Applied Foundation Testing

Alabama Certificate of Authorization CA3058-E

April 3, 2018

Report of Crosshole Sonic Logging (CSL)
Test Shaft
I-10 over Mobile River Bridge
Load Test Program
Mobile County, Alabama
AFT Project No.: 518009

Authored By:

Andrew Best
Staff Geotechnical Engineer

Joseph D. Bailey, P.E.
Senior Geotechnical Engineer
Alabama License No.: 33695-E

ALABAMA LICENSED No. 33695-E PROFESSIONAL ENGINEER JOSEPH D BAILEY

Digitally signed by Joseph D. Bailey
DN: cn=Joseph D. Bailey, o=Applied FOundation Testing, Inc., ou, email=jbailey@testpile.com, c=US
Date: 2018.04.03 07:48:10 -05'00'

For: **Mr. Dan Hunter**
A.H. Beck Foundation Company, Inc.
5123 Blanco Road
San Antonio, Texas 78216
dan.hunter@ahbeck.com

Report for Crosshole Sonic Logging

In General Accordance to ASTM D 6760

General Information

Date:	April 3, 2018		
AFT Project No.:	518009		
Project Description:	I-10 over Mobile River Bridge		
Client Name:	A.H. Beck Foundation Company, Inc.		
Client Address:	5123 Blanco Road San Antonio, Texas 78216		
Client Contact:	Mr. Dan Hunter		
Test Date:	March 29, 2018	**Concrete Age:**	6 Days
Test Equipment Manufacturer/Model:	Olson Instruments Inc. / Freedom Data PC		
AFT Field Personnel:	Michael Worsham, P.E.		
AFT Responsible Engineer:	Joseph D. Bailey, P.E.		

Shaft Information

Bent Number	Shaft Number	Diameter (inches)	Constructed Length (feet)	Concrete Pour Date
NA	Test Shaft	78 / 72	180.2	3/23/2018

Top of Shaft Concrete Elevation (feet)	Shaft Tip Elevation (feet)
+10.2	-170.0

CSL Tube Type		CSL Tube Number							
PVC	☐	1	☐	3	☐	5	☐	7	☐
Steel	X	2	☐	4	☐	6	X	8	☐

Northernmost Tube	Numbering Direction
1	**Clockwise**

Tube Stickup Above Concrete (inches)

Tube 1	Tube 2	Tube 3	Tube 4	Tube 5	Tube 6
32.0	33.0	37.5	26.5	24.5	24.3

Tube Length (feet)

Tube 1	Tube 2	Tube 3	Tube 4	Tube 5	Tube 6
171.9	171.9	171.9	172.0	171.9	171.9

Tube Pairs and Spacing (inches)

Tube Pair:1-2	Tube Pair:2-3	Tube Pair:3-4	Tube Pair:4-5	Tube Pair:5-6	Tube Pair:6-1
29.8	27.3	28.4	27.5	27.4	27.6
Tube Pair:1-4	**Tube Pair:2-5**	**Tube Pair:3-6**			
52.9	56.8	58.1			

Construction Information*

Drilling Method*

Wet	X	Natural/Water		Bentonite		Polymer	X
Dry		*please refer to construction information for more detail.					

Temporary Casing

Yes		Top Elev. (ft)		Length (ft)		Diameter (in)	
No	X	*please refer to construction information for more detail.					

Permanent Casing

Yes	X	Top Elev. (ft)	+10.2	Length (ft)	57.0	Diameter (in)	78 O.D.
No		*please refer to construction information for more detail.					

Installation Records provided to AFT				Soil Boring provided to AFT			
Yes		Attached		Yes	X	Attached	
No	X			No			

Results

Ultrasonic Profiles Attached

FAT and Energy	X	Velocity	X	Waterfall	X

Velocity Reductions Exceeding 10 Percent[1]

Tube Pair: 1-2	12 percent from 127.7 feet to 128.1 feet
Tube Pair: 2-3	12 percent from 127.4 feet to 127.8 feet
Tube Pair: 3-4	≤ 10 percent
Tube Pair: 4-5	≤ 10 percent
Tube Pair: 5-6	≤ 10 percent
Tube Pair: 6-1	≤ 10 percent
Tube Pair: 1-4	≤ 10 percent
Tube Pair: 2-5	≤ 10 percent
Tube Pair: 3-6	22 percent from 126.5 feet to 127.9 feet

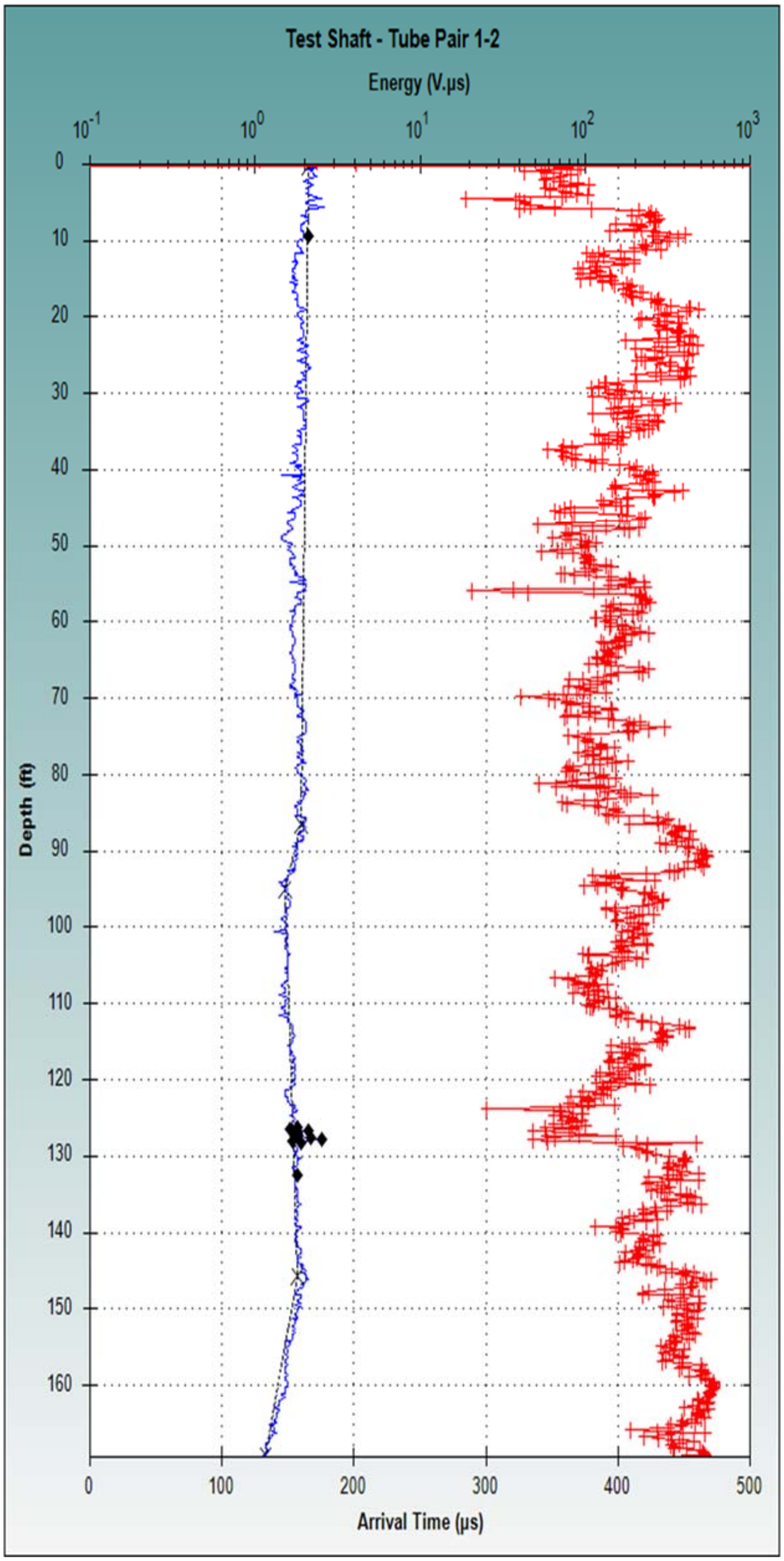
1. Depths referenced are below top of concrete at time of testing.

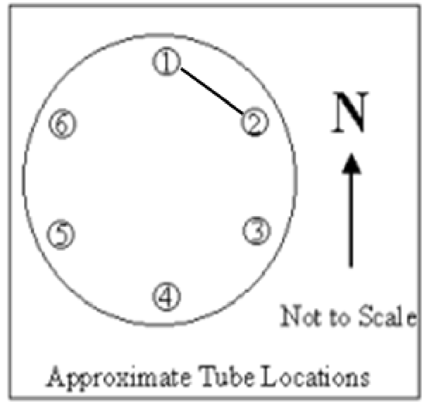
CSL Interpretation
This drilled shaft was constructed with two sets of bi-directional load cell assemblies located at approximate elevations -118.2 and -161.6 feet (128.4 feet and 171.8 feet from top of shaft). A velocity reduction of 12 to 22 percent was observed from 126.5 to 128.1 feet below top of concrete in Tube Pairs 1-2, 2-3, and 3-6. The velocity reductions in Tube Pairs 1-2, 2-3, and 3-6 coincides with the location of the upper bi-directional load cell level. It is important to note the velocity variations observed at this location are typical and to be expected. These velocity variations are of no consequence to the overall shaft integrity. Note, the CSL access tubes were terminated at the top of the lower bi-directional load cell level. The CSL test data did indicated some misalignment in the CSL access tubes along the length of the drilled shaft in several tested profiles. These tested profiles included Tube Pairs 1-2, 2-3, 3-4, 6-1, and 3-6. This misalignment was primarily below the upper bi-directional load cell level. To compensate for the tube misalignment, we performed data analysis within the CSL software program to correct the velocity profiles. An analysis technique known as Leaning Tube Correction (LTC) was applied to selected tube pair profiles which required this correction. The raw data is shown in the arrival time vs depth plots and the banded time vs depth plots. The effects of the tube alignment can be seen in these figures by what appears as sweeping variations in the arrival time with depth. The slope of the leaning tube utilized to correct the tube misalignment is displayed as the dotted line shown in the arrival time vs depth plot, if utilized. The velocity values are then automatically recalculated and displayed in the velocity vs depth plots based on the slope of the leaning tube correction. The tube misalignment along the shaft length did not affect the overall integrity evaluation of the drilled shaft. Our data reduction and analysis techniques (Leaning Tube Correction) allows the drilled shaft integrity evaluation to be made with overall reliability. The corrected velocity plots and energy plots were used to evaluate the integrity. There were no areas with velocity reductions exceeding 10 percent except at the upper AFT-Cell assembly. As previously noted, these velocity variations are typical and are of no consequence to the overall shaft integrity. Based on the CSL tests and analyses, AFT interprets the drilled shaft concrete between the CSL tubes for the length tested is acceptable.

Closure
We appreciate the opportunity to provide our continued services. If you have any questions relating to the content of this report please do not hesitate to contact us.

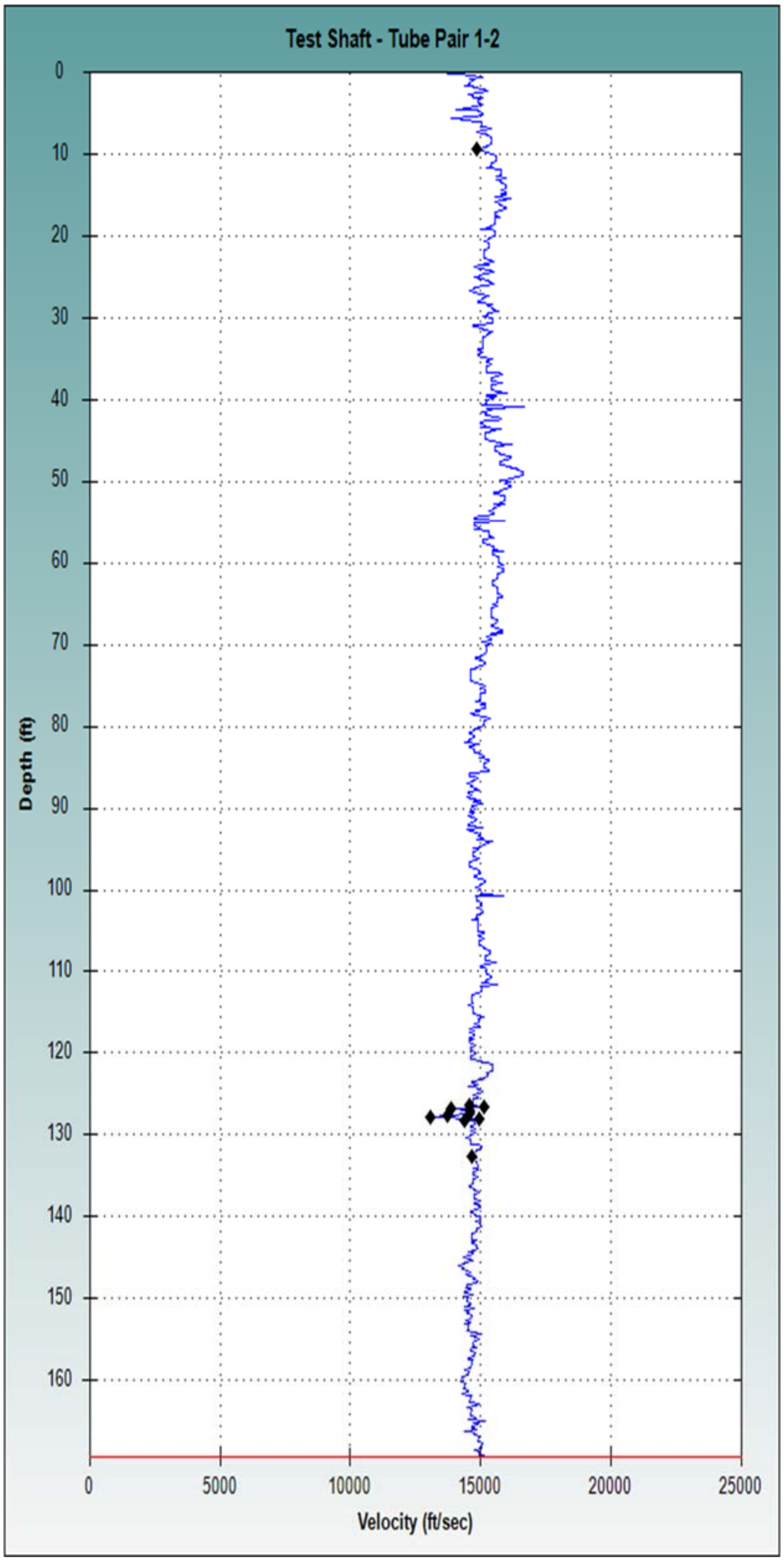
Limitations

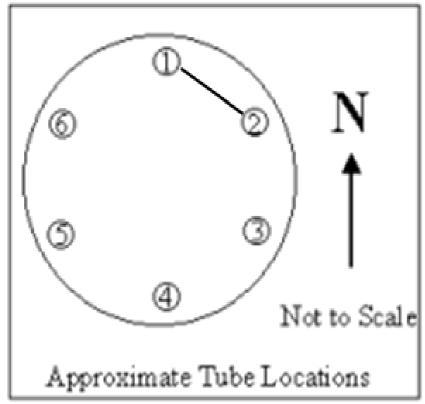
This report presents test measurements made by AFT. Interpretations were made based upon the measurements made by AFT with the latest techniques available and currently accepted standards of care recognized by Geotechnical Engineering professionals. AFT is an independent agency and is not the Geotechnical Engineer of Record. The Geotechnical Engineer of Record should ultimately make final recommendations for foundation design and construction.





Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 29.75
Tubepair Depth - 169.36 ft





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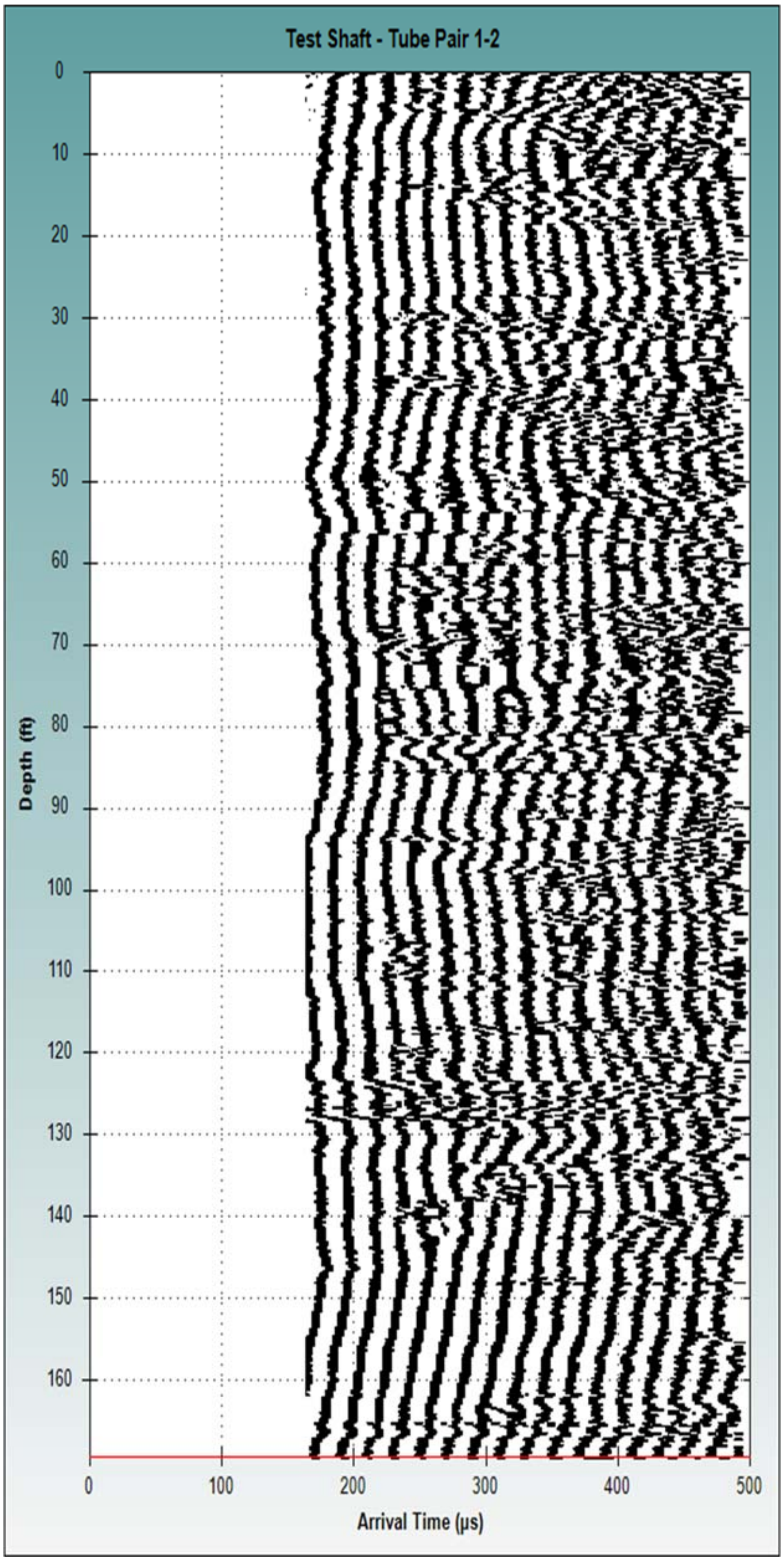

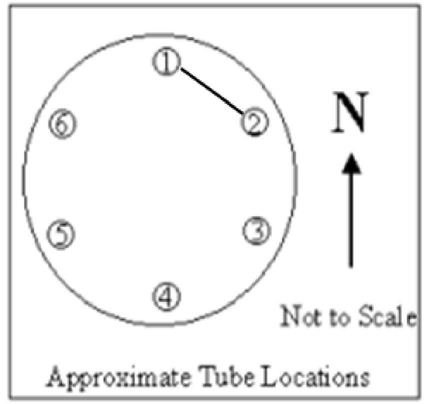

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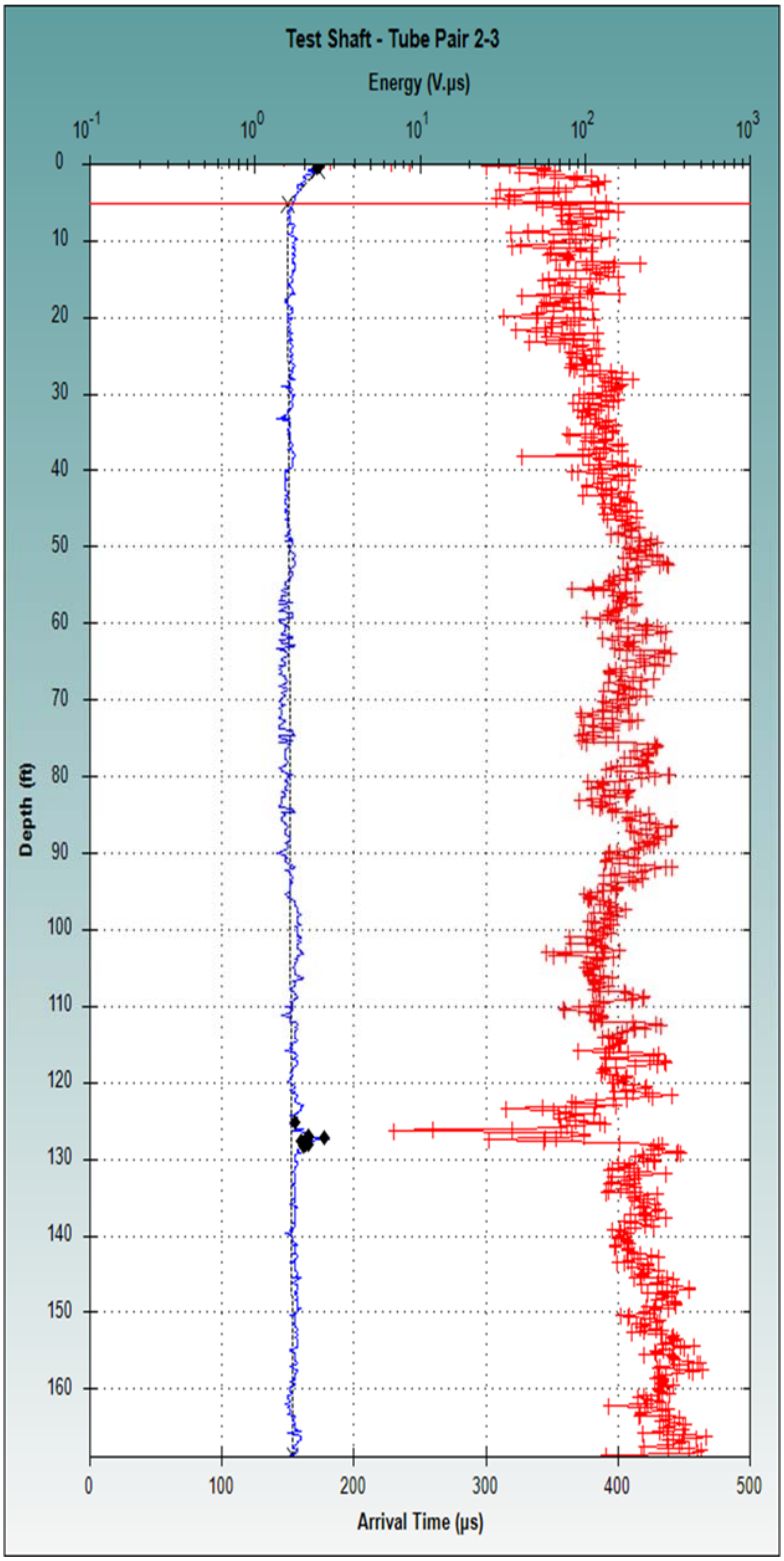
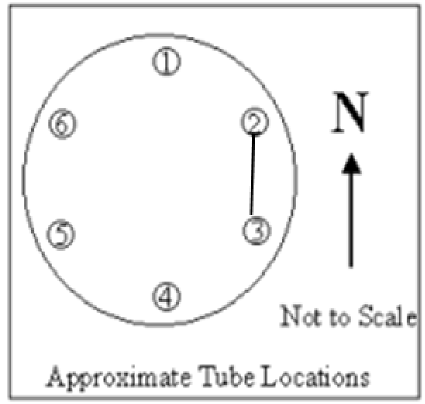
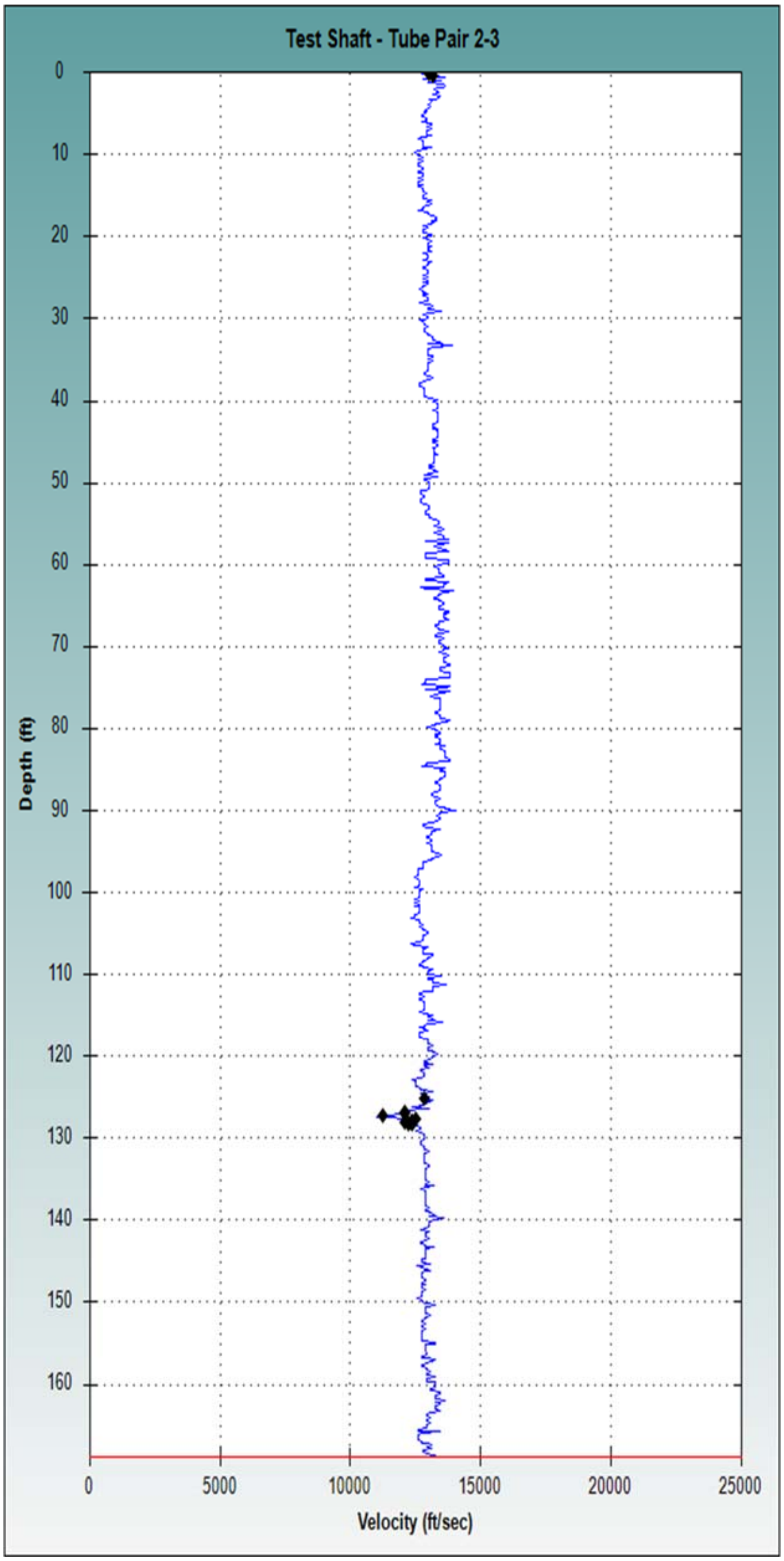
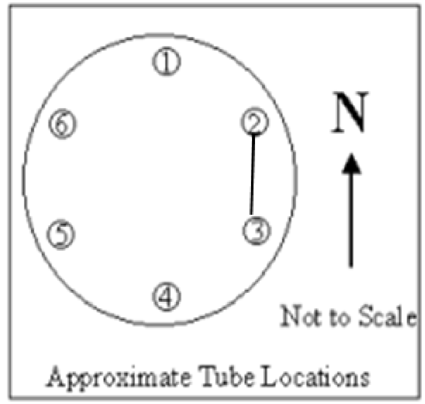




Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 27.25
Tubepair Depth - 168.81 ft





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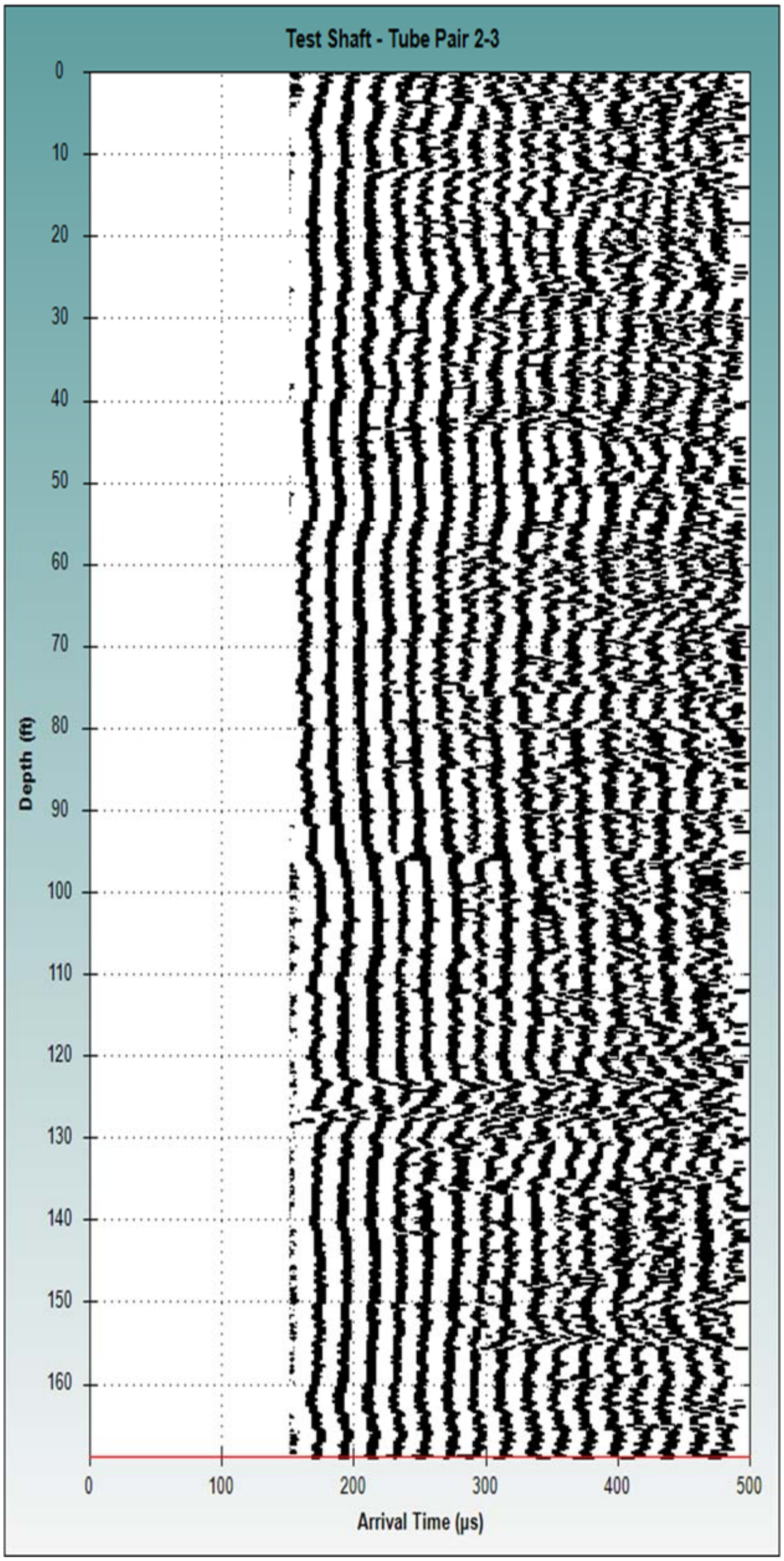

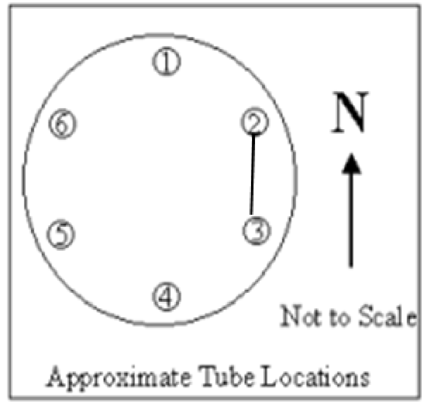

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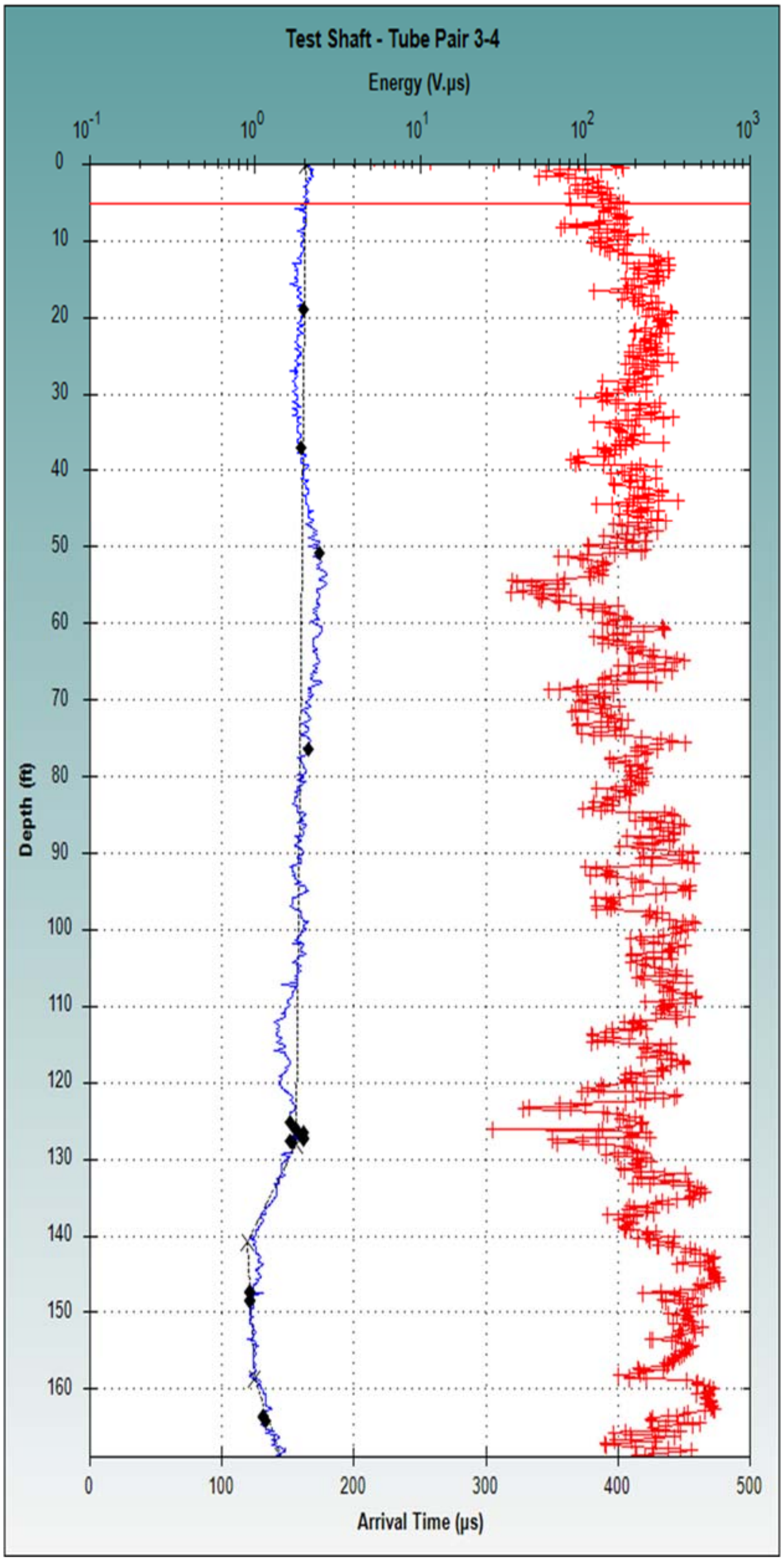
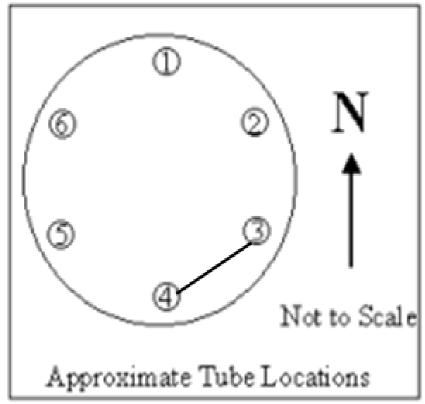
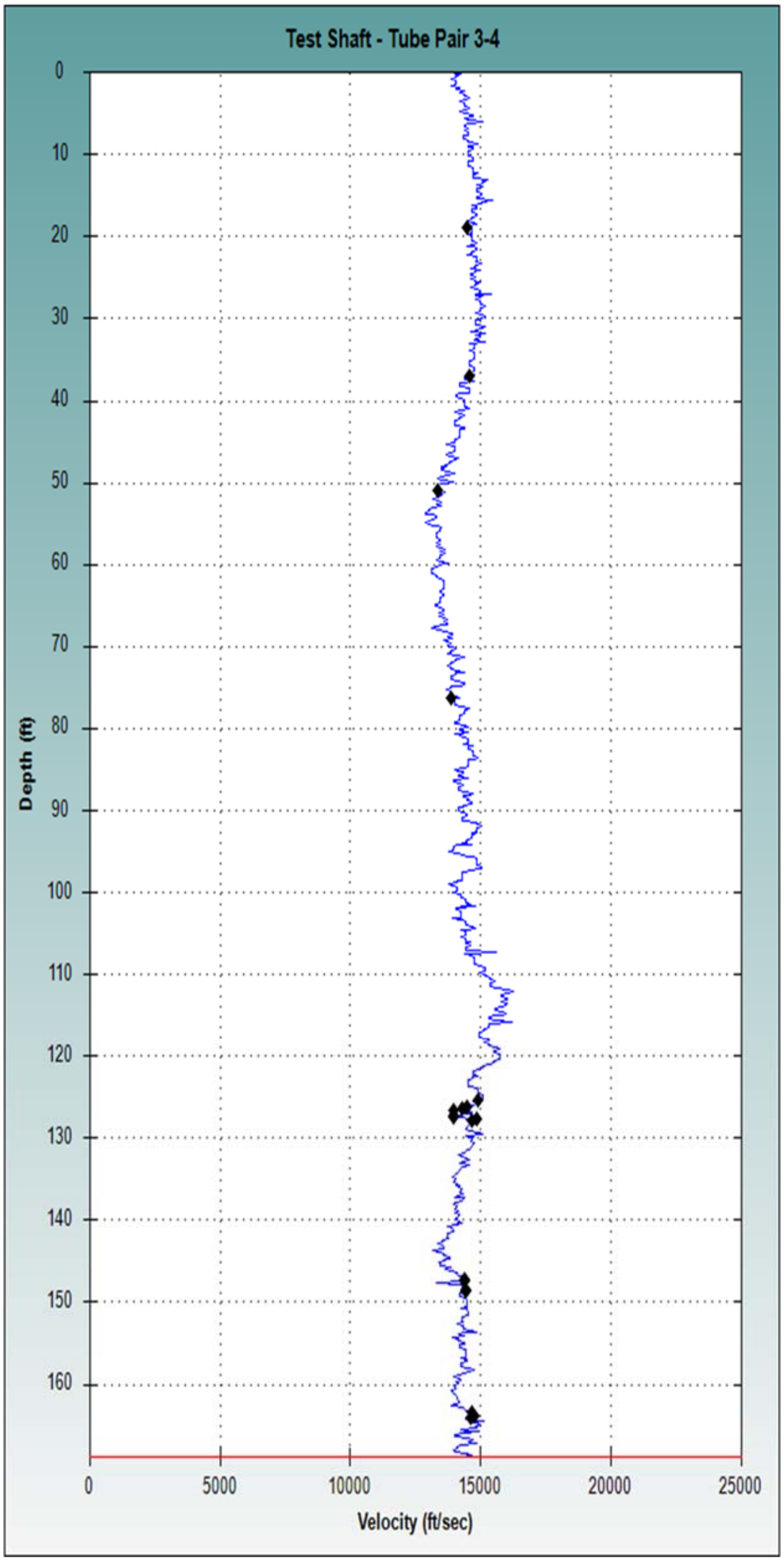
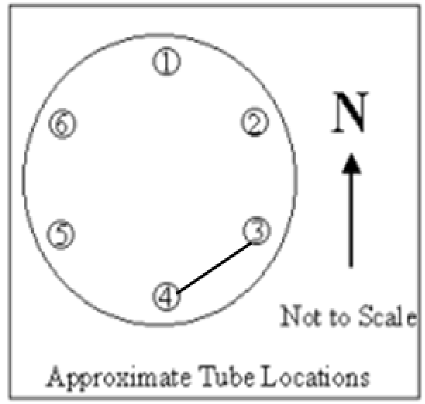
Tubepair Depth - 168.81 ft





Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 28.375
Tubepair Depth - 168.81 ft





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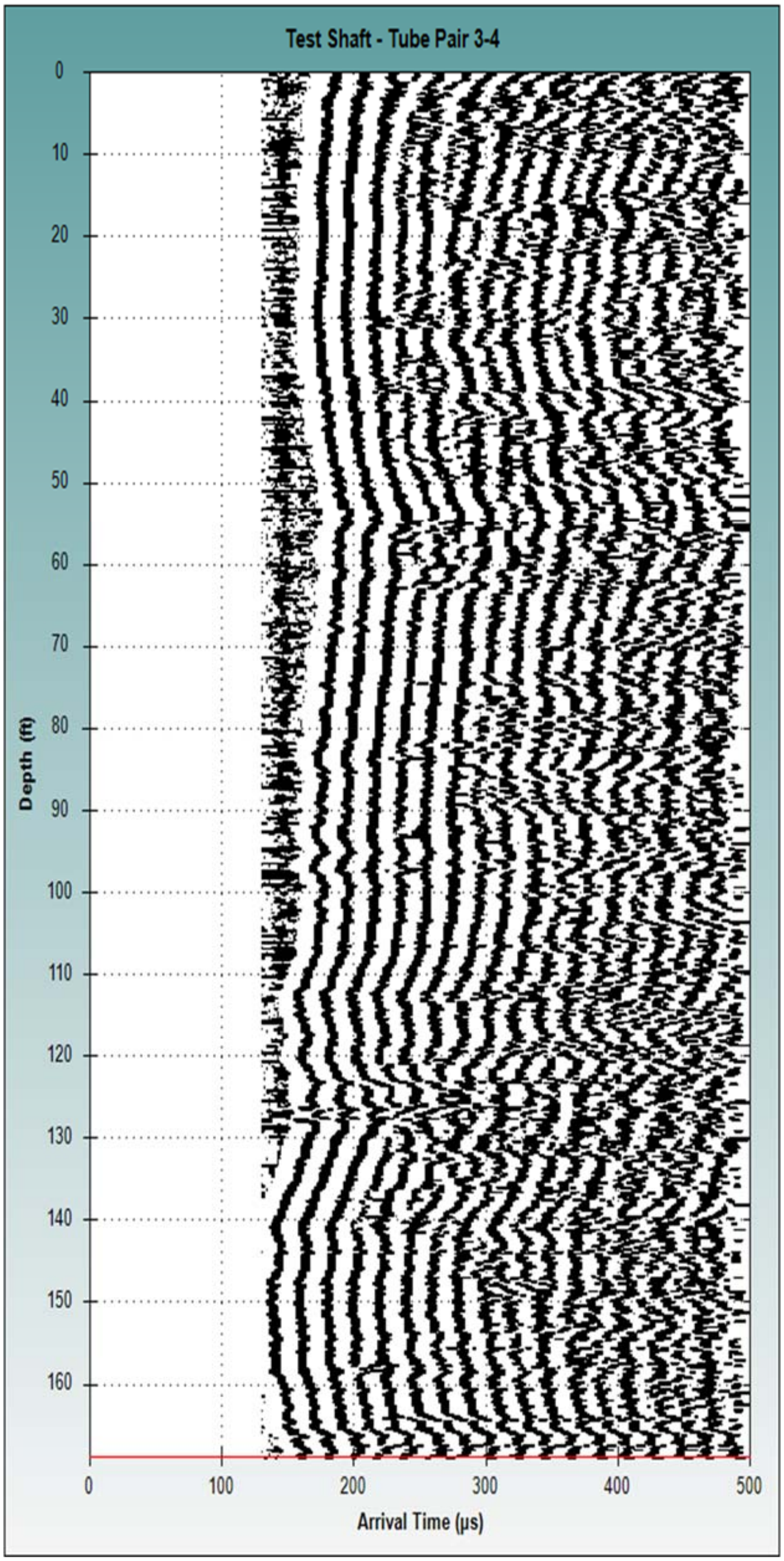
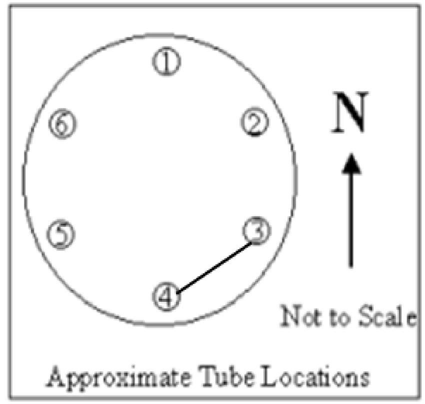
Tube Spacing - 28.375
Tubepair Depth - 168.81 ft





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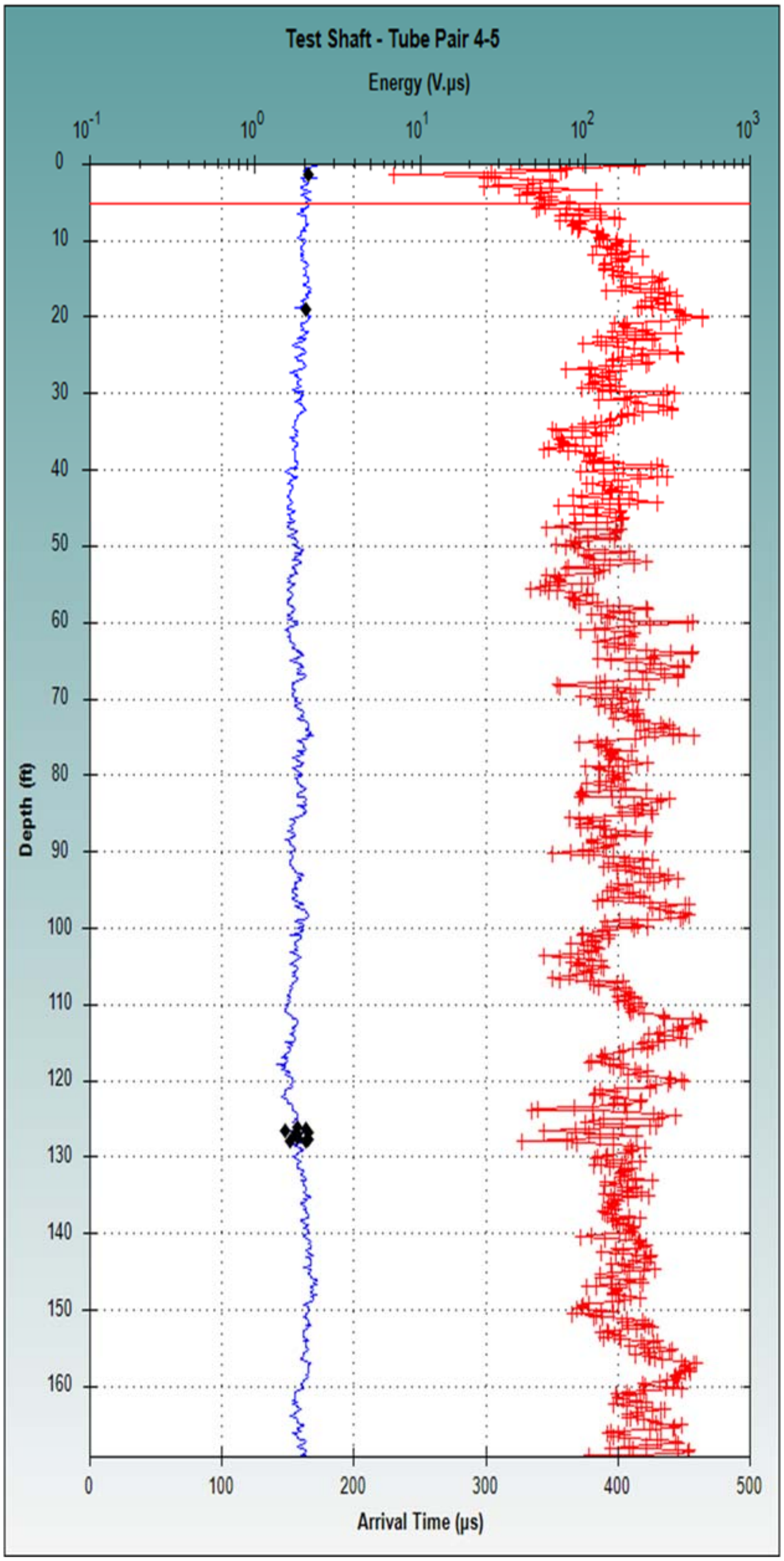
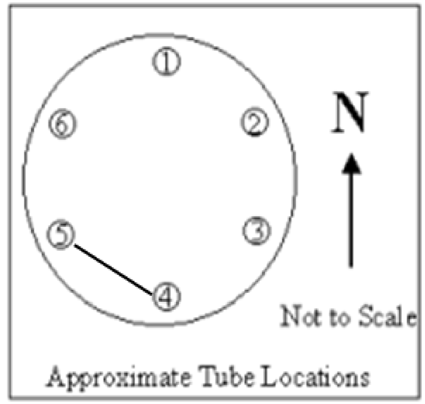
Tube Spacing - 28.375
Tubepair Depth - 168.81 ft





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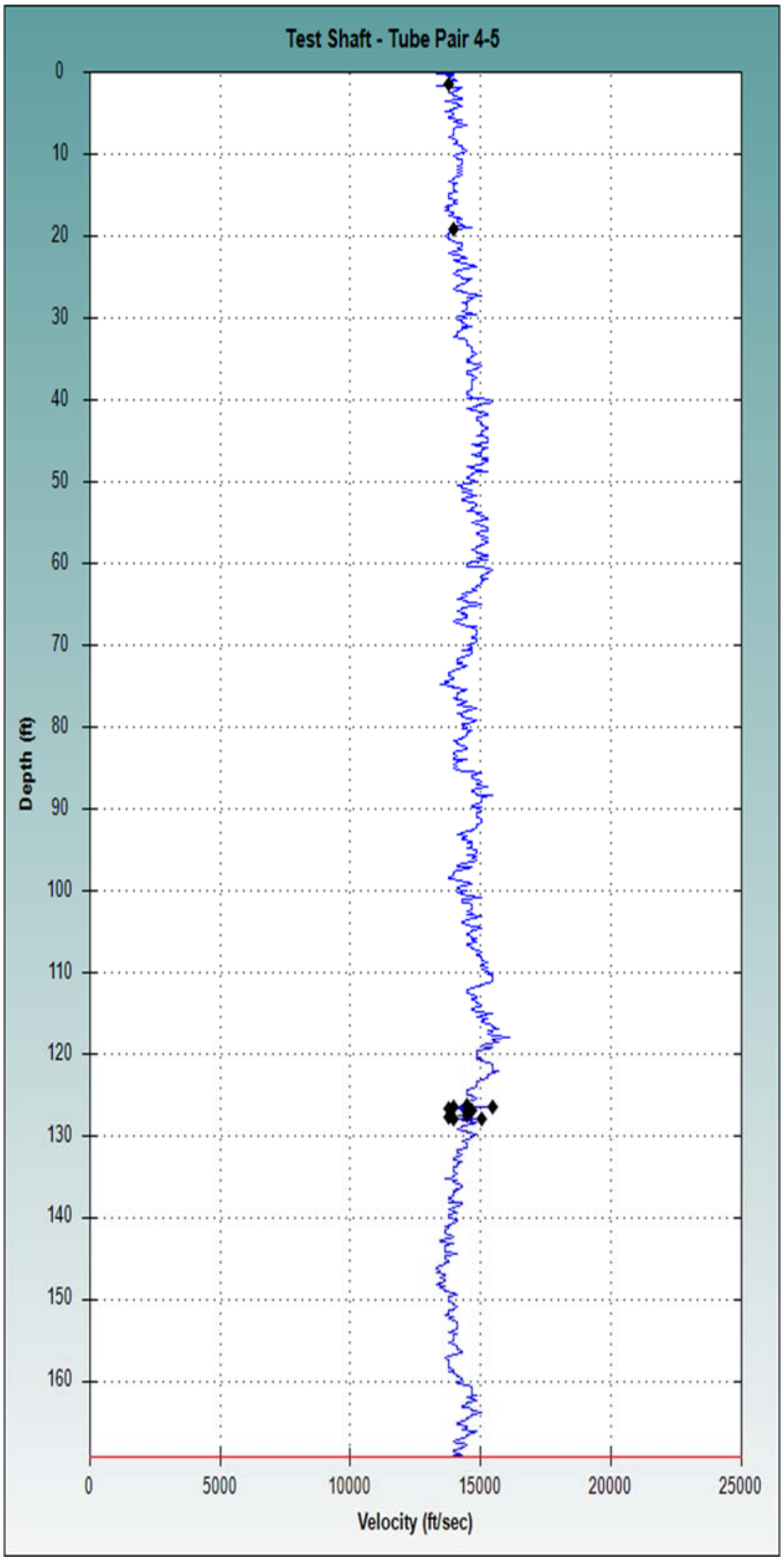
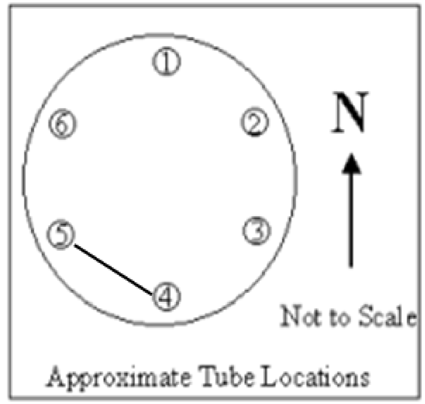
Test Date - 3/29/2018
Tube Spacing - 27.5
Tubepair Depth - 169.17 ft





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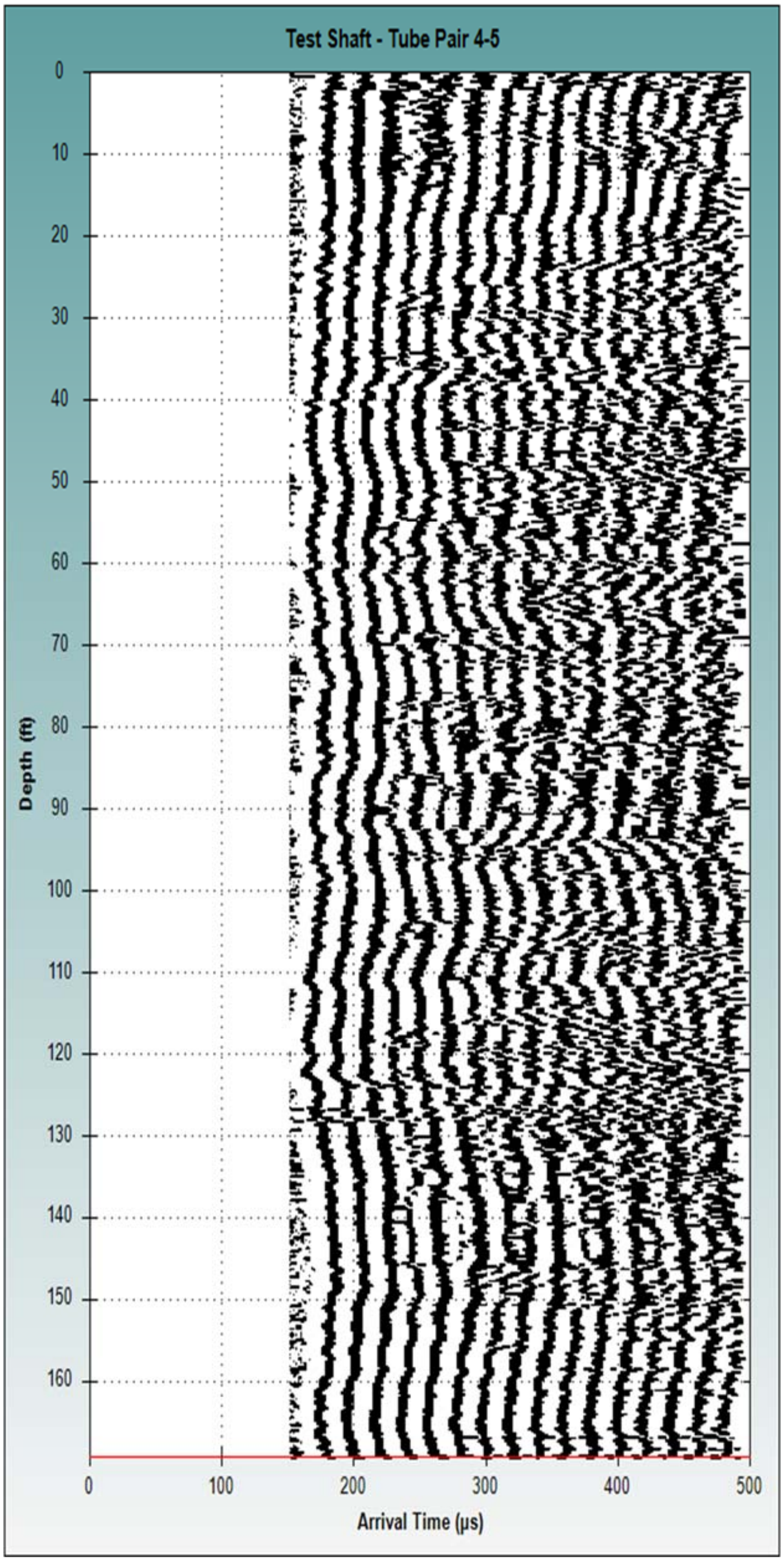

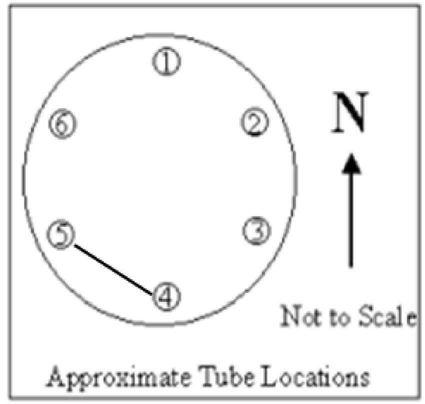

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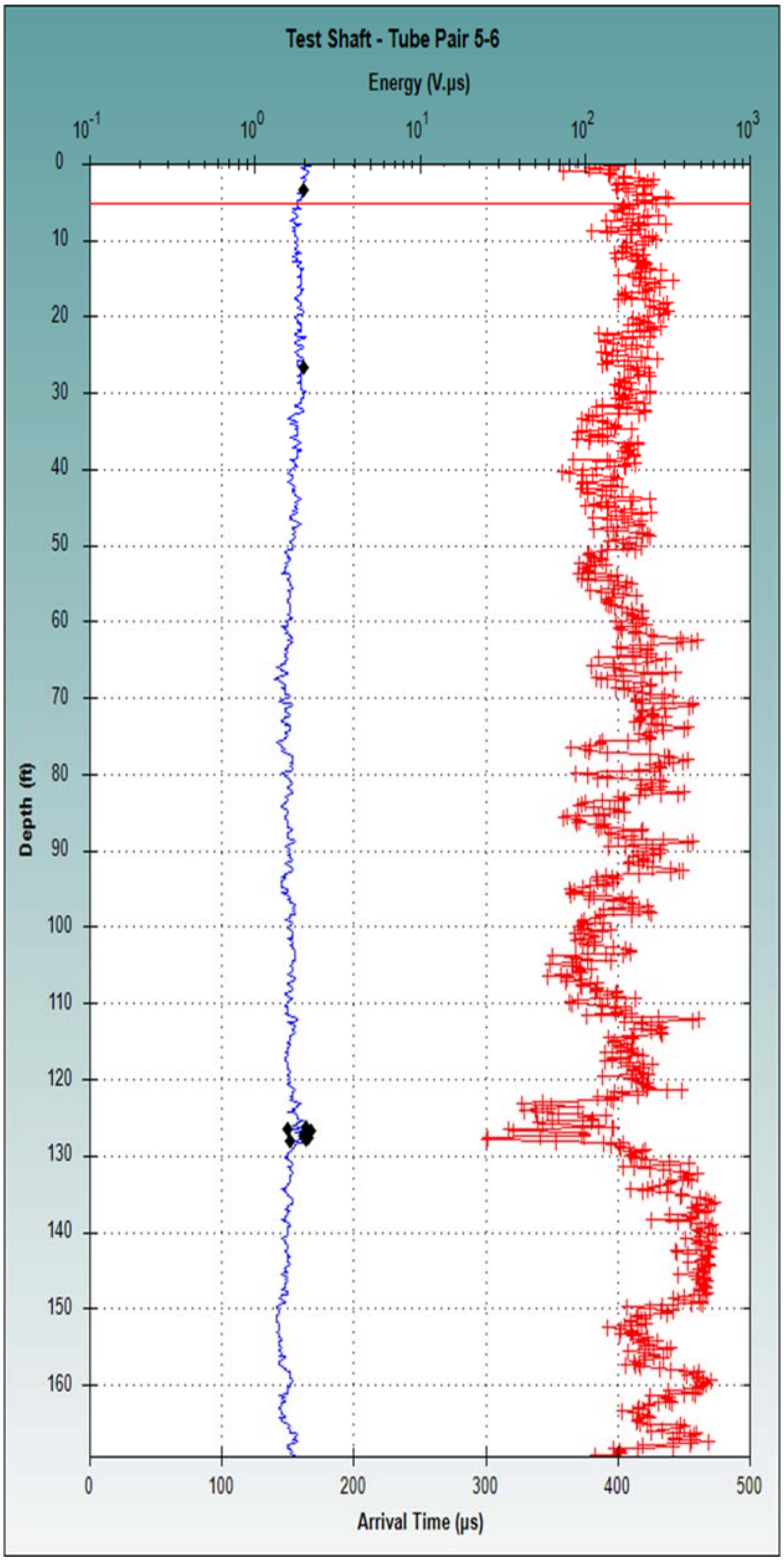
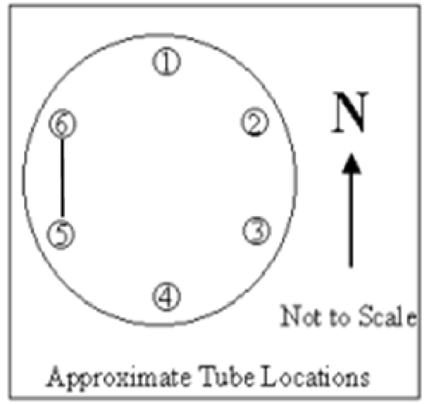
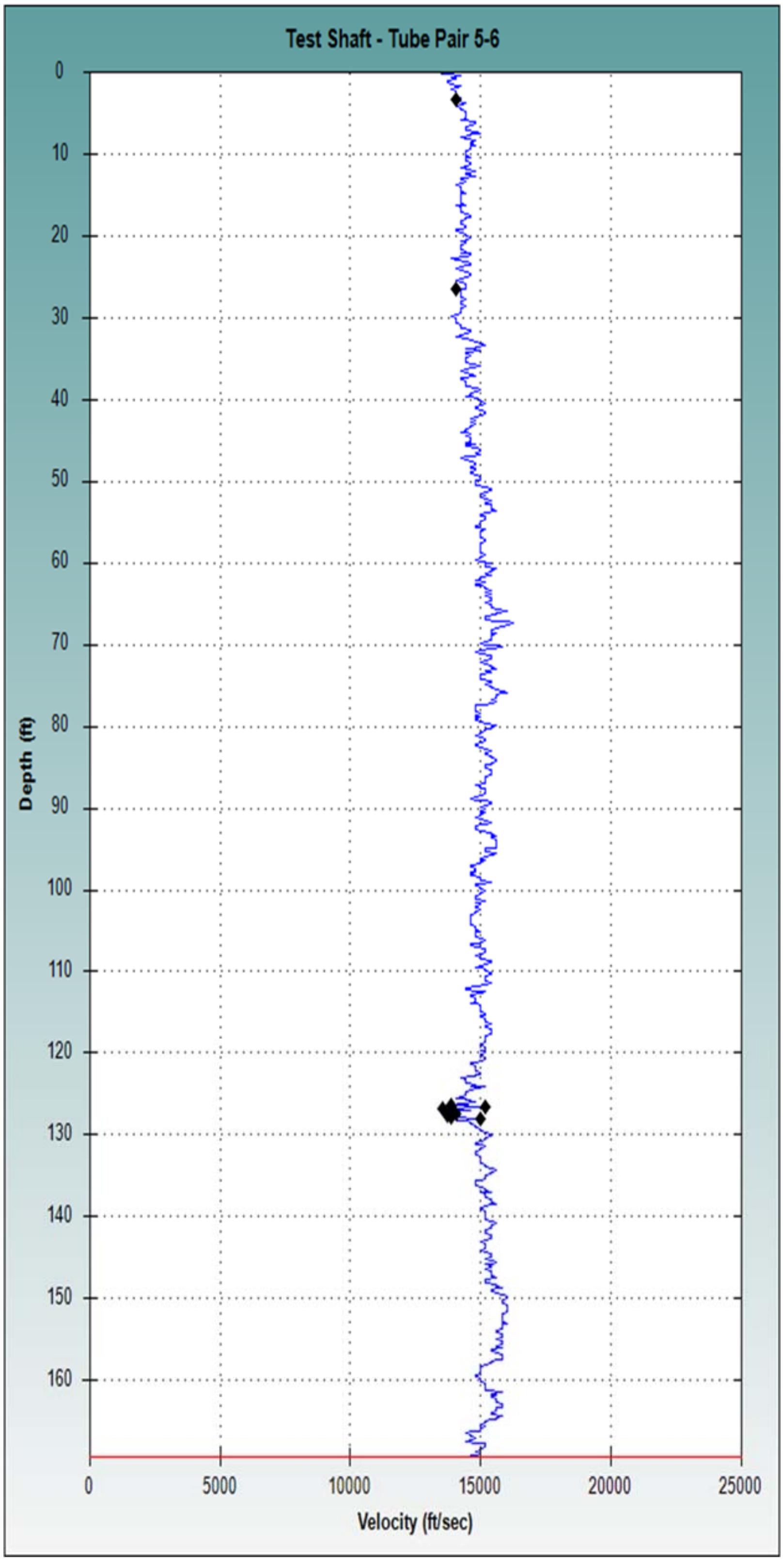
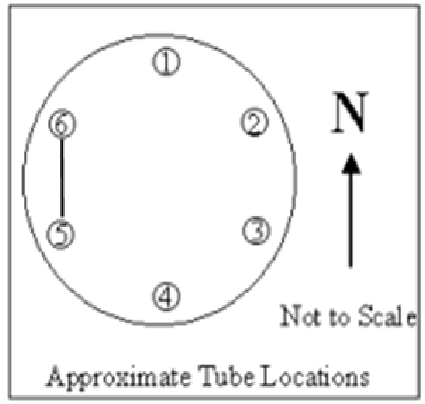
Tubepair Depth - 169.17 ft





Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 27.375
Tubepair Depth - 169.36 ft





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Tube Spacing - 27.375
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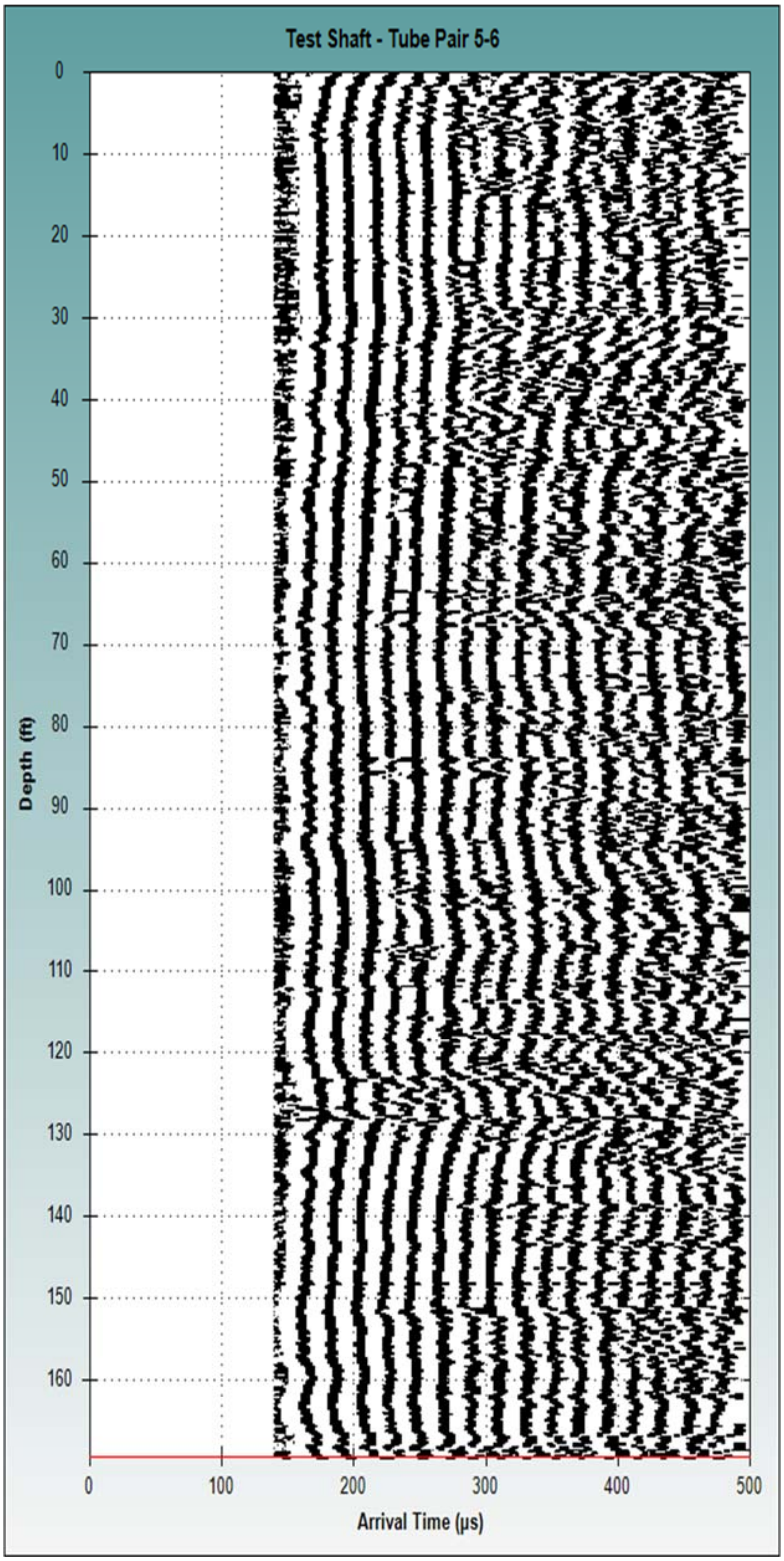

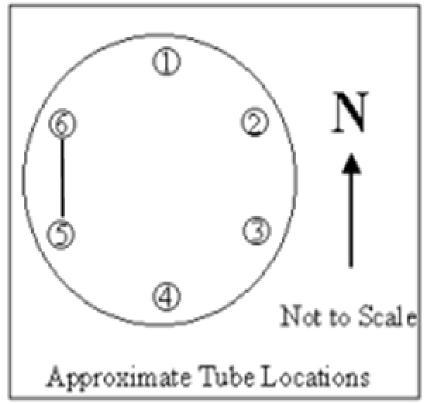

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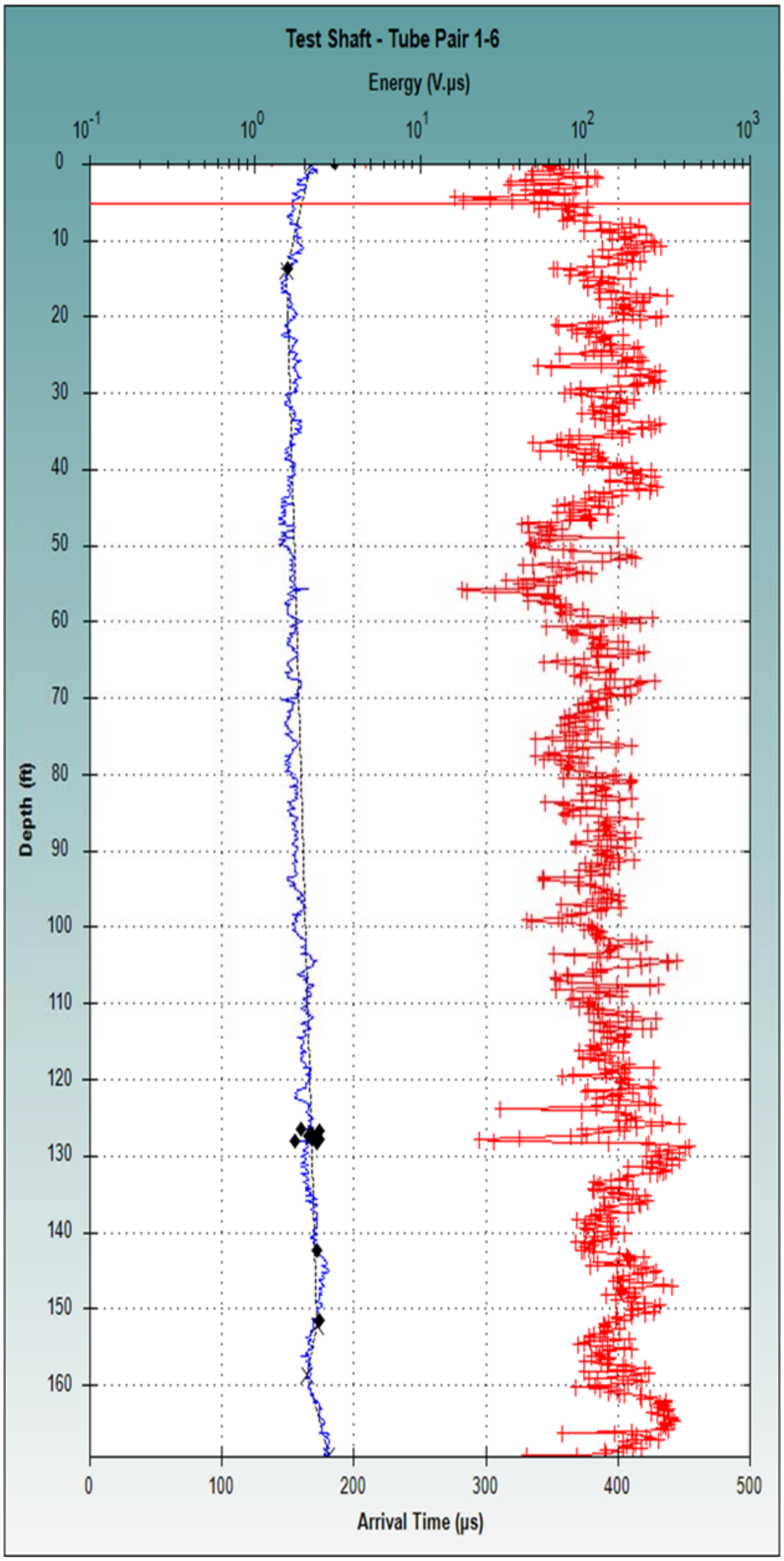
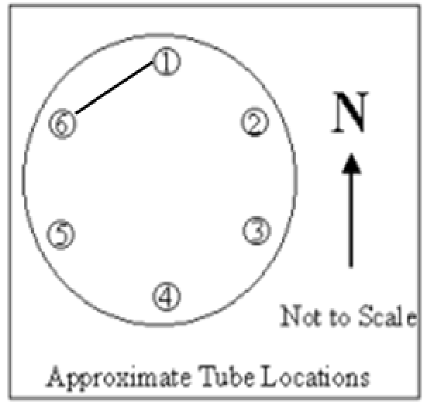
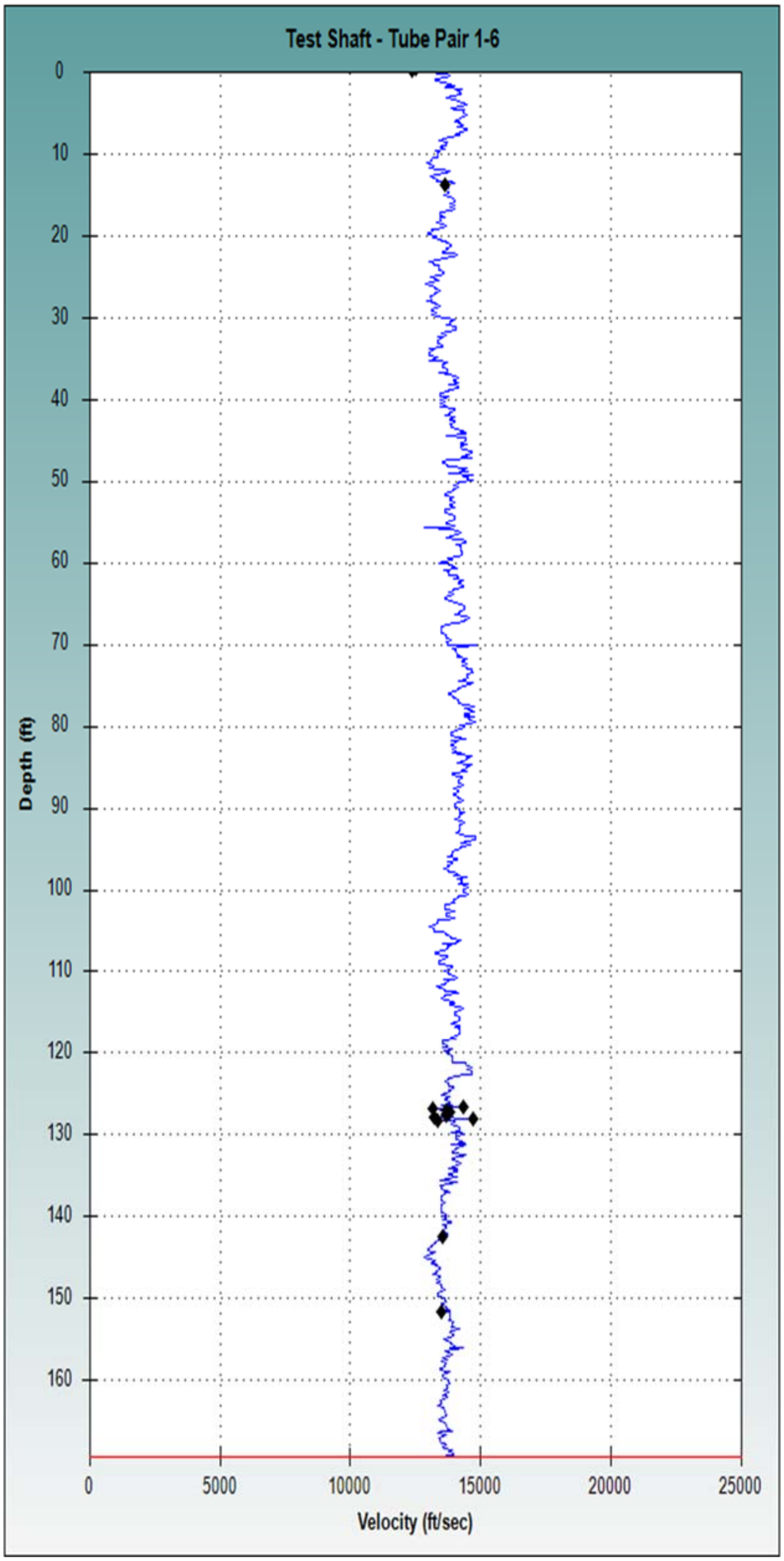
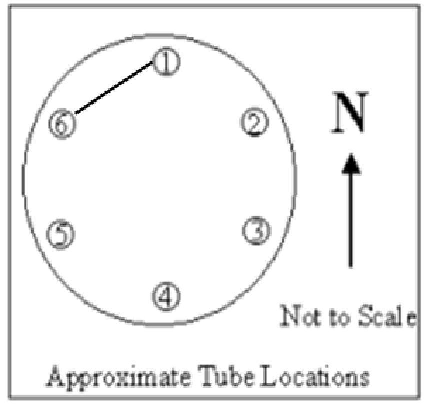




Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 27.625
Tubepair Depth - 169.36 ft





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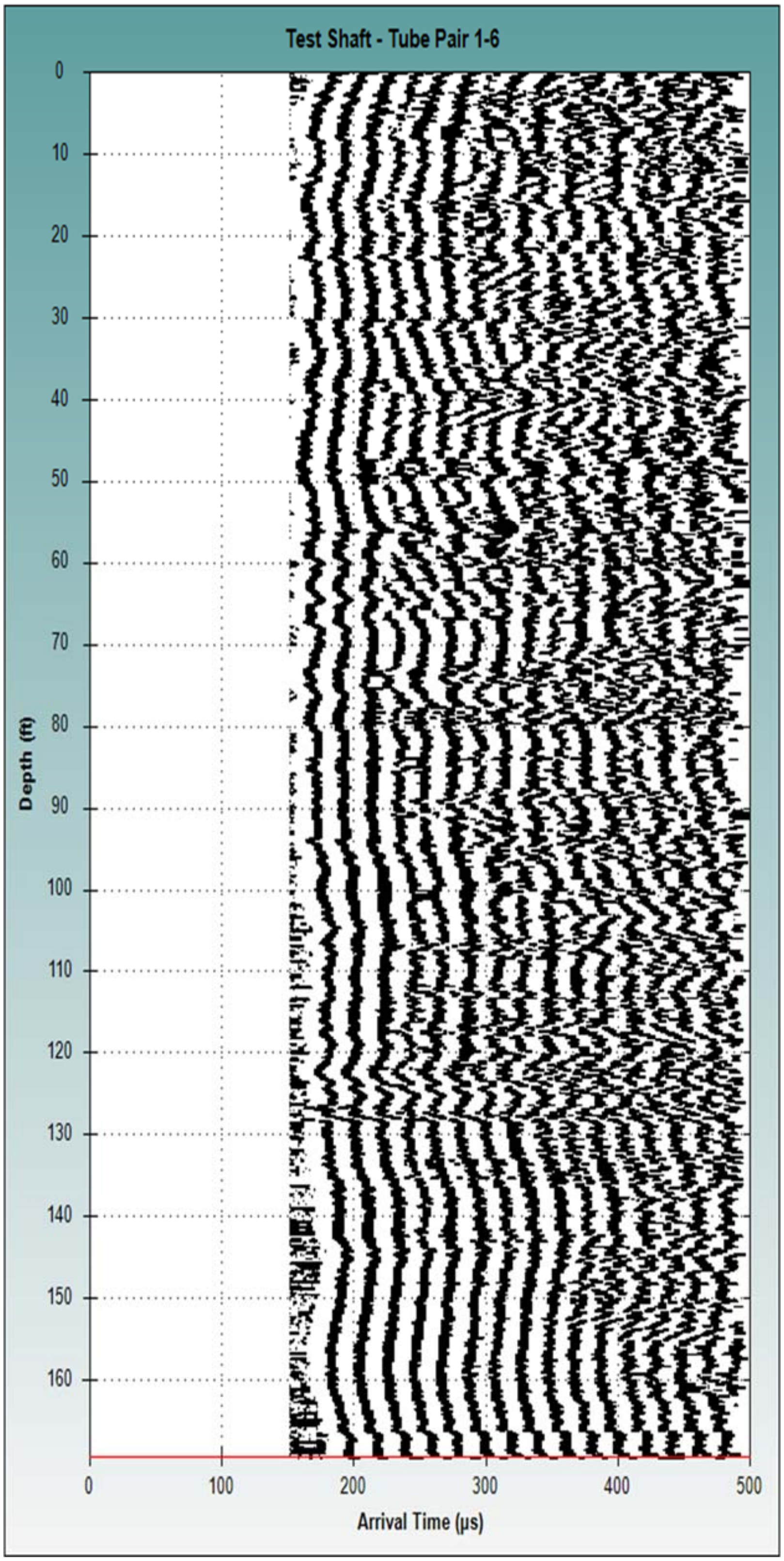
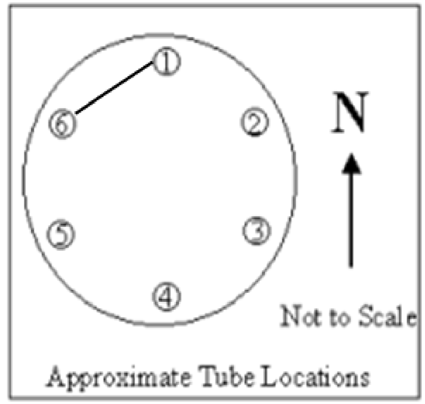
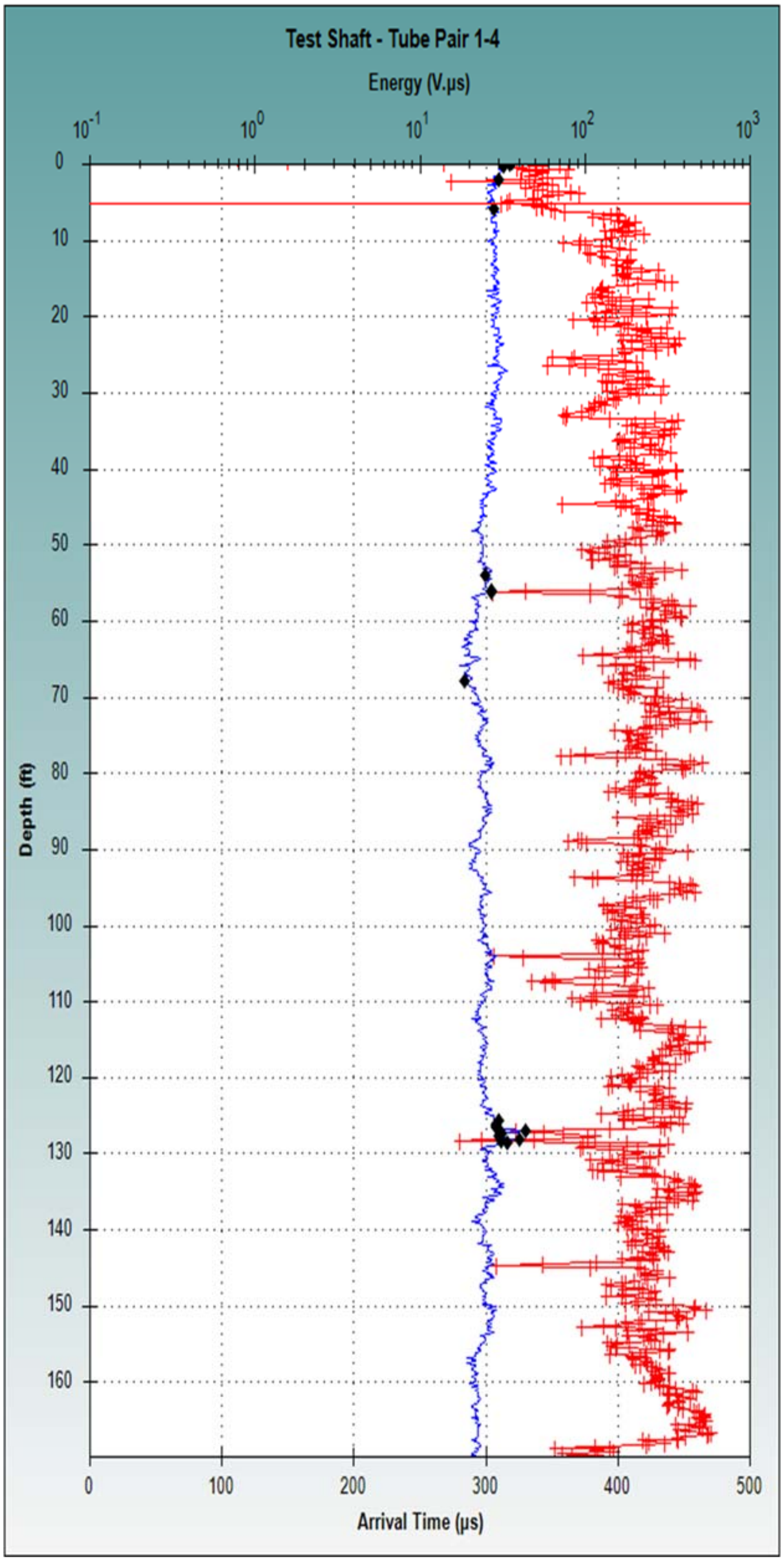
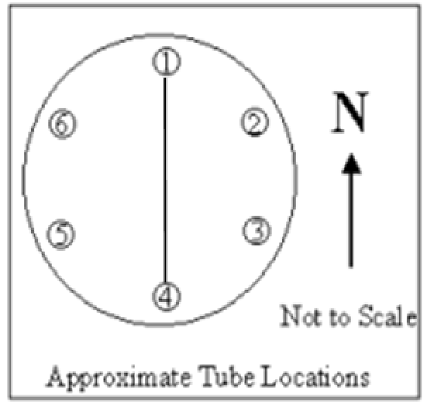
Test Date - 3/29/2018
Tube Spacing - 27.625
Tubepair Depth - 169.36 ft



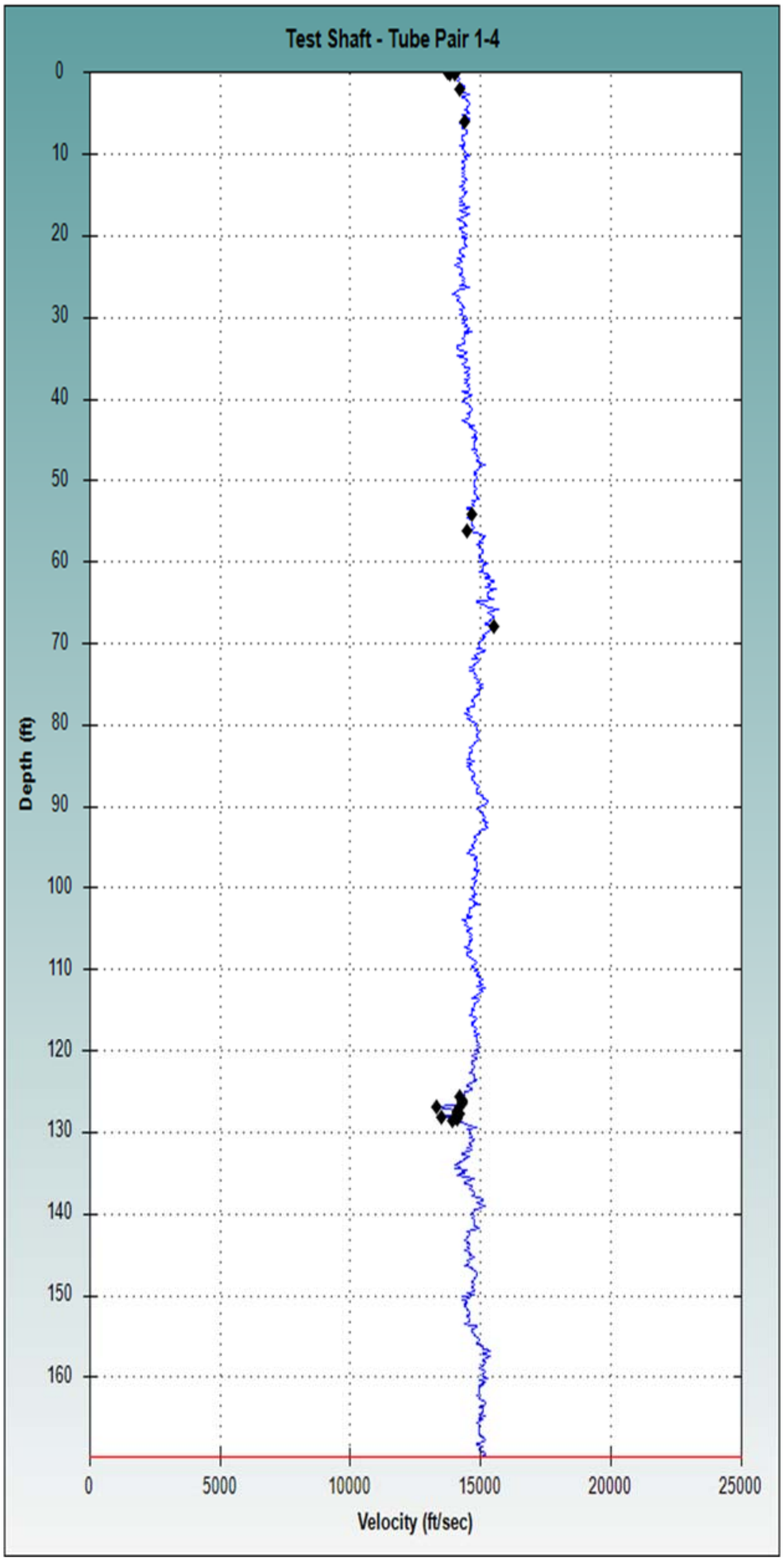


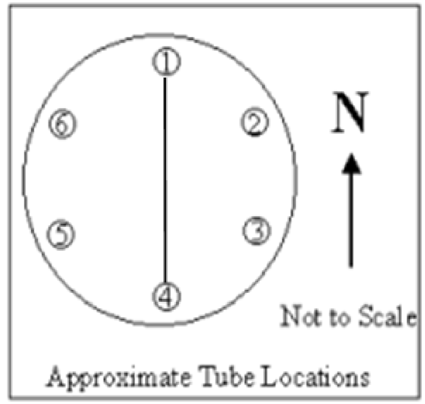
Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 27.625
Tubepair Depth - 169.36 ft





Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 52.875
Tubepair Depth - 169.72 ft





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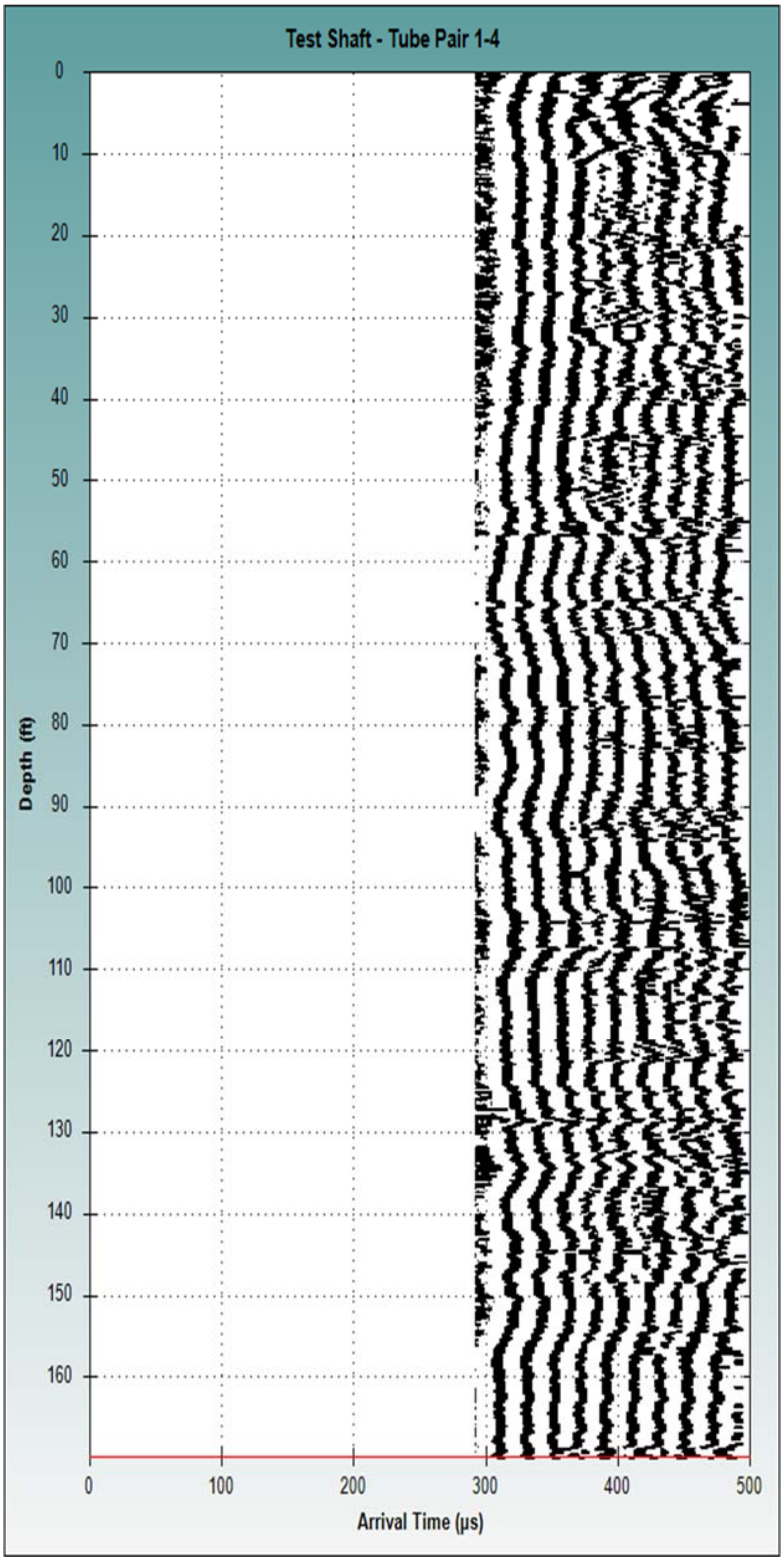

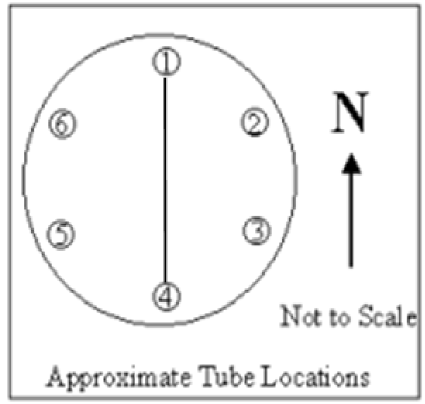

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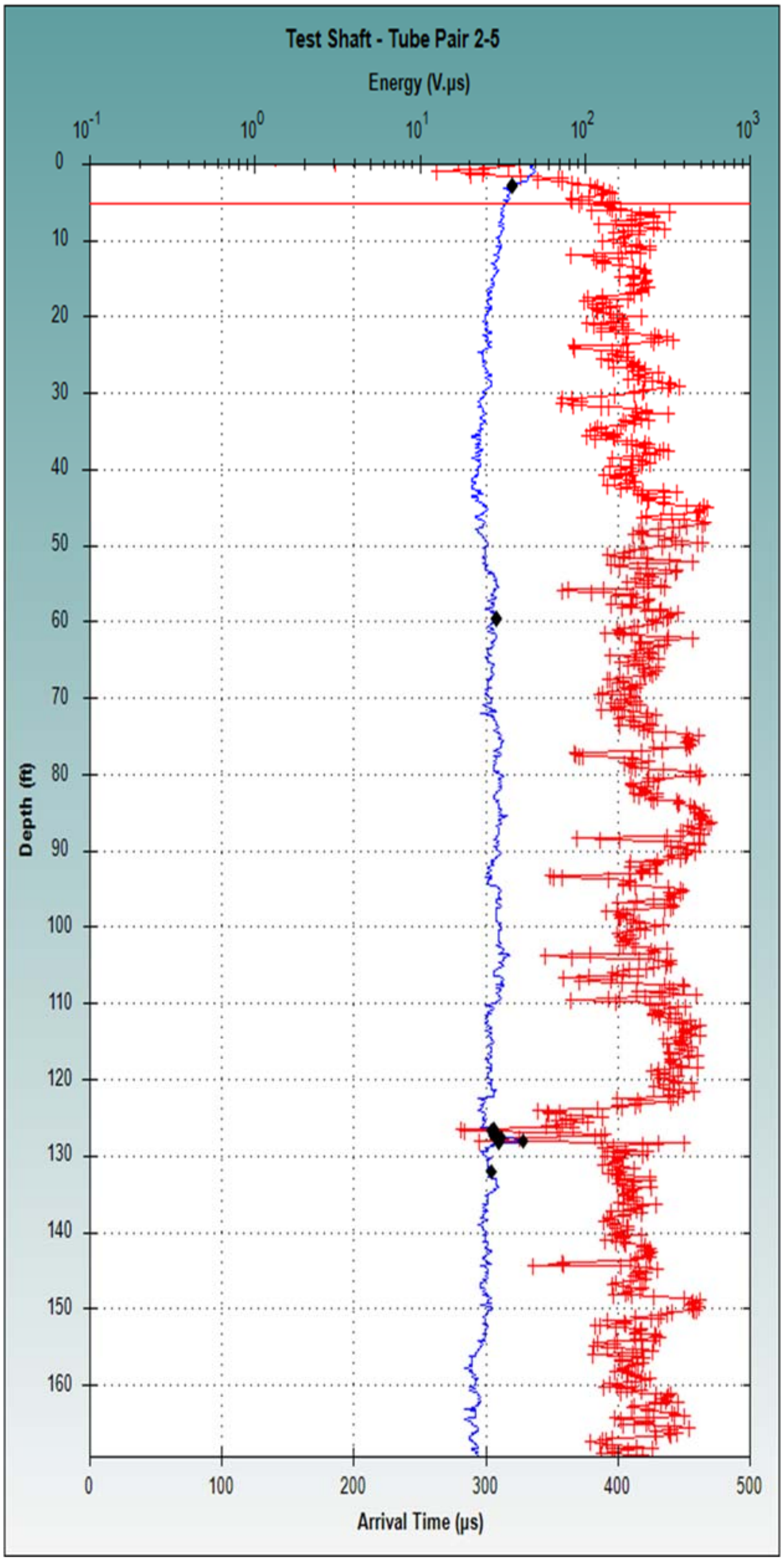
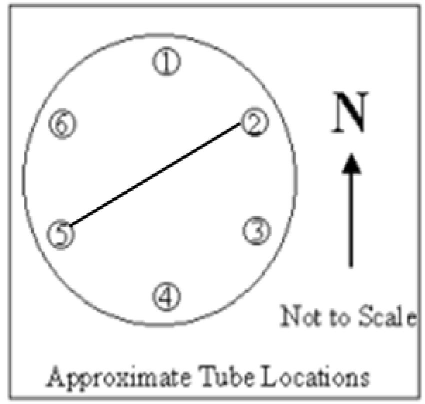
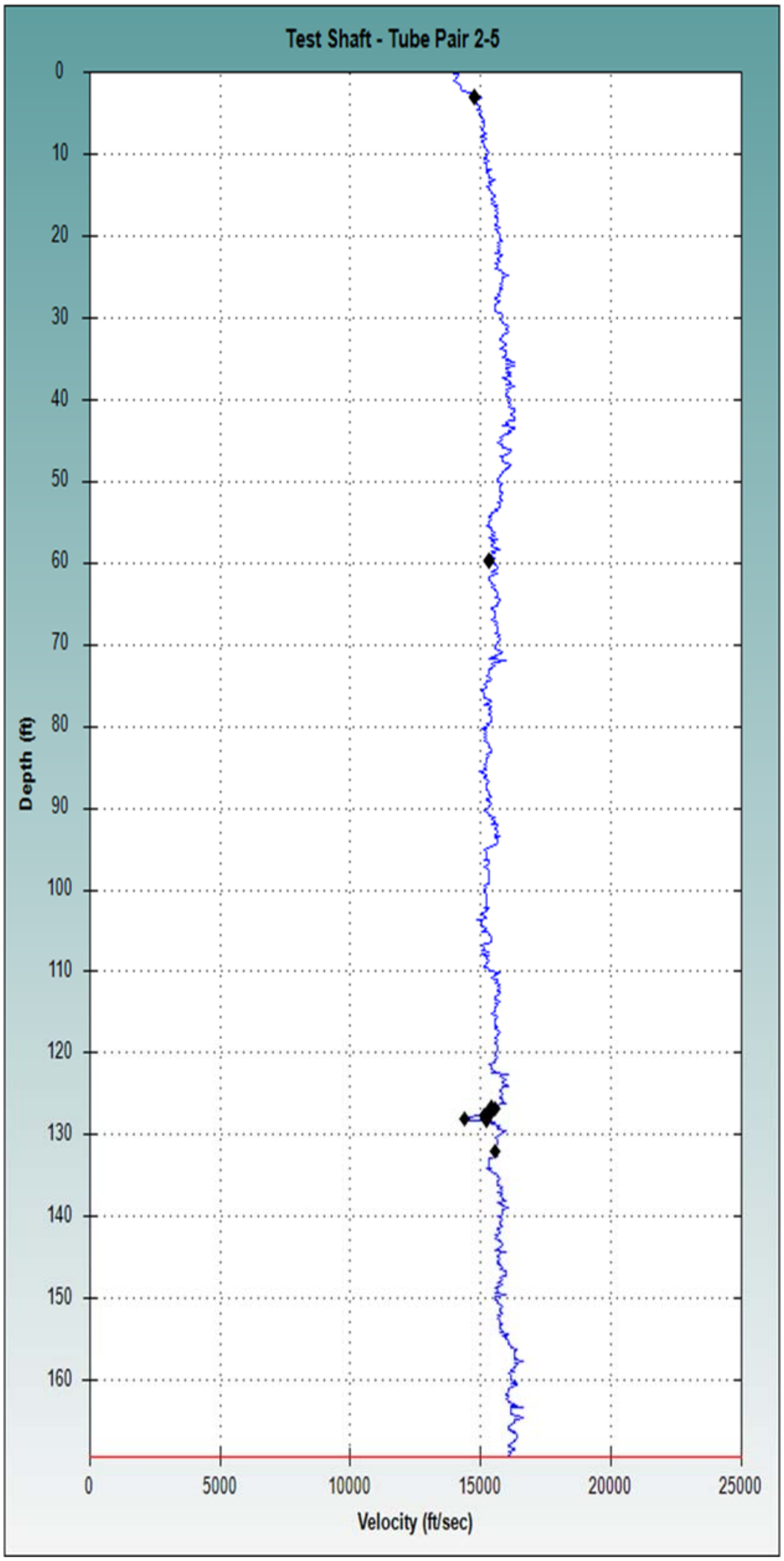
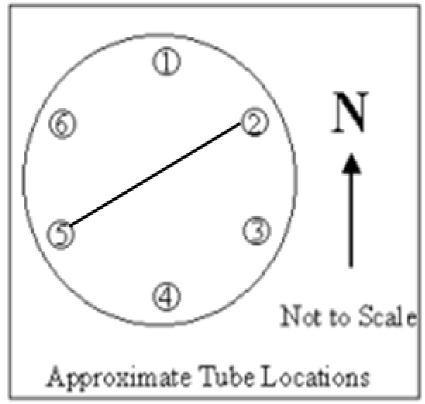




Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 56.75
Tubepair Depth - 169.36 ft





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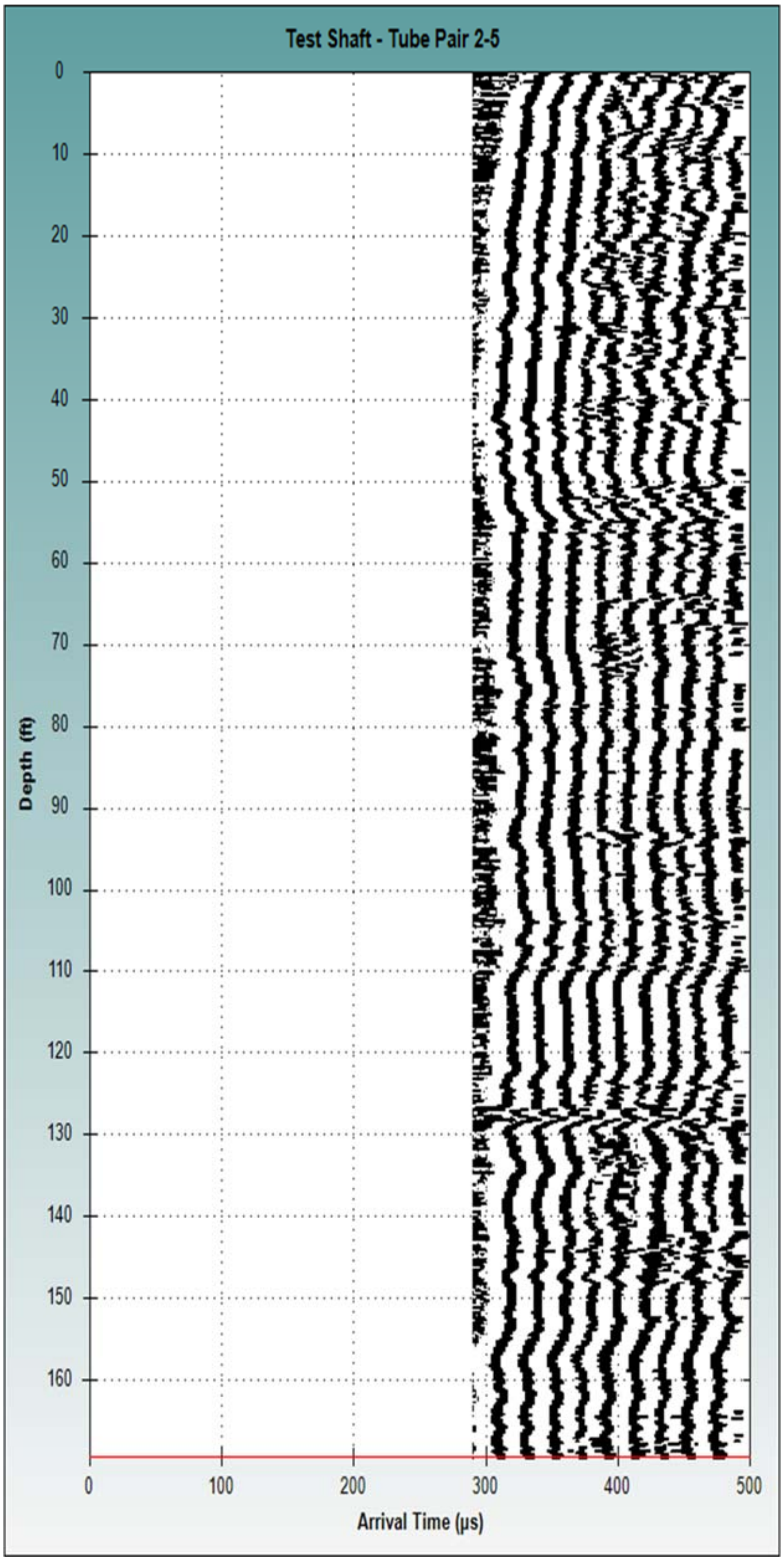

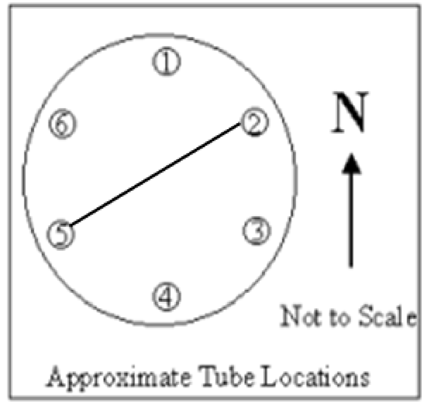

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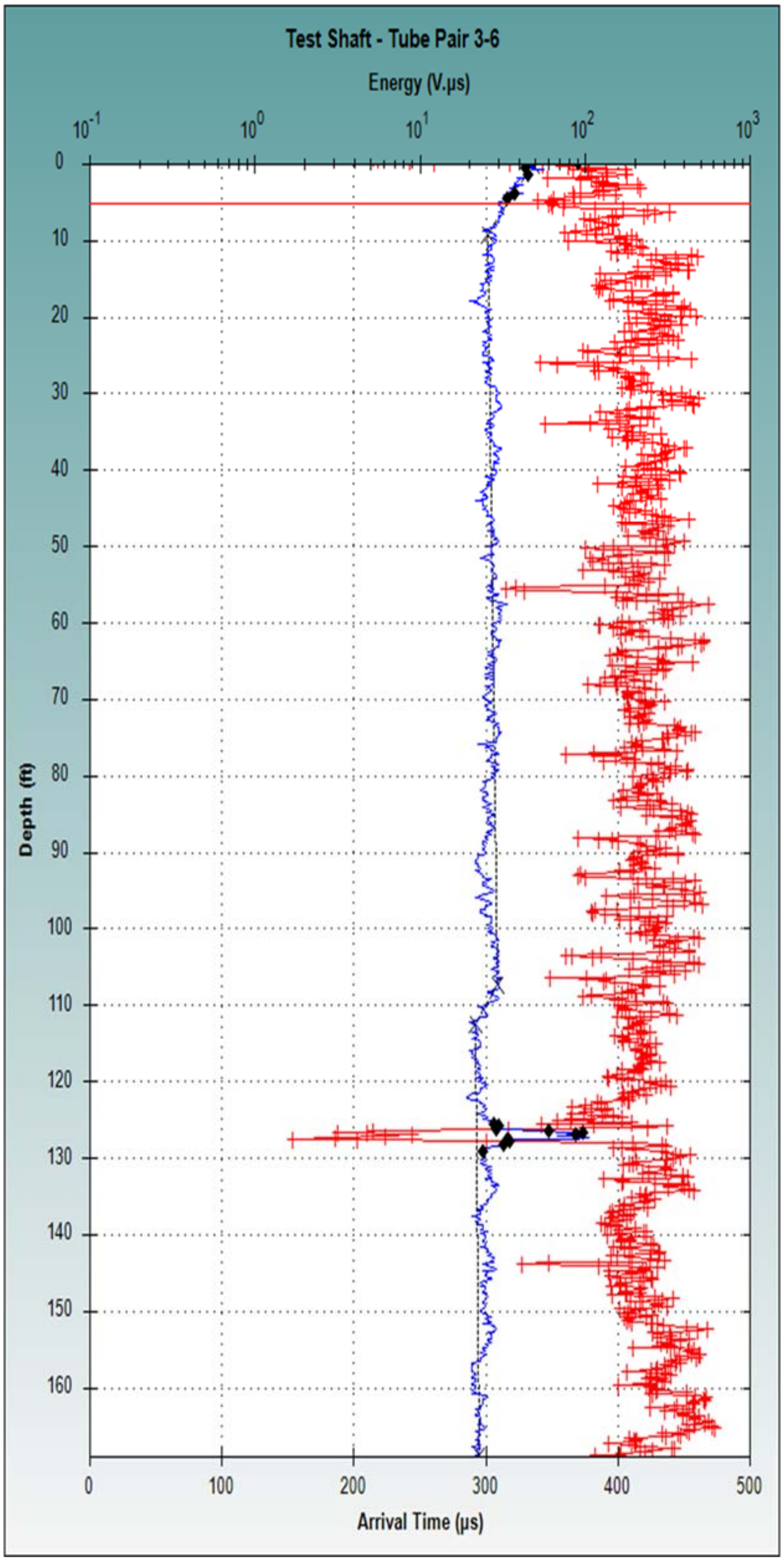
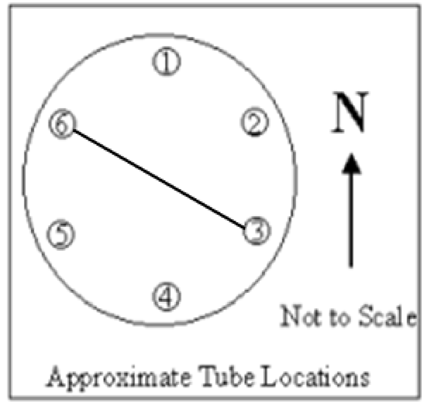
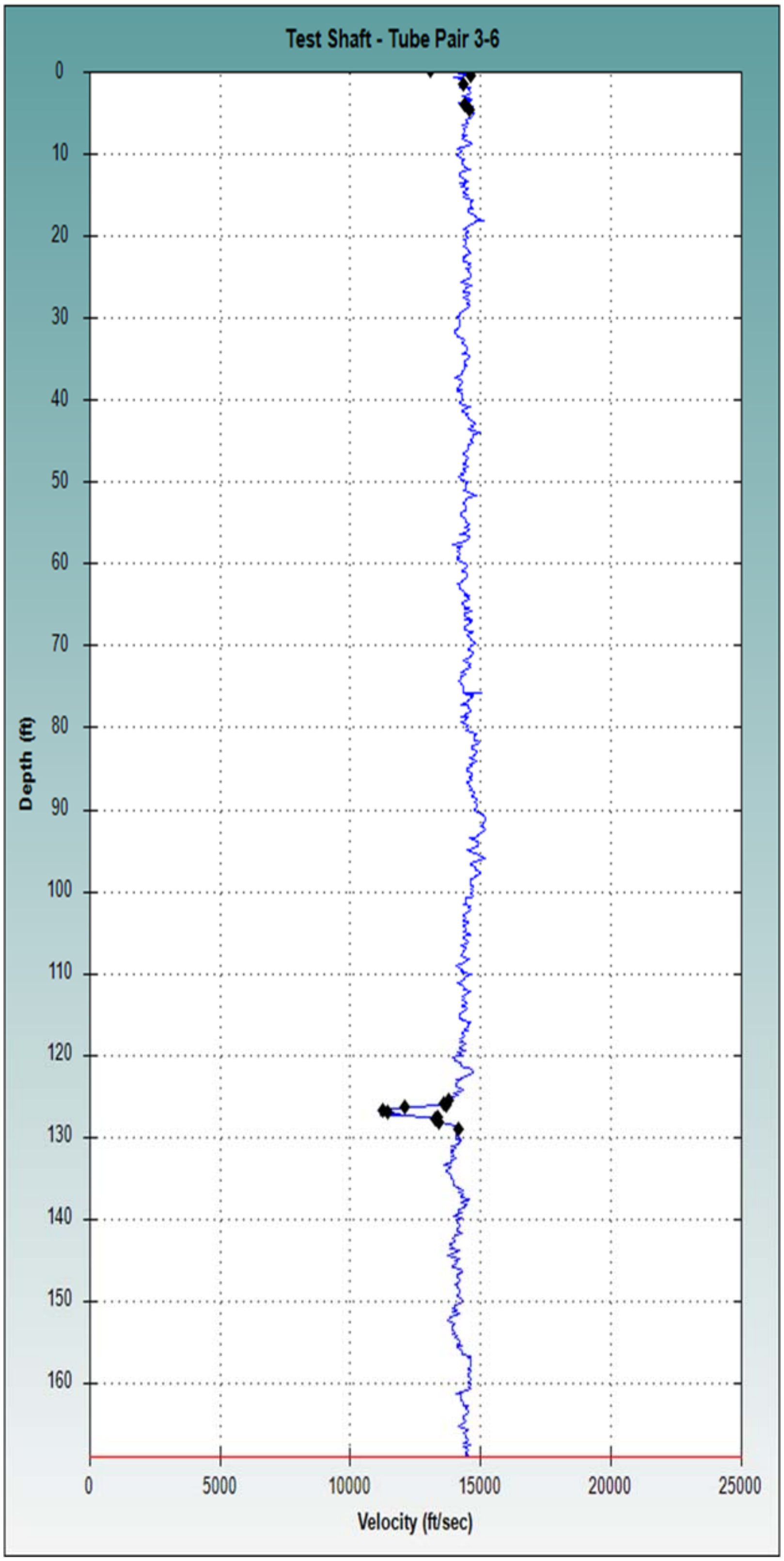
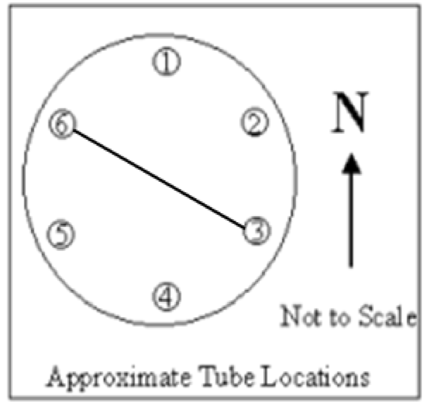




Shaft Name - Test Shaft
Test Date - 3/29/2018
Tube Spacing - 58.125
Tubepair Depth - 168.99 ft



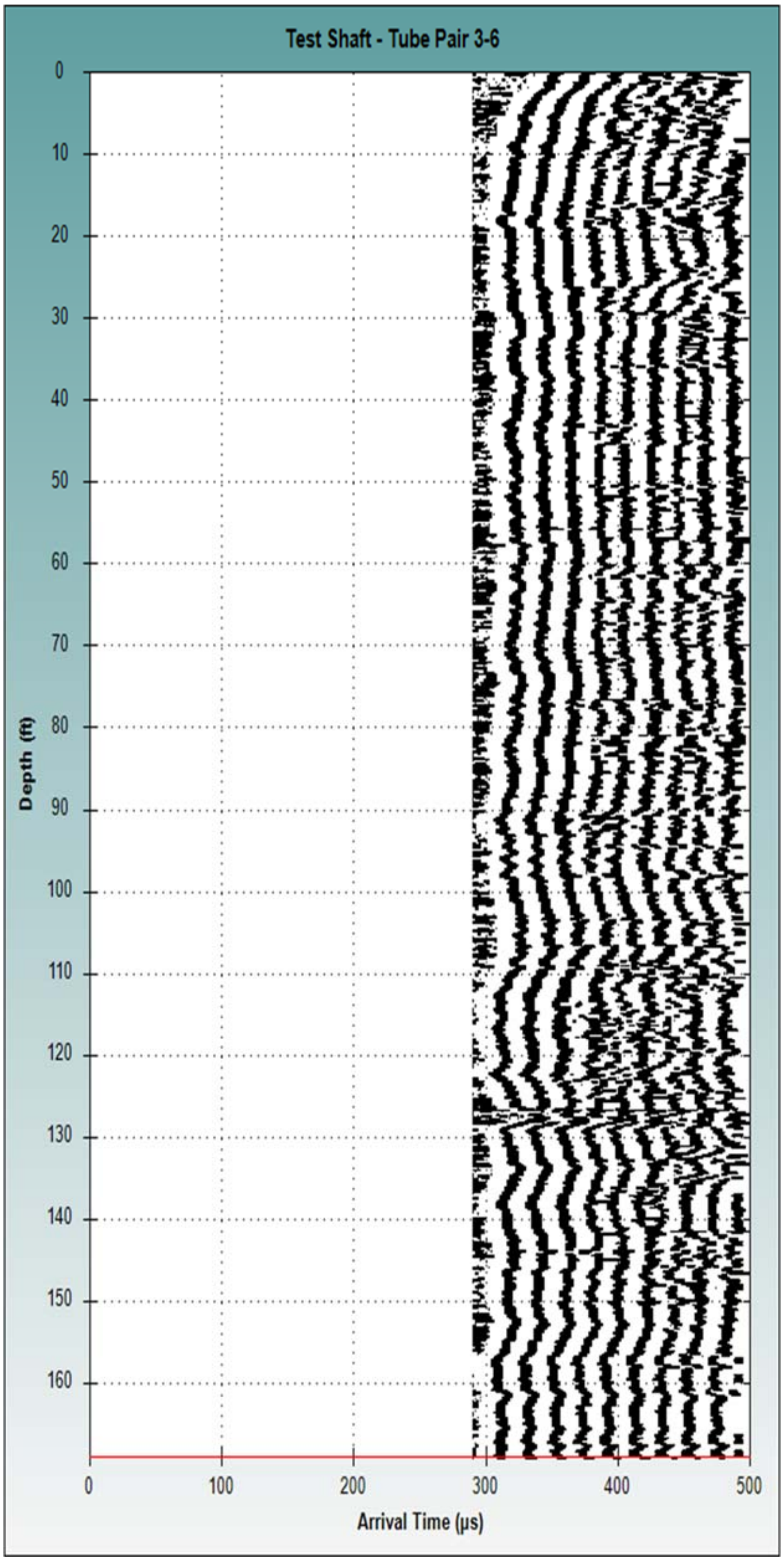


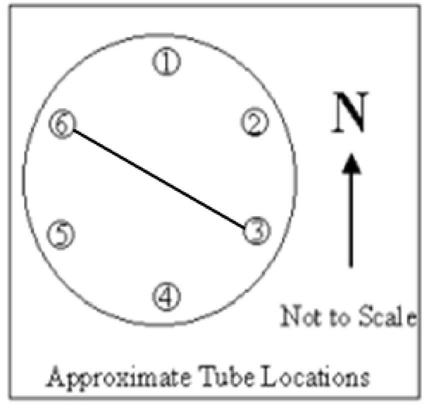
Shaft Name - Test Shaft

Test Date - 3/29/2018

Tube Spacing - 58.125

Tubepair Depth - 168.99 ft





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Tube Spacing - 58.125
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