



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-11W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263369
 Longitude: -107.830864
 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 0994-24-11W, 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 0994-24-11W

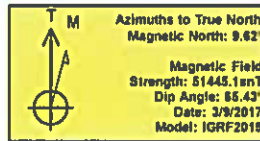
+N-S	+E-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529281.75	2340127.53	39.263369	-107.830864

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-11W	7392.0	-386.0	-1248.6	1528927.88	2338869.40	39.262309	-107.835274

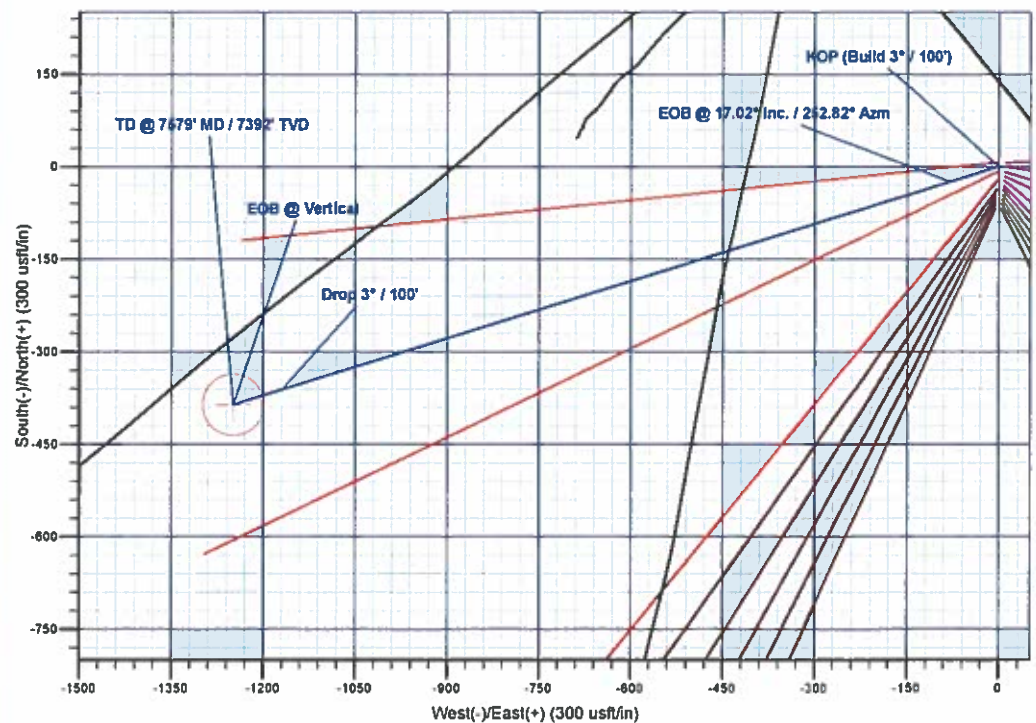
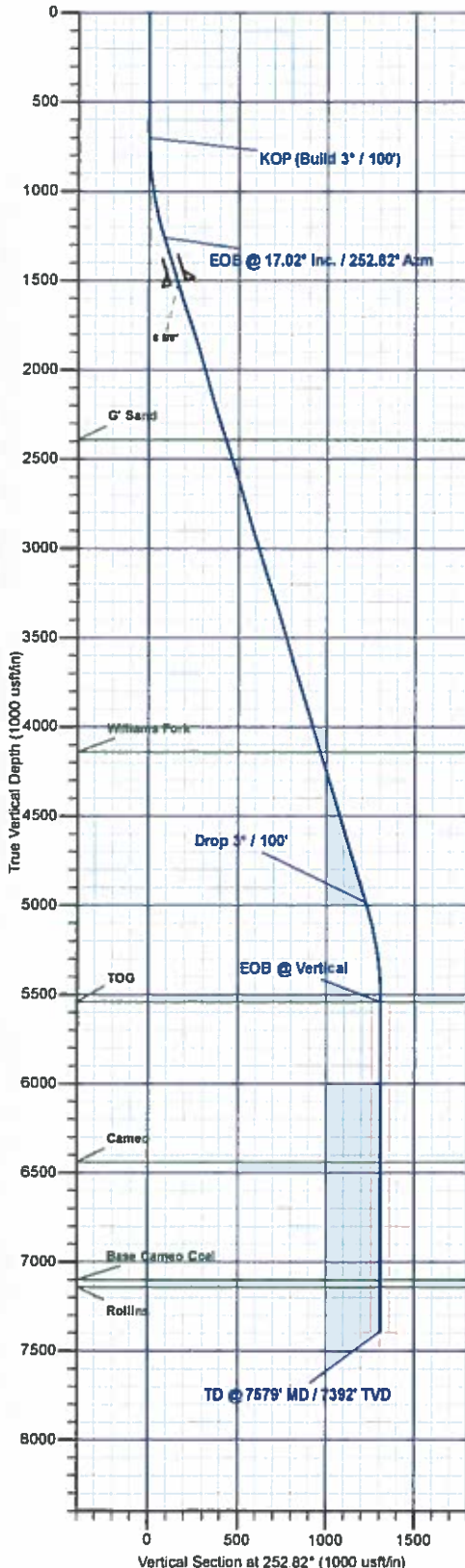
SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dieg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100°)
1267.2	17.02	252.82	1258.9	-24.7	-78.9	3.00	252.82	83.6	EOB @ 17.02° Inc. / 252.82° Azm
5161.9	17.02	252.82	4983.1	-361.3	-1168.8	0.00	0.00	1223.3	Drop 3° / 100°
5729.1	0.00	0.00	5542.0	-386.0	-1248.6	3.00	180.00	1306.9	EOB @ Vertical
7579.1	0.00	0.00	7392.0	-386.0	-1248.6	0.00	0.00	1306.9	TD @ 7579' MD / 7392' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2392.0	2452.2	G' Sand
4142.0	4282.3	Williams Fork
5542.0	5729.1	TOG
6442.0	6629.1	Cameo
7102.0	7289.1	Base Cameo Coal
7142.0	7329.1	Rollins



Plan: Design #1 (Nichols 0994-24-11W Wellbore #1)

Created By: Will Jircik Date: 16:59, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-11W

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-11W
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 0994-24-11W	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 0994-24-11W			
Well Position	+N/-S	68.6 usft	Northing:	1,529,281.76 usft
	+E/-W	-3.2 usft	Easting:	2,340,127.53 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	252.82

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	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,267.2	17.02	252.82	1,258.9	-24.7	-79.9	3.00	3.00	0.00	252.82	
5,161.9	17.02	252.82	4,983.1	-361.3	-1,168.8	0.00	0.00	0.00	0.00	
5,729.1	0.00	0.00	5,542.0	-386.0	-1,248.6	3.00	-3.00	0.00	180.00	
7,579.1	0.00	0.00	7,392.0	-386.0	-1,248.6	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-11W
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 0994-24-11W	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
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	3.00	252.82	800.0	-0.8	-2.5	2.6	3.00	3.00	0.00
900.0	6.00	252.82	899.6	-3.1	-10.0	10.5	3.00	3.00	0.00
1,000.0	9.00	252.82	998.8	-6.9	-22.5	23.5	3.00	3.00	0.00
1,100.0	12.00	252.82	1,097.1	-12.3	-39.9	41.7	3.00	3.00	0.00
1,200.0	15.00	252.82	1,194.3	-19.2	-62.2	65.1	3.00	3.00	0.00
EOB @ 17.02° Inc. / 252.82° Azm									
1,267.2	17.02	252.82	1,258.9	-24.7	-79.9	83.6	3.00	3.00	0.00
1,300.0	17.02	252.82	1,290.3	-27.5	-89.0	93.2	0.00	0.00	0.00
1,400.0	17.02	252.82	1,385.9	-36.2	-117.0	122.5	0.00	0.00	0.00
1,500.0	17.02	252.82	1,481.5	-44.8	-145.0	151.7	0.00	0.00	0.00
8 5/8"									
1,530.0	17.02	252.82	1,510.2	-47.4	-153.4	160.5	0.00	0.00	0.00
1,600.0	17.02	252.82	1,577.1	-53.5	-172.9	181.0	0.00	0.00	0.00
1,700.0	17.02	252.82	1,672.8	-62.1	-200.9	210.3	0.00	0.00	0.00
1,800.0	17.02	252.82	1,768.4	-70.7	-228.8	239.5	0.00	0.00	0.00
1,900.0	17.02	252.82	1,864.0	-79.4	-256.8	268.8	0.00	0.00	0.00
2,000.0	17.02	252.82	1,959.6	-88.0	-284.8	298.1	0.00	0.00	0.00
2,100.0	17.02	252.82	2,055.2	-96.7	-312.7	327.3	0.00	0.00	0.00
2,200.0	17.02	252.82	2,150.9	-105.3	-340.7	356.6	0.00	0.00	0.00
2,300.0	17.02	252.82	2,246.5	-114.0	-368.6	385.8	0.00	0.00	0.00
2,400.0	17.02	252.82	2,342.1	-122.6	-396.6	415.1	0.00	0.00	0.00
G' Sand									
2,452.2	17.02	252.82	2,392.0	-127.1	-411.2	430.4	0.00	0.00	0.00
2,500.0	17.02	252.82	2,437.7	-131.3	-424.5	444.4	0.00	0.00	0.00
2,600.0	17.02	252.82	2,533.4	-139.9	-452.5	473.6	0.00	0.00	0.00
2,700.0	17.02	252.82	2,629.0	-148.5	-480.5	502.9	0.00	0.00	0.00
2,800.0	17.02	252.82	2,724.6	-157.2	-508.4	532.2	0.00	0.00	0.00
2,900.0	17.02	252.82	2,820.2	-165.8	-536.4	561.4	0.00	0.00	0.00
3,000.0	17.02	252.82	2,915.8	-174.5	-564.3	590.7	0.00	0.00	0.00
3,100.0	17.02	252.82	3,011.5	-183.1	-592.3	620.0	0.00	0.00	0.00
3,200.0	17.02	252.82	3,107.1	-191.8	-620.3	649.2	0.00	0.00	0.00
3,300.0	17.02	252.82	3,202.7	-200.4	-648.2	678.5	0.00	0.00	0.00
3,400.0	17.02	252.82	3,298.3	-209.0	-676.2	707.7	0.00	0.00	0.00
3,500.0	17.02	252.82	3,394.0	-217.7	-704.1	737.0	0.00	0.00	0.00
3,600.0	17.02	252.82	3,489.6	-226.3	-732.1	766.3	0.00	0.00	0.00
3,700.0	17.02	252.82	3,585.2	-235.0	-760.0	795.5	0.00	0.00	0.00
3,800.0	17.02	252.82	3,680.8	-243.6	-788.0	824.8	0.00	0.00	0.00
3,900.0	17.02	252.82	3,776.4	-252.3	-816.0	854.1	0.00	0.00	0.00
4,000.0	17.02	252.82	3,872.1	-260.9	-843.9	883.3	0.00	0.00	0.00
4,100.0	17.02	252.82	3,967.7	-269.6	-871.9	912.6	0.00	0.00	0.00
4,200.0	17.02	252.82	4,063.3	-278.2	-899.8	941.9	0.00	0.00	0.00
Williams Fork									
4,282.3	17.02	252.82	4,142.0	-285.3	-922.8	965.9	0.00	0.00	0.00
4,300.0	17.02	252.82	4,158.9	-286.8	-927.8	971.1	0.00	0.00	0.00
4,400.0	17.02	252.82	4,254.6	-295.5	-955.7	1,000.4	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-11W
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 0994-24-11W	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	17.02	252.82	4,350.2	-304.1	-983.7	1,029.6	0.00	0.00	0.00
4,600.0	17.02	252.82	4,445.8	-312.8	-1,011.7	1,058.9	0.00	0.00	0.00
4,700.0	17.02	252.82	4,541.4	-321.4	-1,039.6	1,088.2	0.00	0.00	0.00
4,800.0	17.02	252.82	4,637.0	-330.1	-1,067.6	1,117.4	0.00	0.00	0.00
4,900.0	17.02	252.82	4,732.7	-338.7	-1,095.5	1,146.7	0.00	0.00	0.00
5,000.0	17.02	252.82	4,828.3	-347.3	-1,123.5	1,176.0	0.00	0.00	0.00
5,100.0	17.02	252.82	4,923.9	-356.0	-1,151.5	1,205.2	0.00	0.00	0.00
Drop 3" / 100'									
5,161.9	17.02	252.82	4,983.1	-361.3	-1,168.8	1,223.3	0.00	0.00	0.00
5,200.0	15.87	252.82	5,019.6	-364.5	-1,179.1	1,234.1	3.00	-3.00	0.00
5,300.0	12.87	252.82	5,116.5	-371.9	-1,202.8	1,258.9	3.00	-3.00	0.00
5,400.0	9.87	252.82	5,214.5	-377.7	-1,221.6	1,278.7	3.00	-3.00	0.00
5,500.0	6.87	252.82	5,313.5	-382.0	-1,235.5	1,293.2	3.00	-3.00	0.00
5,600.0	3.87	252.82	5,413.0	-384.7	-1,244.5	1,302.6	3.00	-3.00	0.00
5,700.0	0.87	252.82	5,512.9	-386.0	-1,248.4	1,306.7	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,729.1	0.00	0.00	5,542.0	-386.0	-1,248.6	1,306.9	3.00	-3.00	368.34
5,800.0	0.00	0.00	5,612.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
5,900.0	0.00	0.00	5,712.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,000.0	0.00	0.00	5,812.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,100.0	0.00	0.00	5,912.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,200.0	0.00	0.00	6,012.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,300.0	0.00	0.00	6,112.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,400.0	0.00	0.00	6,212.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,500.0	0.00	0.00	6,312.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,600.0	0.00	0.00	6,412.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
Cameo									
6,629.1	0.00	0.00	6,442.0	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,700.0	0.00	0.00	6,512.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,800.0	0.00	0.00	6,612.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
6,900.0	0.00	0.00	6,712.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
7,000.0	0.00	0.00	6,812.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
7,100.0	0.00	0.00	6,912.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
7,200.0	0.00	0.00	7,012.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
Base Cameo Coal									
7,289.1	0.00	0.00	7,102.0	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
7,300.0	0.00	0.00	7,112.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
Rollins									
7,329.1	0.00	0.00	7,142.0	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
7,400.0	0.00	0.00	7,212.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
7,500.0	0.00	0.00	7,312.9	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00
TD @ 7679' MD / 7392' TVD									
7,579.1	0.00	0.00	7,392.0	-386.0	-1,248.6	1,306.9	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-11W
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 0994-24-11W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
PBHL - Nichols 0994-24	0.00	0.00	7,392.0	-386.0	-1,248.6	1,528,927.89	2,338,869.40	39.262309	-107.835274
- plan hits target center									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,510.2	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,452.2	2,392.0	G' Sand			
4,282.3	4,142.0	Williams Fork			
5,729.1	5,542.0	TOG			
6,629.1	6,442.0	Cameo			
7,289.1	7,102.0	Base Cameo Coal			
7,329.1	7,142.0	Rollins			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.0	700.0	0.0	0.0	KOP (Build 3" / 100')
1,267.2	1,258.9	-24.7	-79.9	EOB @ 17.02° Inc. / 252.82° Azm
5,161.9	4,983.1	-361.3	-1,168.8	Drop 3" / 100'
5,729.1	5,542.0	-386.0	-1,248.6	EOB @ Vertical
7,579.1	7,392.0	-386.0	-1,248.6	TD @ 7579' MD / 7392' TVD