	0.00	0.00
5,000.0	27.79	215.39	4,551.8	-1,538.1	-1,092.6	1,886.6	0.00	0.00	0.00
Drop 3° / 100'									
5,044.8	27.79	215.39	4,591.5	-1,555.1	-1,104.7	1,907.5	0.00	0.00	0.00
5,100.0	26.14	215.39	4,640.6	-1,575.5	-1,119.2	1,932.6	3.00	-3.00	0.00
5,200.0	23.14	215.39	4,731.5	-1,609.5	-1,143.3	1,974.2	3.00	-3.00	0.00
5,300.0	20.14	215.39	4,824.5	-1,639.5	-1,164.7	2,011.1	3.00	-3.00	0.00
5,400.0	17.14	215.39	4,919.2	-1,665.6	-1,183.2	2,043.1	3.00	-3.00	0.00
5,500.0	14.14	215.39	5,015.5	-1,687.6	-1,198.8	2,070.0	3.00	-3.00	0.00
5,600.0	11.14	215.39	5,113.1	-1,705.4	-1,211.4	2,091.9	3.00	-3.00	0.00
5,700.0	8.14	215.39	5,211.7	-1,719.1	-1,221.1	2,108.6	3.00	-3.00	0.00
5,800.0	5.14	215.39	5,311.0	-1,728.5	-1,227.8	2,120.2	3.00	-3.00	0.00
5,900.0	2.14	215.39	5,410.8	-1,733.6	-1,231.5	2,126.5	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,971.3	0.00	0.00	5,482.0	-1,734.7	-1,232.3	2,127.9	3.00	-3.00	202.94
6,000.0	0.00	0.00	5,510.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,100.0	0.00	0.00	5,610.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,200.0	0.00	0.00	5,710.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,300.0	0.00	0.00	5,810.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,400.0	0.00	0.00	5,910.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,500.0	0.00	0.00	6,010.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,600.0	0.00	0.00	6,110.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,700.0	0.00	0.00	6,210.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,800.0	0.00	0.00	6,310.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
Cameo									
6,871.3	0.00	0.00	6,382.0	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
6,900.0	0.00	0.00	6,410.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,000.0	0.00	0.00	6,510.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,100.0	0.00	0.00	6,610.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,200.0	0.00	0.00	6,710.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,300.0	0.00	0.00	6,810.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,400.0	0.00	0.00	6,910.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,500.0	0.00	0.00	7,010.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
Base Cameo Coal									
7,531.3	0.00	0.00	7,042.0	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
Rollins									
7,571.3	0.00	0.00	7,082.0	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,600.0	0.00	0.00	7,110.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,700.0	0.00	0.00	7,210.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
7,800.0	0.00	0.00	7,310.7	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00
TD @ 7821.3' MD / 7332.0' TVD									
7,821.3	0.00	0.00	7,332.0	-1,734.7	-1,232.3	2,127.9	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-17W
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 0994-24-17W	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 0994-24 - plan hits target center - Point	0.00	0.00	7,332.0	-1,734.7	-1,232.3	1,527,542.17	2,338,846.23	39.258504	-107.835230

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,482.1	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,490.7	2,332.0	G' Sand			
4,468.9	4,082.0	Williams Fork			
5,971.3	5,482.0	TOG			
6,871.3	6,382.0	Cameo			
7,531.3	7,042.0	Base Cameo Coal			
7,571.3	7,082.0	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')
1,426.5	1,390.5	-179.6	-127.6	EOB @ 27.79° Inc. / 215.39° Azm
5,044.8	4,591.5	-1,555.1	-1,104.7	Drop 3" / 100'
5,971.3	5,482.0	-1,734.7	-1,232.3	EOB @ Vertical
7,821.3	7,332.0	-1,734.7	-1,232.3	TD @ 7821.3' MD / 7332.0' TVD