



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-10W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263389
 Longitude: -107.830861
 Ground Level: 7212.0
 well @ 7242.0ustf (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 0994-24-10W, True North
 Vertical (TVD) Reference: well @ 7242.0ustf (H&P #522)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7242.0ustf (H&P #522)
 Calculation Method: Minimum Curvature

WELL DETAILS: Nichols 0994-24-10W

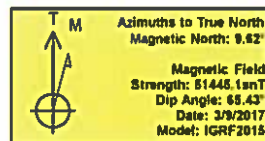
+N-S	+E-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529194.06	2340128.55	39.263389	-107.830861

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-10W	7402.0	-126.7	-1236.2	1529194.06	2336889.55	39.263041	-107.835227

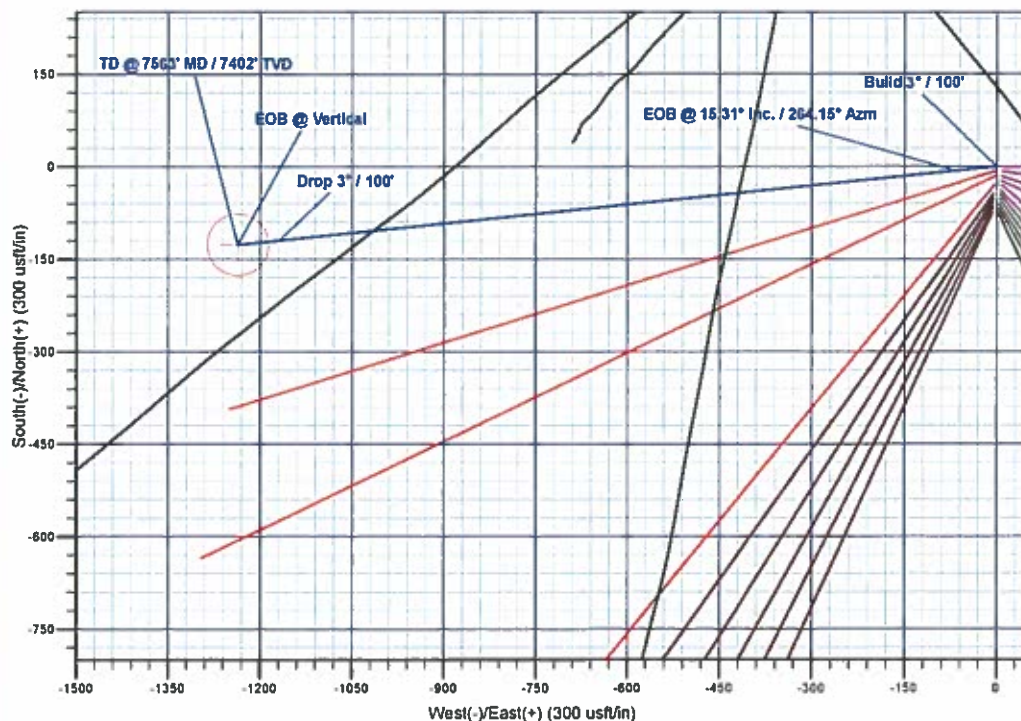
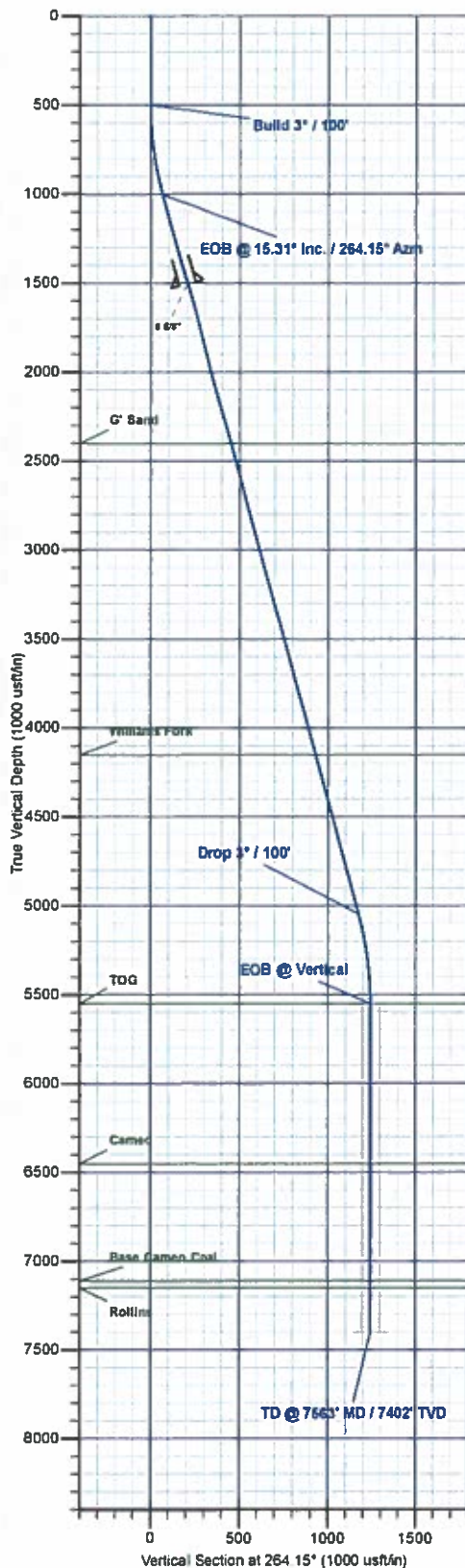
SECTION DETAILS

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	Build 3" / 100'
1010.4	15.31	264.15	1004.4	-4.9	-57.4	3.00	264.15	67.6	EOB @ 15.31" Inc. / 264.15" Azm
5202.5	15.31	264.15	5047.6	-113.8	-1168.7	0.00	0.00	1174.8	Drop 3" / 100'
5712.9	0.00	0.00	5552.0	-126.7	-1236.2	3.00	180.00	1242.6	EOB @ Vertical
7562.9	0.00	0.00	7402.0	-126.7	-1236.2	0.00	0.00	1242.6	TD @ 7563' MD / 7402' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2402.0	2459.5	G' Sand
4152.0	4273.3	Williams Fork
5552.0	5712.9	TOG
6452.0	6612.9	Cameo
7112.0	7272.9	Base Cameo Coal
7152.0	7312.9	Rollins



Plan: Design #1 (Nichols 0994-24-10W/Wellbore #1)

Created By: Will Jircik Date: 16:54, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-10W

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-10W
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 0994-24-10W	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 0994-24-10W			
Well Position	+N/-S	75.9 usft	Northing:	1,529,289.02 usft
	+E/-W	-2.3 usft	Easting:	2,340,128.57 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	264.15

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)	TPO (°)	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	
1,010.4	15.31	264.15	1,004.4	-6.9	-67.4	3.00	3.00	0.00	264.15	
5,202.5	15.31	264.15	5,047.6	-119.8	-1,168.7	0.00	0.00	0.00	0.00	
5,712.9	0.00	0.00	5,552.0	-126.7	-1,236.2	3.00	-3.00	0.00	180.00	
7,562.9	0.00	0.00	7,402.0	-126.7	-1,236.2	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-10W
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 0994-24-10W	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
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	264.15	600.0	-0.3	-2.6	2.6	3.00	3.00	0.00
700.0	6.00	264.15	699.6	-1.1	-10.4	10.5	3.00	3.00	0.00
800.0	9.00	264.15	798.8	-2.4	-23.4	23.5	3.00	3.00	0.00
900.0	12.00	264.15	897.1	-4.3	-41.5	41.7	3.00	3.00	0.00
1,000.0	15.00	264.15	994.3	-6.6	-64.7	65.1	3.00	3.00	0.00
EOB @ 15.31° Inc. / 264.15° Azm									
1,010.4	15.31	264.15	1,004.4	-6.9	-67.4	67.8	3.00	3.00	0.00
1,100.0	15.31	264.15	1,090.8	-9.3	-91.0	91.5	0.00	0.00	0.00
1,200.0	15.31	264.15	1,187.2	-12.0	-117.3	117.9	0.00	0.00	0.00
1,300.0	15.31	264.15	1,283.7	-14.7	-143.5	144.3	0.00	0.00	0.00
1,400.0	15.31	264.15	1,380.1	-17.4	-169.8	170.7	0.00	0.00	0.00
1,500.0	15.31	264.15	1,476.6	-20.1	-196.1	197.1	0.00	0.00	0.00
8 5/8"									
1,530.0	15.31	264.15	1,505.5	-20.9	-203.9	205.0	0.00	0.00	0.00
1,600.0	15.31	264.15	1,573.0	-22.8	-222.3	223.5	0.00	0.00	0.00
1,700.0	15.31	264.15	1,669.5	-25.5	-248.6	249.9	0.00	0.00	0.00
1,800.0	15.31	264.15	1,765.9	-28.2	-274.9	276.3	0.00	0.00	0.00
1,900.0	15.31	264.15	1,862.4	-30.9	-301.1	302.7	0.00	0.00	0.00
2,000.0	15.31	264.15	1,958.8	-33.6	-327.4	329.1	0.00	0.00	0.00
2,100.0	15.31	264.15	2,055.3	-36.3	-353.7	355.5	0.00	0.00	0.00
2,200.0	15.31	264.15	2,151.7	-38.9	-380.0	381.9	0.00	0.00	0.00
2,300.0	15.31	264.15	2,248.2	-41.6	-406.2	408.4	0.00	0.00	0.00
2,400.0	15.31	264.15	2,344.6	-44.3	-432.5	434.8	0.00	0.00	0.00
G' Sand									
2,459.5	15.31	264.15	2,402.0	-45.9	-448.1	450.5	0.00	0.00	0.00
2,500.0	15.31	264.15	2,441.1	-47.0	-458.8	461.2	0.00	0.00	0.00
2,600.0	15.31	264.15	2,537.5	-49.7	-485.0	487.6	0.00	0.00	0.00
2,700.0	15.31	264.15	2,634.0	-52.4	-511.3	514.0	0.00	0.00	0.00
2,800.0	15.31	264.15	2,730.4	-55.1	-537.6	540.4	0.00	0.00	0.00
2,900.0	15.31	264.15	2,826.9	-57.8	-563.8	566.8	0.00	0.00	0.00
3,000.0	15.31	264.15	2,923.3	-60.5	-590.1	593.2	0.00	0.00	0.00
3,100.0	15.31	264.15	3,019.8	-63.2	-616.4	619.6	0.00	0.00	0.00
3,200.0	15.31	264.15	3,116.2	-65.9	-642.7	646.0	0.00	0.00	0.00
3,300.0	15.31	264.15	3,212.7	-68.6	-668.9	672.4	0.00	0.00	0.00
3,400.0	15.31	264.15	3,309.1	-71.3	-695.2	698.8	0.00	0.00	0.00
3,500.0	15.31	264.15	3,405.6	-74.0	-721.5	725.2	0.00	0.00	0.00
3,600.0	15.31	264.15	3,502.0	-76.6	-747.7	751.7	0.00	0.00	0.00
3,700.0	15.31	264.15	3,598.5	-79.3	-774.0	778.1	0.00	0.00	0.00
3,800.0	15.31	264.15	3,694.9	-82.0	-800.3	804.5	0.00	0.00	0.00
3,900.0	15.31	264.15	3,791.4	-84.7	-826.5	830.9	0.00	0.00	0.00
4,000.0	15.31	264.15	3,887.8	-87.4	-852.8	857.3	0.00	0.00	0.00
4,100.0	15.31	264.15	3,984.3	-90.1	-879.1	883.7	0.00	0.00	0.00
4,200.0	15.31	264.15	4,080.7	-92.8	-905.4	910.1	0.00	0.00	0.00
Williams Fork									
4,273.9	15.31	264.15	4,152.0	-94.8	-924.8	929.6	0.00	0.00	0.00
4,300.0	15.31	264.15	4,177.2	-95.5	-931.6	936.5	0.00	0.00	0.00
4,400.0	15.31	264.15	4,273.6	-98.2	-957.9	962.9	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 0994-24-10W	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	15.31	264.15	4,370.1	-100.9	-984.2	989.3	0.00	0.00	0.00
4,600.0	15.31	264.15	4,466.5	-103.6	-1,010.4	1,015.7	0.00	0.00	0.00
4,700.0	15.31	264.15	4,563.0	-106.3	-1,036.7	1,042.1	0.00	0.00	0.00
4,800.0	15.31	264.15	4,659.4	-109.0	-1,063.0	1,068.5	0.00	0.00	0.00
4,900.0	15.31	264.15	4,755.9	-111.7	-1,089.2	1,095.0	0.00	0.00	0.00
5,000.0	15.31	264.15	4,852.3	-114.3	-1,115.5	1,121.4	0.00	0.00	0.00
5,100.0	15.31	264.15	4,948.8	-117.0	-1,141.8	1,147.8	0.00	0.00	0.00
5,200.0	15.31	264.15	5,045.2	-119.7	-1,168.1	1,174.2	0.00	0.00	0.00
Drop 3° / 100'									
5,202.5	15.31	264.15	5,047.6	-119.8	-1,168.7	1,174.8	0.00	0.00	0.00
5,300.0	12.39	264.15	5,142.3	-122.2	-1,191.9	1,198.2	3.00	-3.00	0.00
5,400.0	9.39	264.15	5,240.5	-124.1	-1,210.7	1,217.1	3.00	-3.00	0.00
5,500.0	6.39	264.15	5,339.5	-125.5	-1,224.4	1,230.8	3.00	-3.00	0.00
5,600.0	3.39	264.15	5,439.1	-126.4	-1,232.8	1,239.3	3.00	-3.00	0.00
5,700.0	0.39	264.15	5,539.1	-126.7	-1,236.1	1,242.6	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,712.9	0.00	0.00	5,552.0	-126.7	-1,236.2	1,242.6	3.00	-3.00	741.71
5,800.0	0.00	0.00	5,639.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
5,900.0	0.00	0.00	5,739.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,000.0	0.00	0.00	5,839.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,100.0	0.00	0.00	5,939.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,200.0	0.00	0.00	6,039.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,300.0	0.00	0.00	6,139.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,400.0	0.00	0.00	6,239.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,500.0	0.00	0.00	6,339.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,600.0	0.00	0.00	6,439.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
Cameo									
6,612.9	0.00	0.00	6,452.0	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,700.0	0.00	0.00	6,539.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,800.0	0.00	0.00	6,639.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
6,900.0	0.00	0.00	6,739.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
7,000.0	0.00	0.00	6,839.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
7,100.0	0.00	0.00	6,939.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
7,200.0	0.00	0.00	7,039.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
Base Cameo Coal									
7,272.9	0.00	0.00	7,112.0	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
7,300.0	0.00	0.00	7,139.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
Rollins									
7,312.9	0.00	0.00	7,152.0	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
7,400.0	0.00	0.00	7,239.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
7,500.0	0.00	0.00	7,339.1	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00
TD @ 7563' MD / 7402' TVD									
7,562.9	0.00	0.00	7,402.0	-126.7	-1,236.2	1,242.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-10W
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 0994-24-10W	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	7,402.0	-126.7	-1,236.2	1,529,194.06	2,338,889.56	39.263041	-107.835227

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,505.5	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,459.5	2,402.0	G' Sand			
4,273.9	4,152.0	Williams Fork			
5,712.9	5,552.0	TOG			
6,612.9	6,452.0	Cameo			
7,272.9	7,112.0	Base Cameo Coal			
7,312.9	7,152.0	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	Build 3° / 100°
1,010.4	1,004.4	-6.9	-67.4	EOB @ 15.31° Inc. / 264.15° Azm
5,202.5	5,047.6	-119.8	-1,168.7	Drop 3° / 100°
5,712.9	5,552.0	-126.7	-1,236.2	EOB @ Vertical
7,562.9	7,402.0	-126.7	-1,236.2	TD @ 7563' MD / 7402' TVD