

Applied Foundation Testing

September 12, 2008

Report of Cross-Hole Sonic Logging Test Shaft 2

Drilled Shaft Load Test Program

I-80 Bridge Project

Council Bluffs,

Pottawattamie County, Iowa

NHS-080-1(318)0-11-78

AFT Project No.: 108026



Authored By:

Date:

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Report on Cross-hole Sonic Logging

In General Accordance with ASTM D 6760

General Information				
Date:	September 12, 2008			
AFT Project No.:	108026			
Project Description:	Drilled Shaft Load Test Program I-80 Bridge Project Council Bluffs, Pottawattamie County, Iowa NHS-080-1(318)0-11-78			
Client Name:	Longfellow Drilling			
Client Address:	1209 County Highway J23, Clearfield, Iowa 50840			
Client Contact:	Mike Kemery			
Test Date:	August 27, 2008			
Test Equipment Manufacturer/Model:	Olson Instruments, Model Freedom Data PC			
AFT Field Personnel:	Michael K. Muchard, P.E.			
AFT Responsible Engineer:	Michael K. Muchard, P.E.			
Shaft Information				
Concrete Strength at Time of Test	Shaft Number	Diameter (in)	Length (ft)	Installation Date
5020 psi	TS-2	60	55'-5"	8/21/08
Plan Cut-Off Elevation (ft)		Top of Concrete Elevation (ft)		
988.42		988.72		
CSL Tube Type	Number of CSL Tubes			
PVC <input type="checkbox"/>	1 <input type="checkbox"/>	3 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>	7 <input type="checkbox"/>
Steel <input checked="" type="checkbox"/>	2 <input type="checkbox"/>	4 <input type="checkbox"/>	6 <input type="checkbox"/>	8 <input type="checkbox"/>
Northernmost Tube	Numbering Direction			
1	clockwise			
Tube Stickup Above Concrete (ft)				
Tube 1	Tube 2	Tube 3	Tube 4	Tube 5
2.85	2.975	2.975	2.775	2.70
Tube Length (ft)				
Tube 1	Tube 2	Tube 3	Tube 4	Tube 5
58.1	57.95	58.25	58.15	58.05



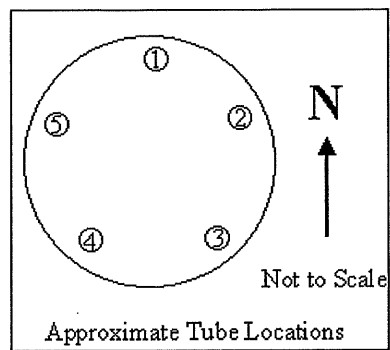
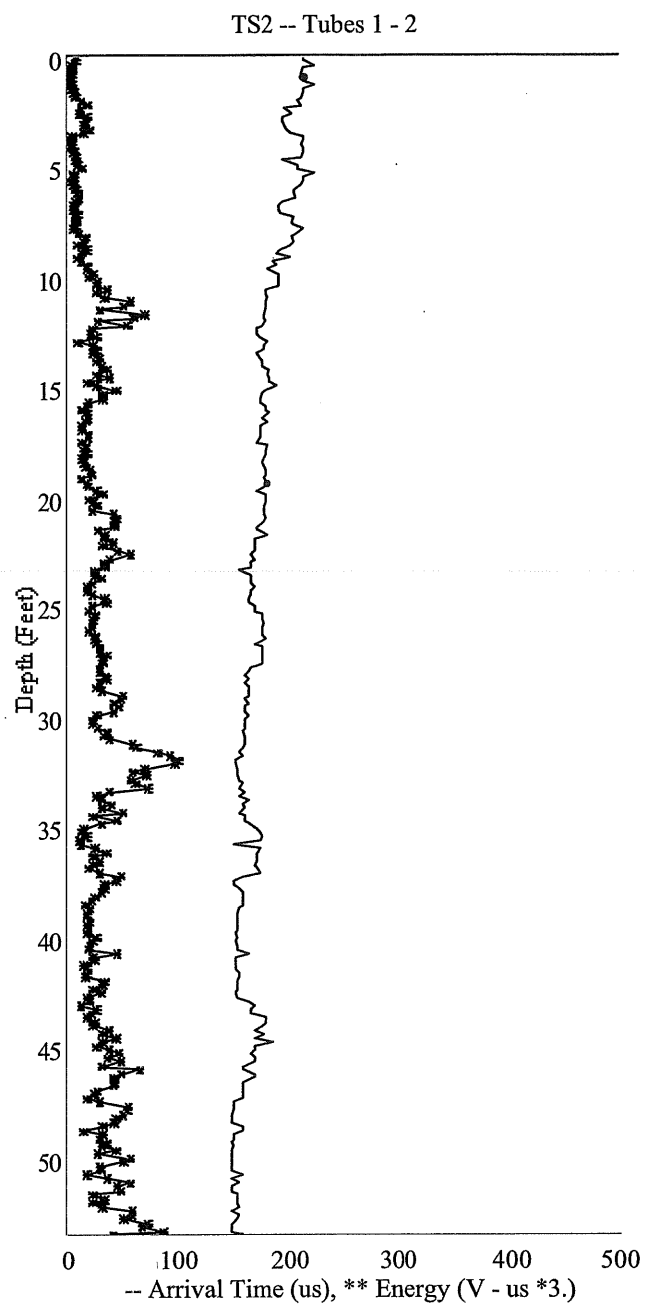
Tube Pairs and Spacings (in)							
Tube Pair: 1-2	Tube Pair: 2-3	Tube Pair: 3-4	Tube Pair: 4-5	Tube Pair: 5-1			
26.4	32.4	27.6	30	29.4			
Tube Pair: 1-3	Tube Pair: 1-4	Tube Pair: 2-4	Tube Pair: 2-5	Tube Pair: 3-5			
47.4	47.28	45.6	45	45.36			
Construction Information*							
Drilling Method							
Wet	<input checked="" type="checkbox"/>	Natural/Water	<input type="checkbox"/>	Bentonite	<input type="checkbox"/>	Polymer	<input checked="" type="checkbox"/>
Dry	<input type="checkbox"/>	*please refer to Contractor for construction information					
Temporary Casing							
Yes	<input type="checkbox"/>	Top Elev. (ft)	<input type="text"/>	Length (ft)	<input type="text"/>	Diameter (in)	<input type="text"/>
No	<input checked="" type="checkbox"/>						
Permanent Casing							
Yes	<input checked="" type="checkbox"/>	Top Elev. (ft)	<input type="text" value="988.72"/>	Length (ft)	<input type="text" value="4.0"/>	Diameter (in)	<input type="text" value="66.0"/>
No	<input type="checkbox"/>						
Installation Records provided to AFT		Soil Boring provided to AFT					
Yes	<input checked="" type="checkbox"/>	Attached	<input checked="" type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	Attached	<input type="checkbox"/>
No	<input type="checkbox"/>			No	<input type="checkbox"/>		
Results							
Ultrasonic Profiles Attached							
Energy , FAT	<input checked="" type="checkbox"/>	Velocity	<input checked="" type="checkbox"/>	Banded Time (waterfall)	<input checked="" type="checkbox"/>		
Velocity Deviations (depths referenced are below top of concrete)							
Tube Pair: 1-2	≤10 percent						
Tube Pair: 2-3	≤10 percent						
Tube Pair: 3-4	≤10 percent						
Tube Pair: 4-5	12 percent upper 1 ft						
Tube Pair: 5-1	≤10 percent						
Tube Pair: 1-3	≤10 percent						
Tube Pair: 1-4	≤10 percent						
Tube Pair: 2-4	17 percent from 2.25 to 4.0 ft						
Tube Pair: 2-5	15 percent in upper 1 ft, 17 percent from 3.25 ft to 4.0 ft						
Tube Pair: 3-5	≤10 percent						

**CSL Interpretation**

All tested tube pairs exhibited velocity reductions of less than 10 percent for the tested length of the shaft except the upper 1 to 4 feet in tube pairs 4-5, 2-4 and 2-5. These zones had velocity reductions of 12 to 17 percent. Signals in these areas had good energy, amplitude and slightly delayed but well defined arrival times. Moreover, the wave velocities in these areas were 10,000 to 11,000 feet per second which is indicative of good concrete. Furthermore, these areas are located within the permanent casing. Based on our evaluation of this data we recommend the shaft concrete between the tubes be considered acceptable for the purposes of post grouting and load testing.

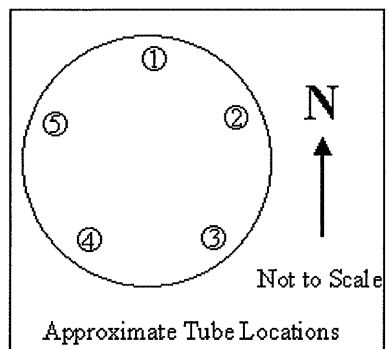
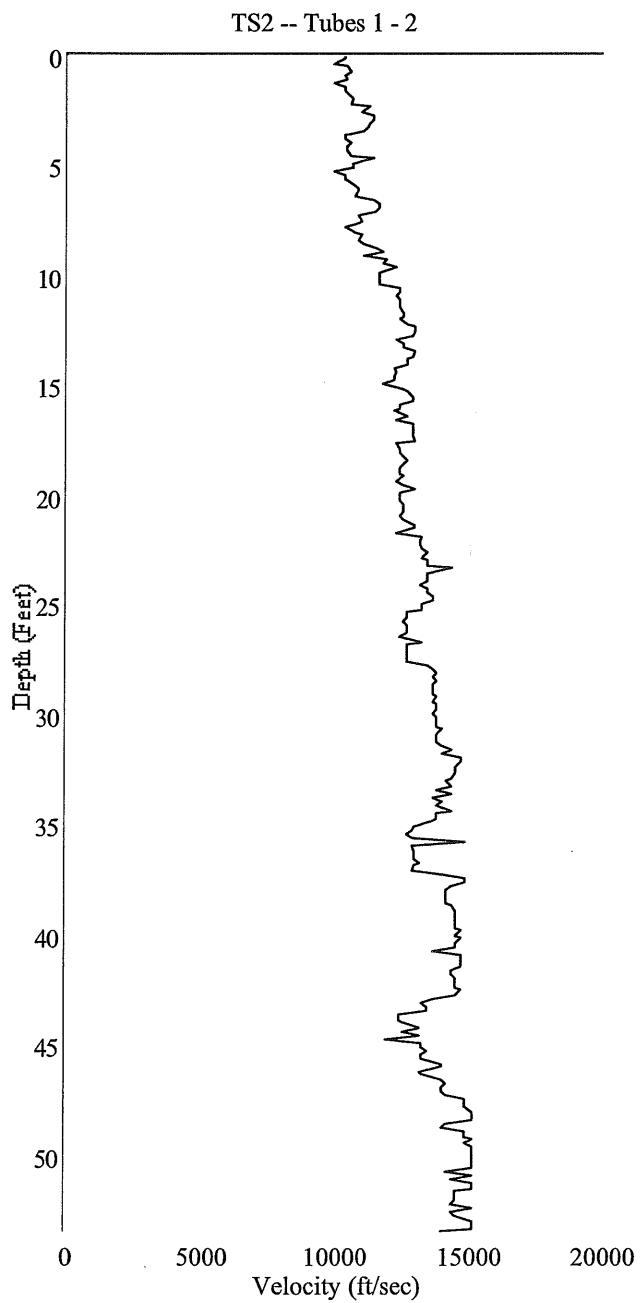
Limitations

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.



Tube Spacing : 26.40 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

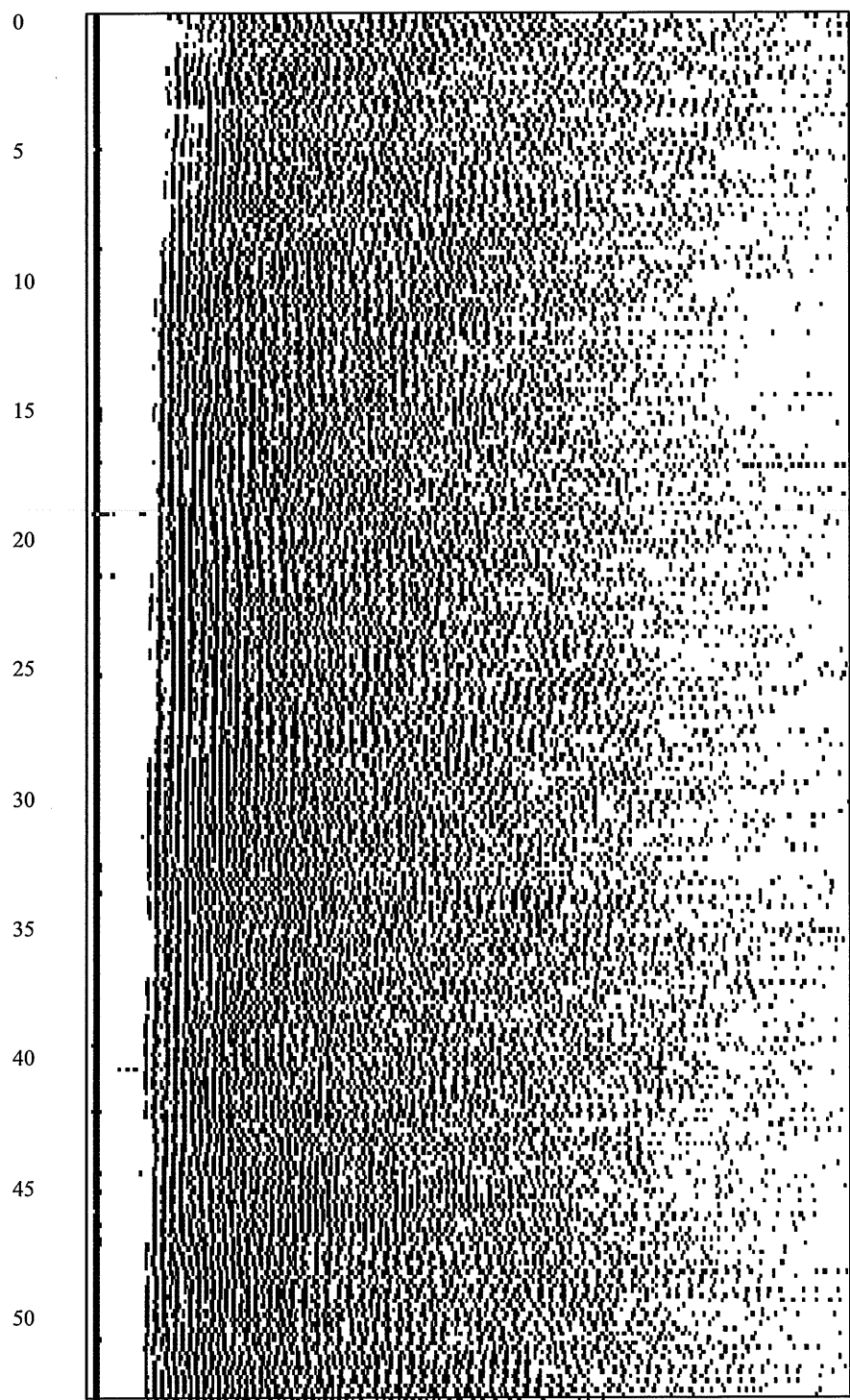
Figure 1



Tube Spacing : 26.40 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 2

Depth (ft)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
Time (micro seconds)

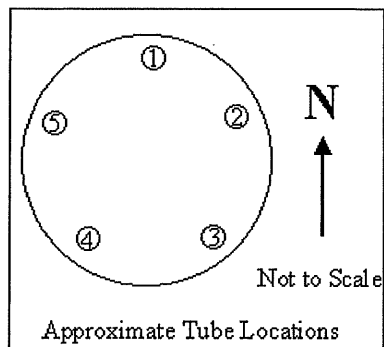
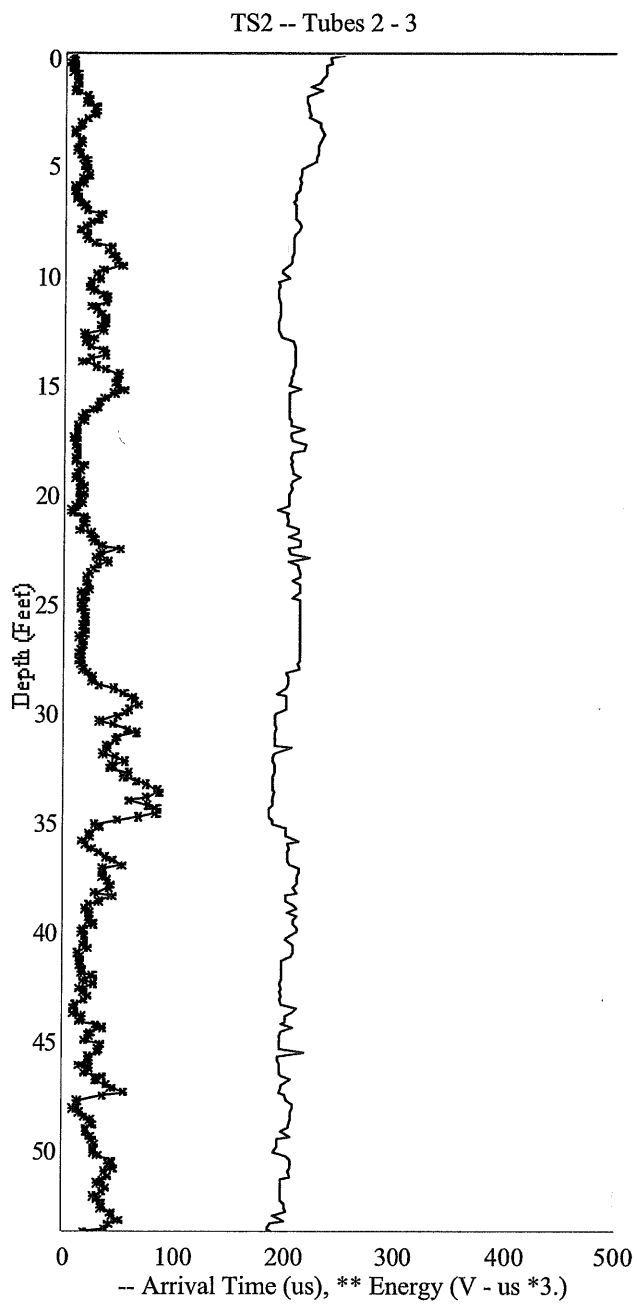
Shaft Name: TS2

Tube pair: 1 - 2

Number of Tubes: 5

Tube Spacing: 26.4 inches

Figure 3



Tube Spacing : 32.40 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 4

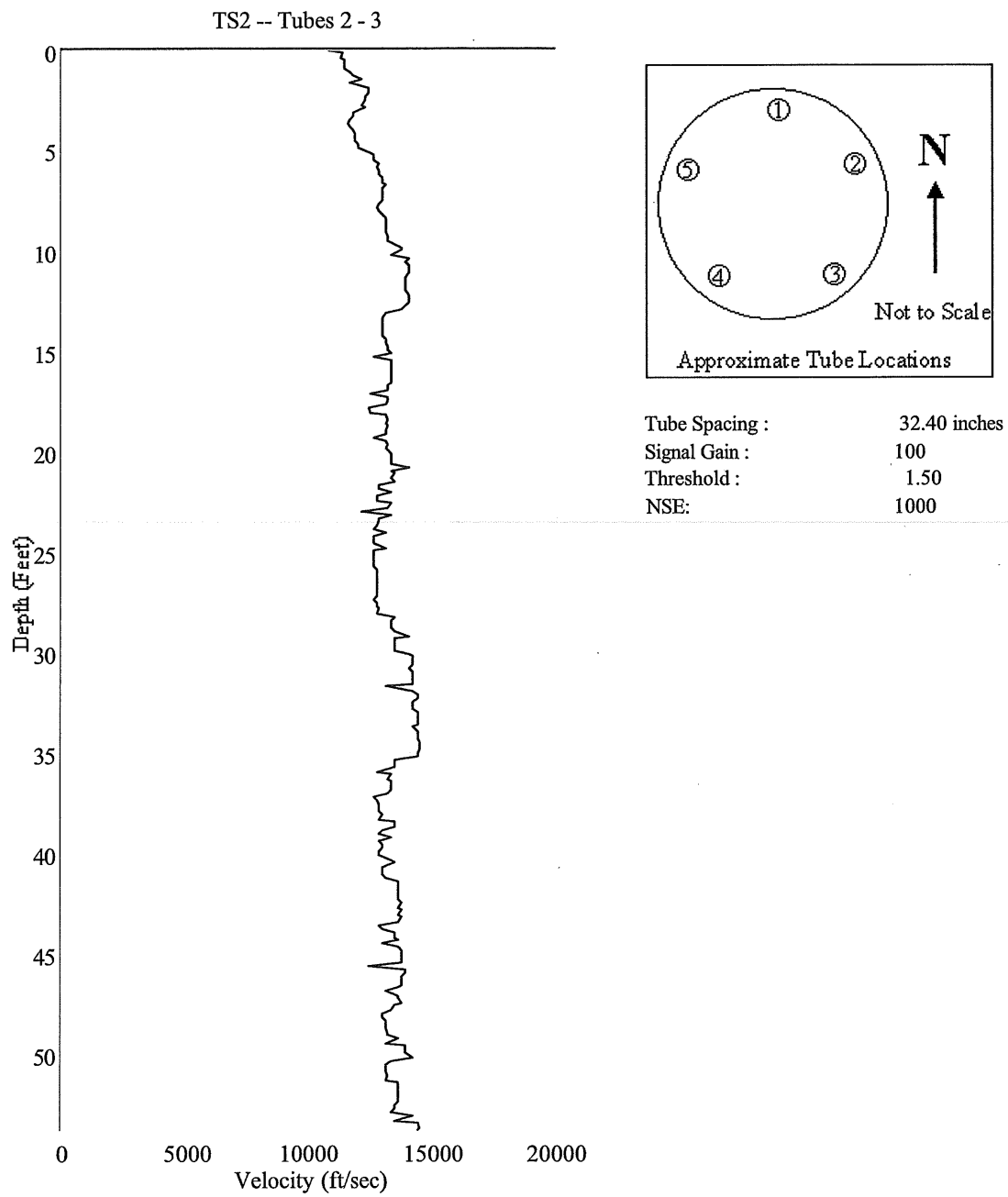
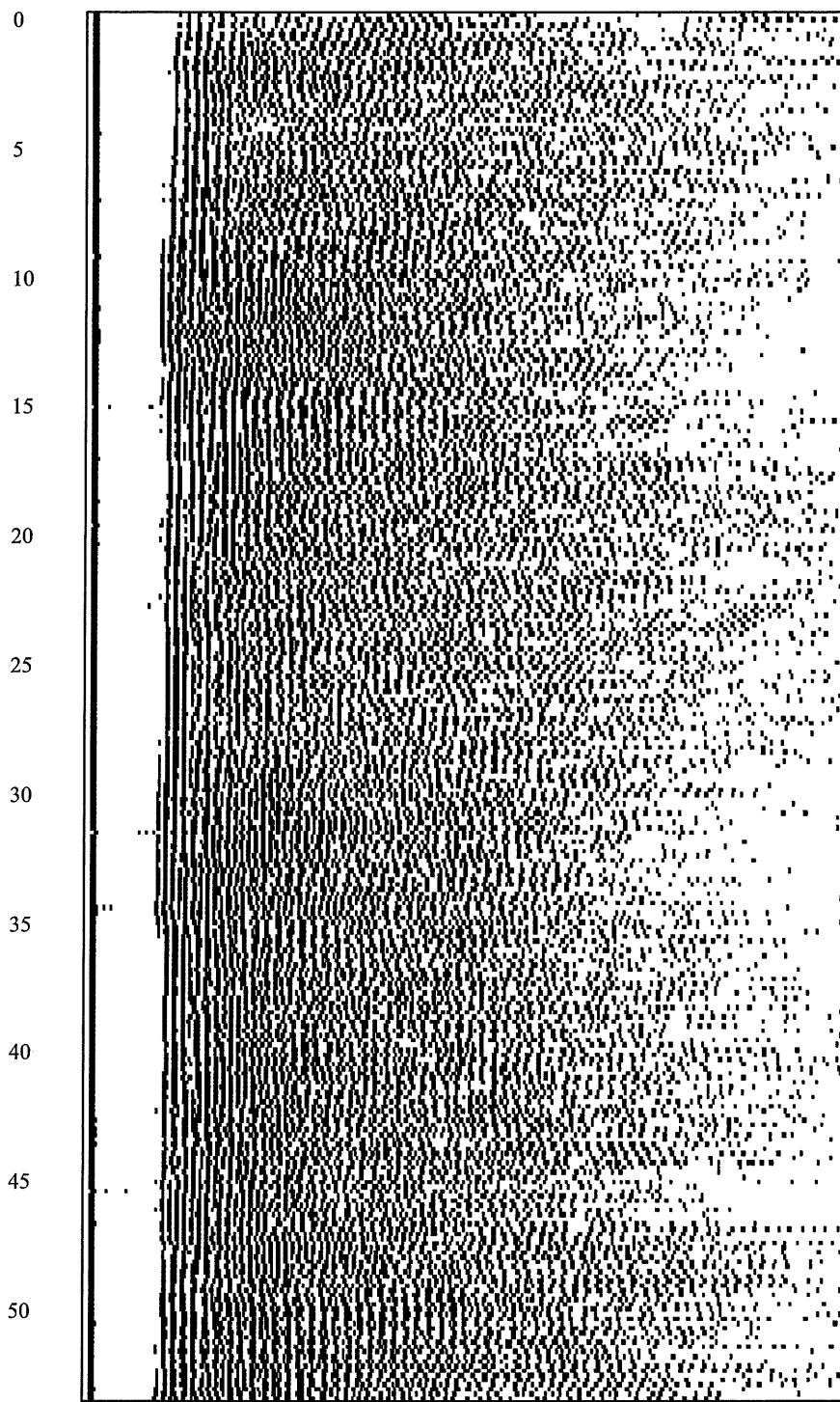


Figure 5

Depth (ft)



Shaft Name: TS2

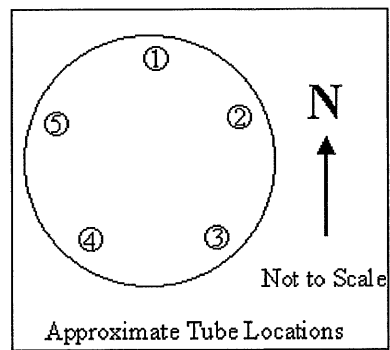
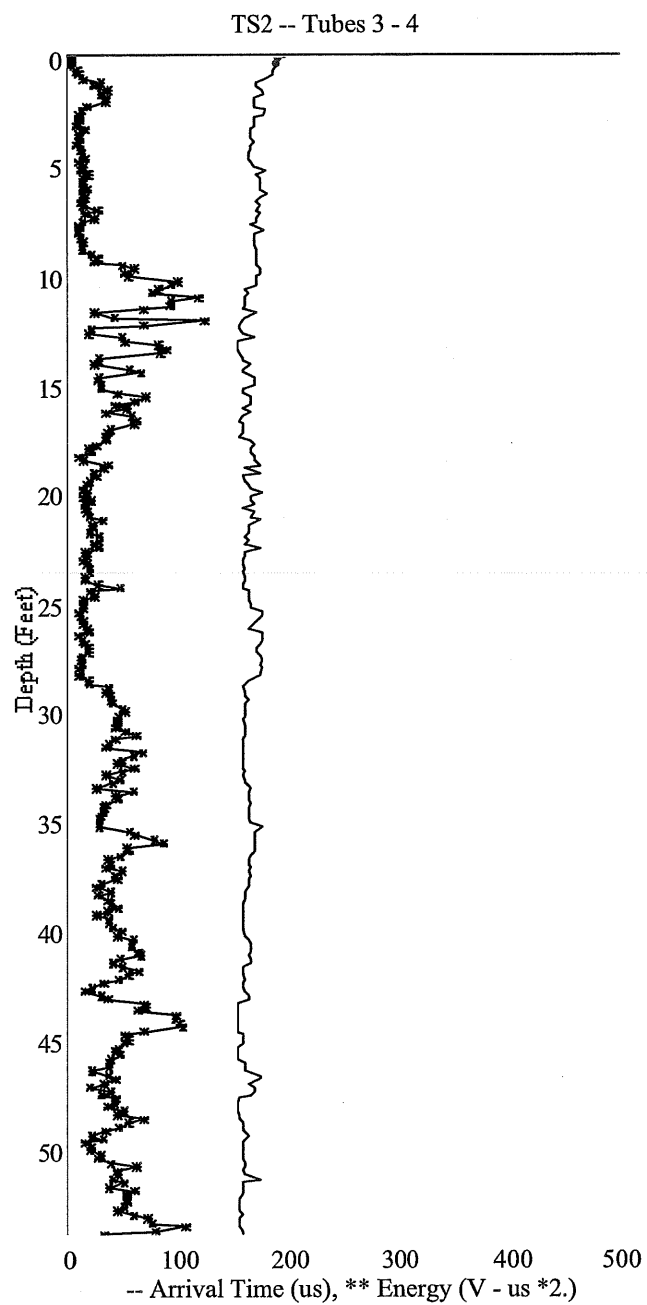
Tube pair: 2 - 3

Number of Tubes: 5

Tube Spacing: 32.4 inches

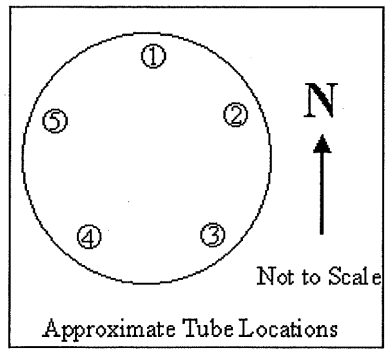
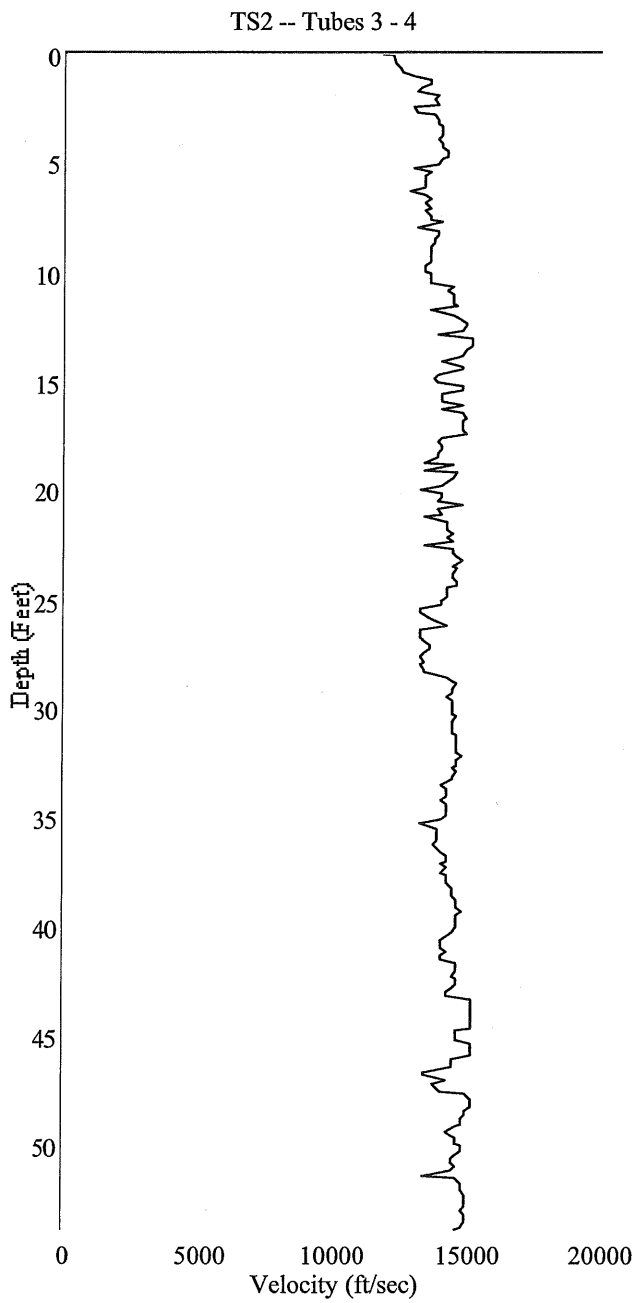
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
Time (micro seconds)

Figure 6



Tube Spacing : 27.60 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

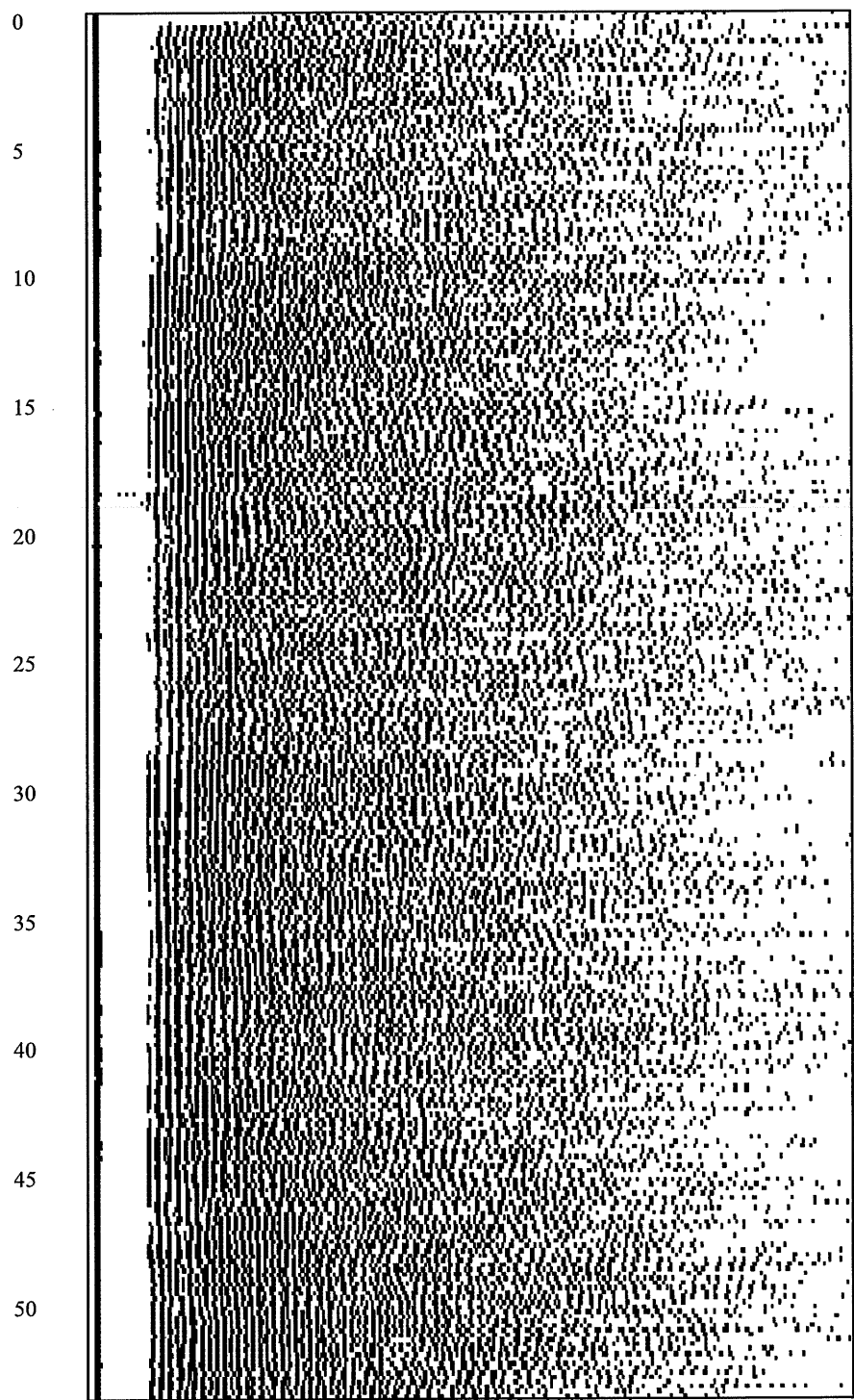
Figure 7



Tube Spacing : 27.60 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 8

Depth (ft)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
Time (micro seconds)

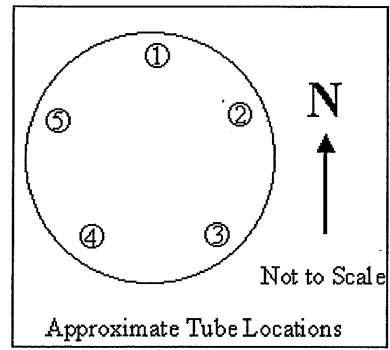
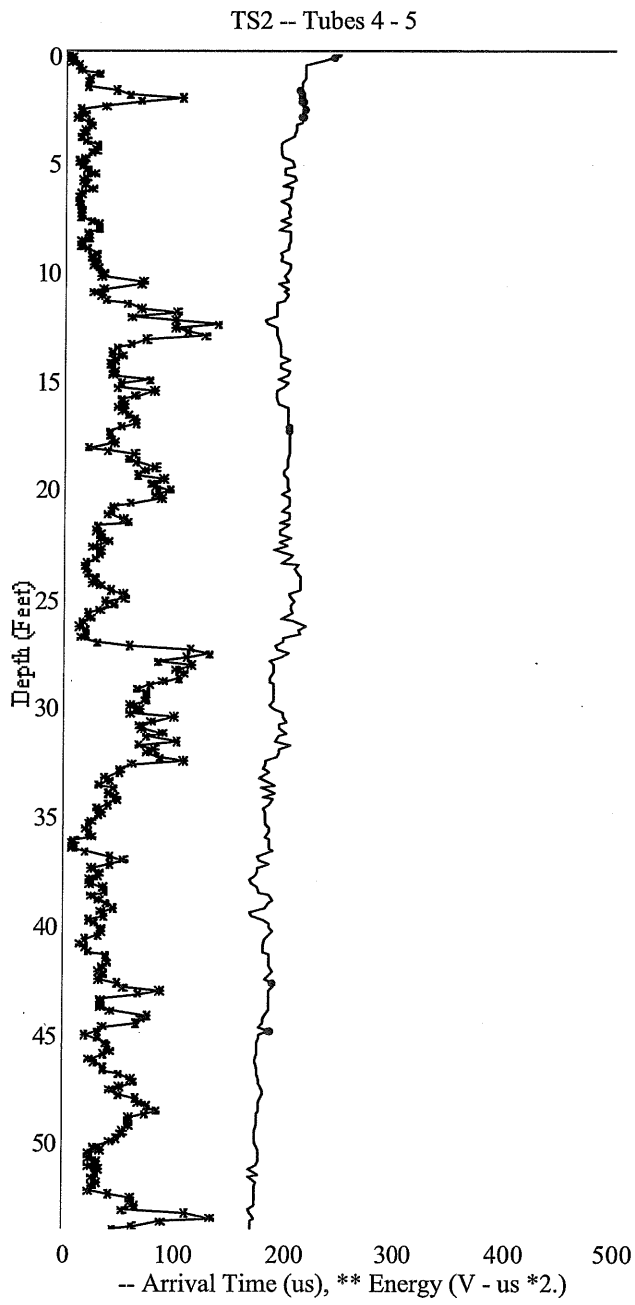
Shaft Name: TS2

Tube pair: 3 - 4

Number of Tubes: 5

Tube Spacing: 27.6 inches

Figure 9



Tube Spacing : 30.00 inches
 Signal Gain : 100
 Threshold : 1.50
 NSE: 1000

Figure 10

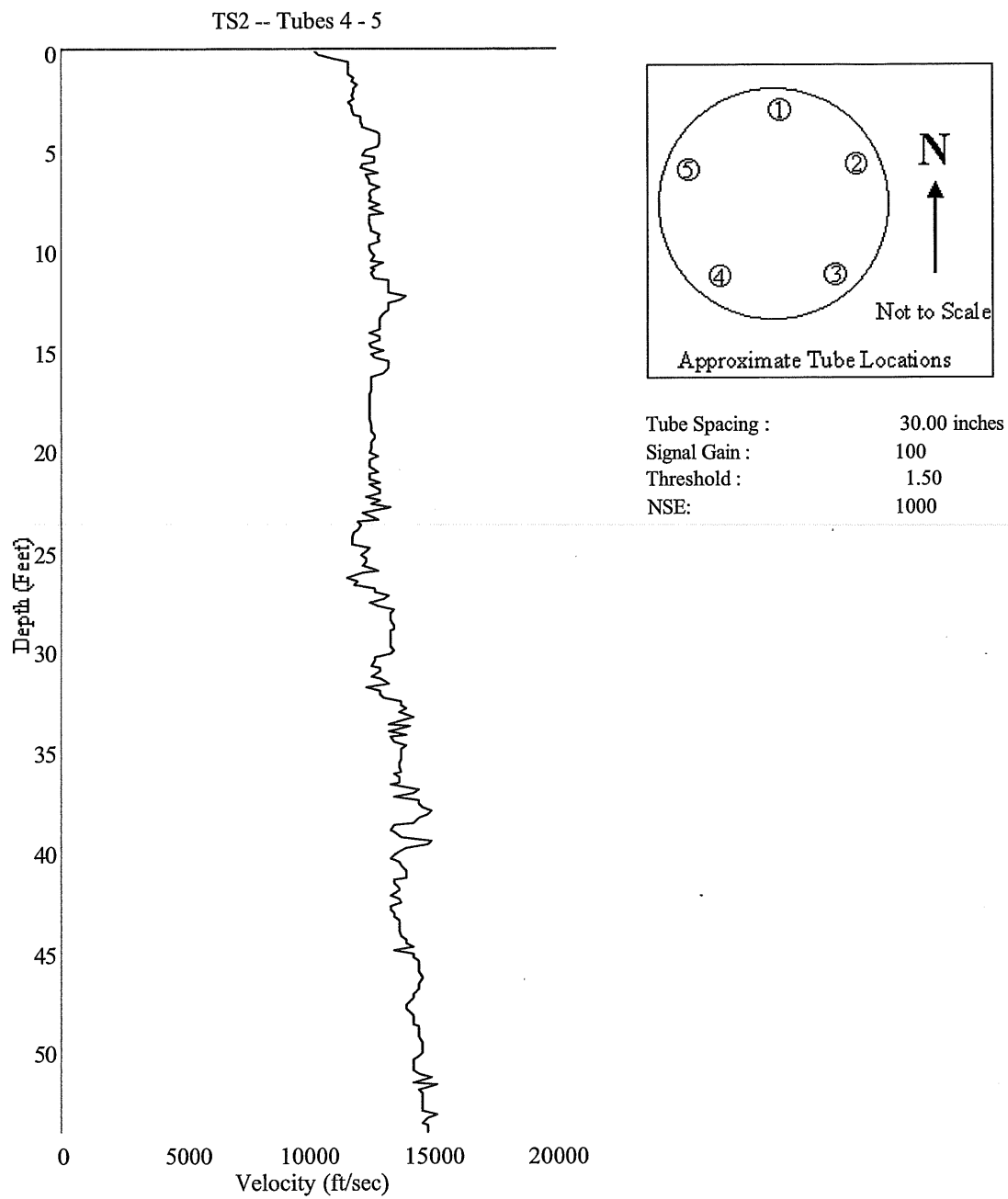
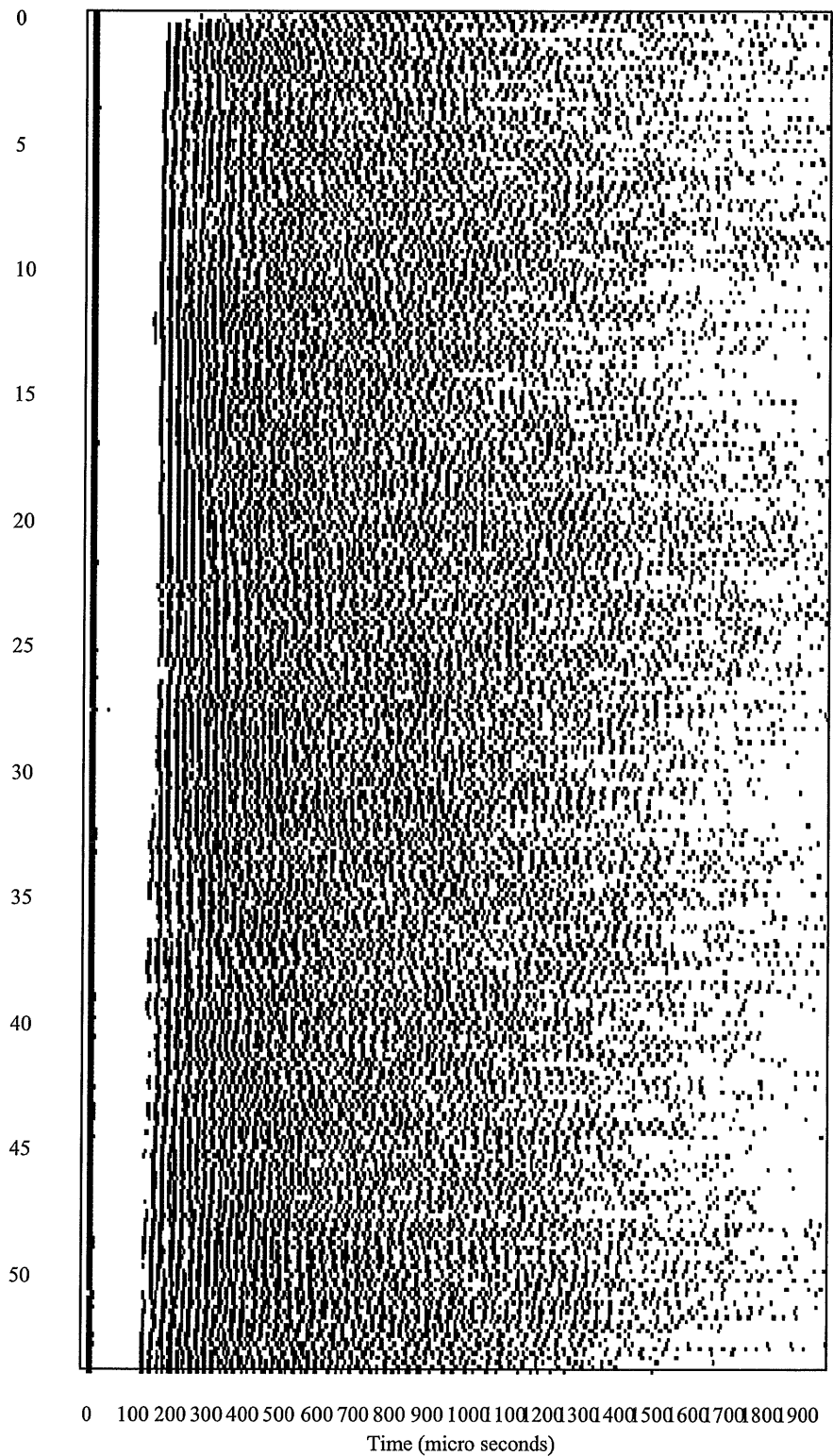


Figure 11

Depth (ft)



Shaft Name: TS2

Tubepair: 4 - 5

Number of Tubes: 5

Tube Spacing: 30. inches

Figure 12

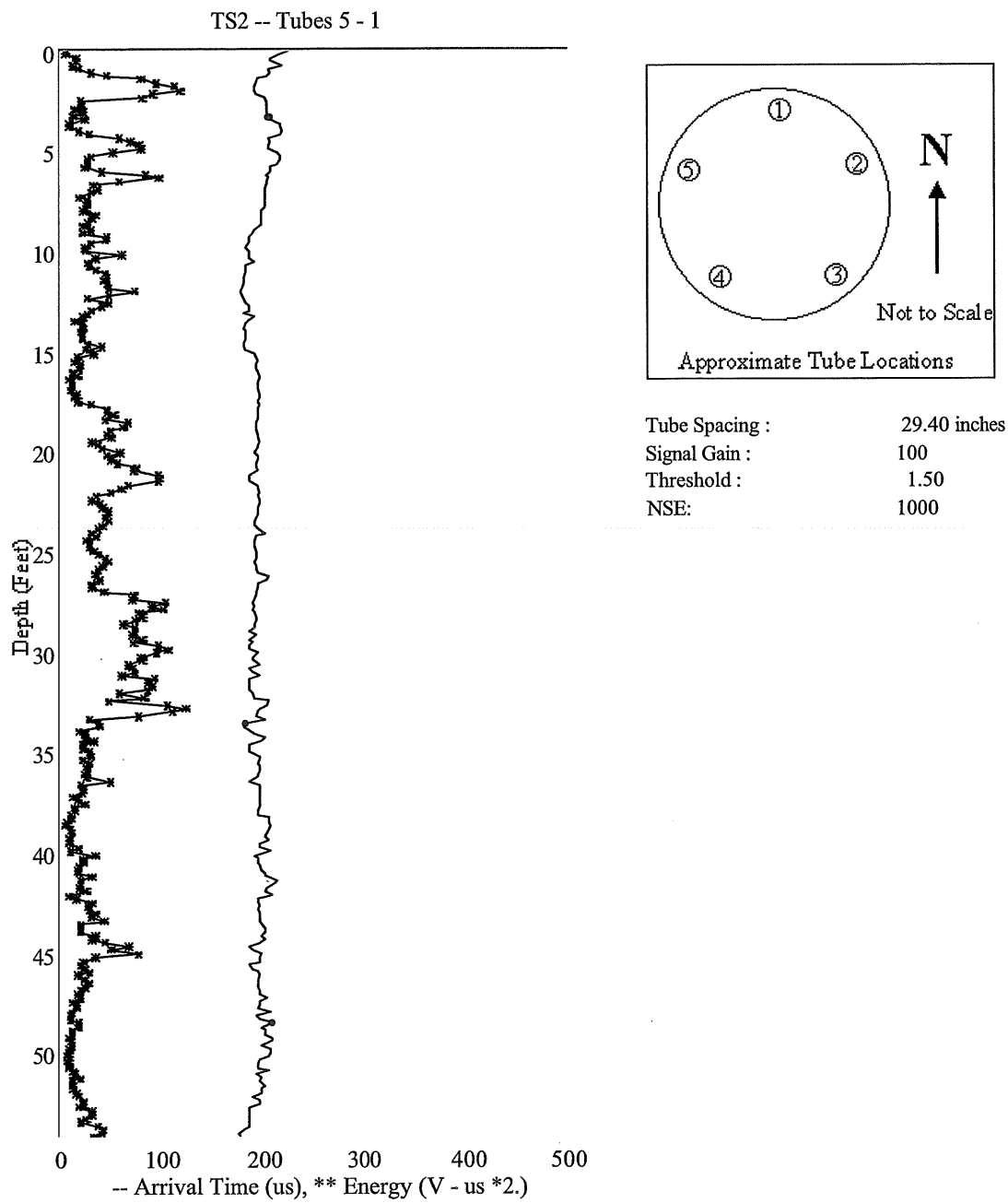
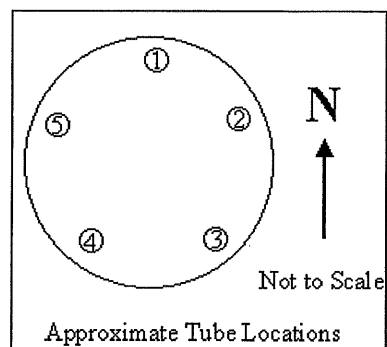
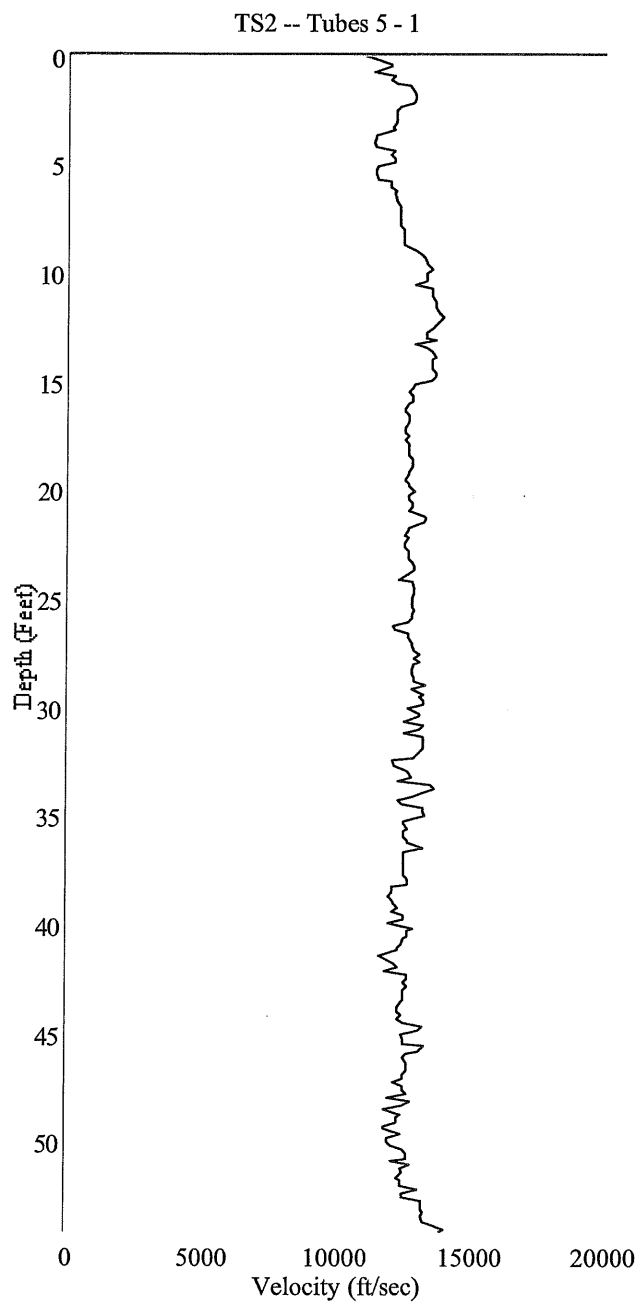


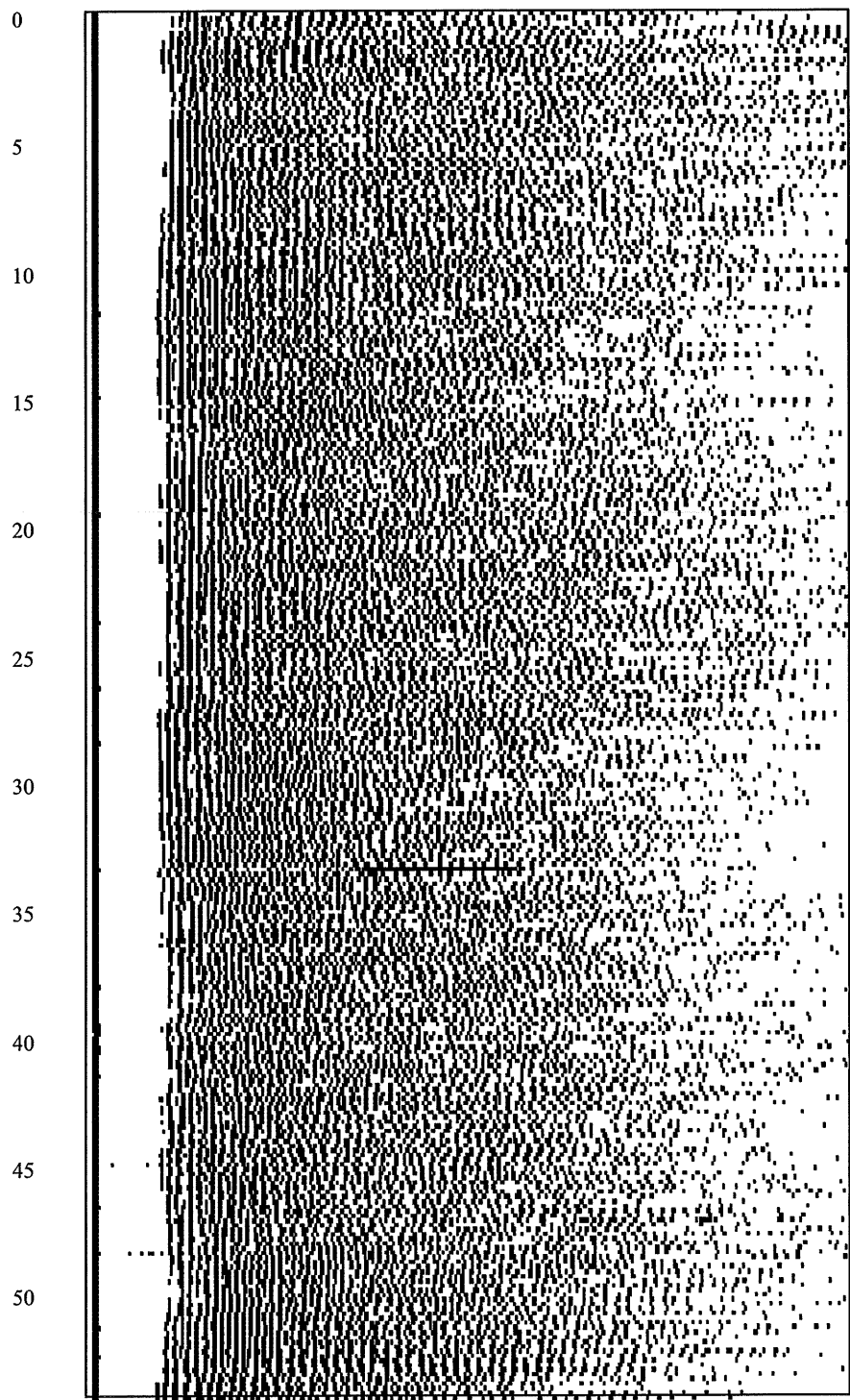
Figure 13



Tube Spacing : 29.40 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 14

Depth (ft)



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
Time (micro seconds)

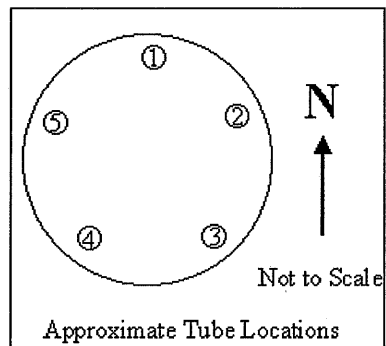
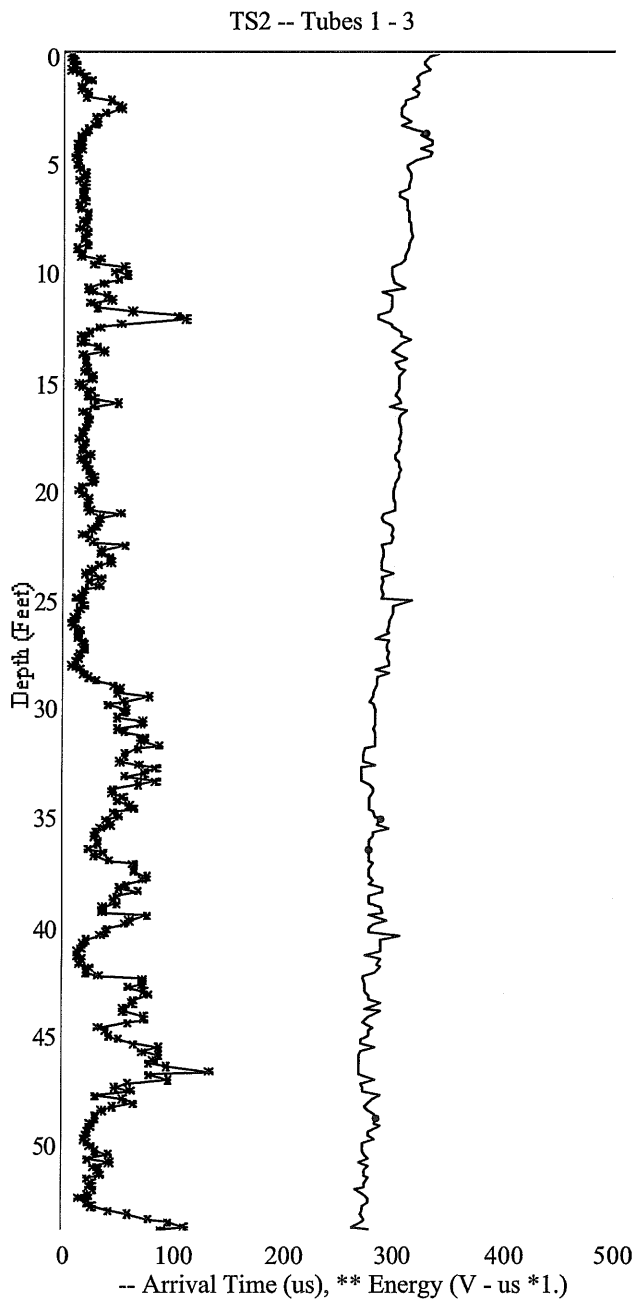
Shaft Name: TS2

Tubepair: 5 - 1

Number of Tubes: 5

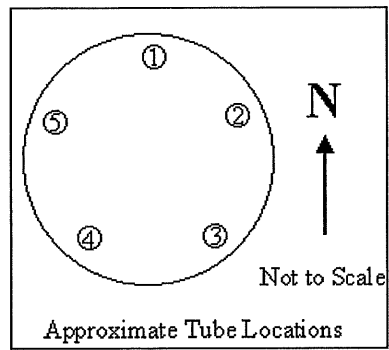
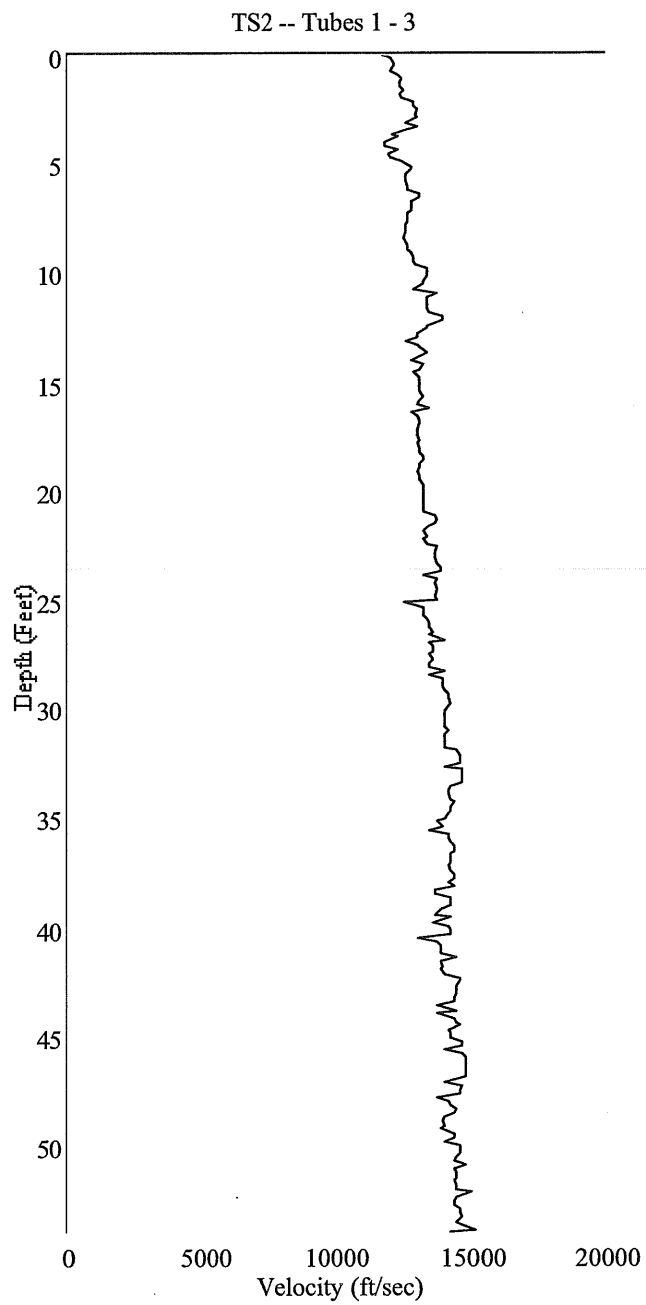
Tube Spacing: 29.4 inches

Figure 15



Tube Spacing : 47.40 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 16



Tube Spacing :	47.40 inches
Signal Gain :	100
Threshold :	1.50
NSE:	1000

Figure 14

Depth (ft)

0

5

10

15

20

25

30

35

40

45

50

Shaft Name: TS2

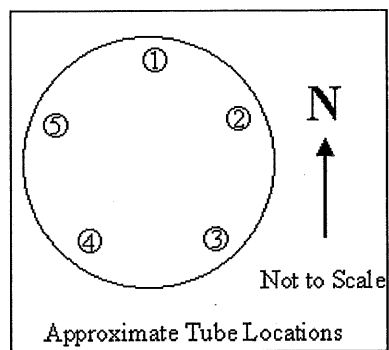
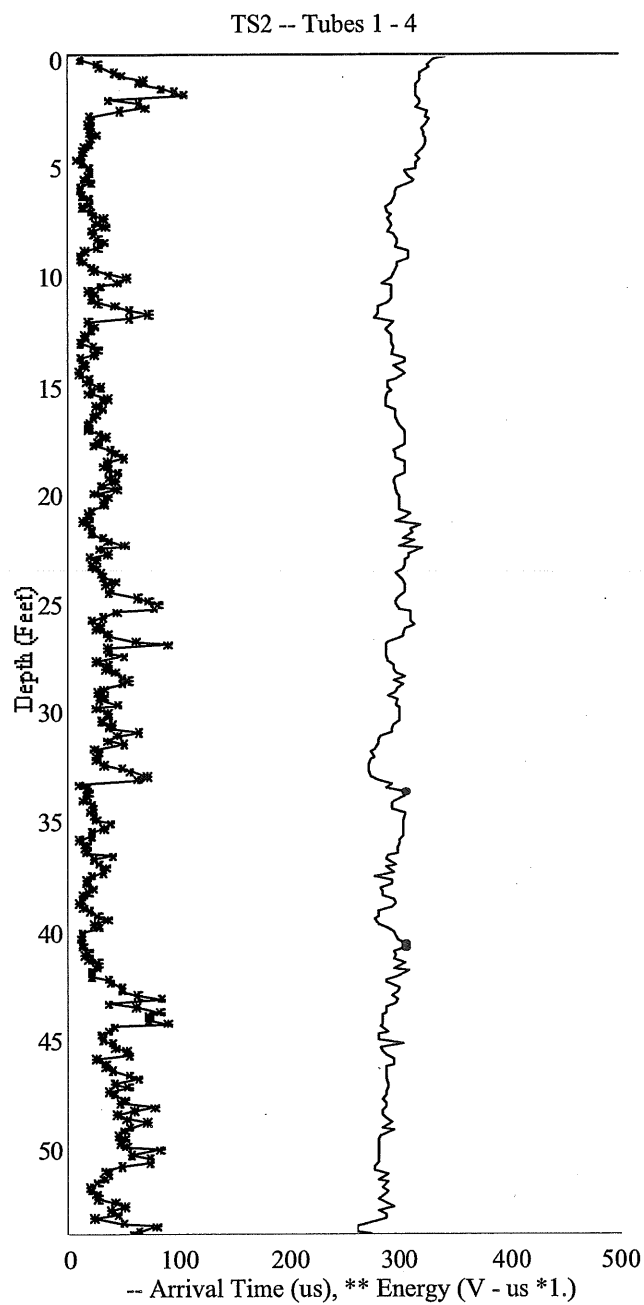
Tube pair: 1 - 3

Number of Tubes: 5

Tube Spacing: 47.4 inches

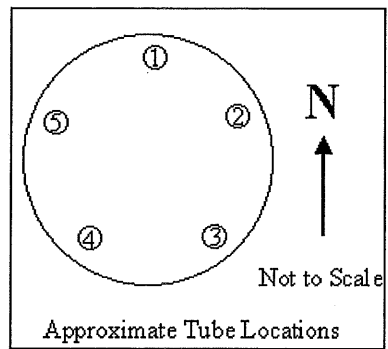
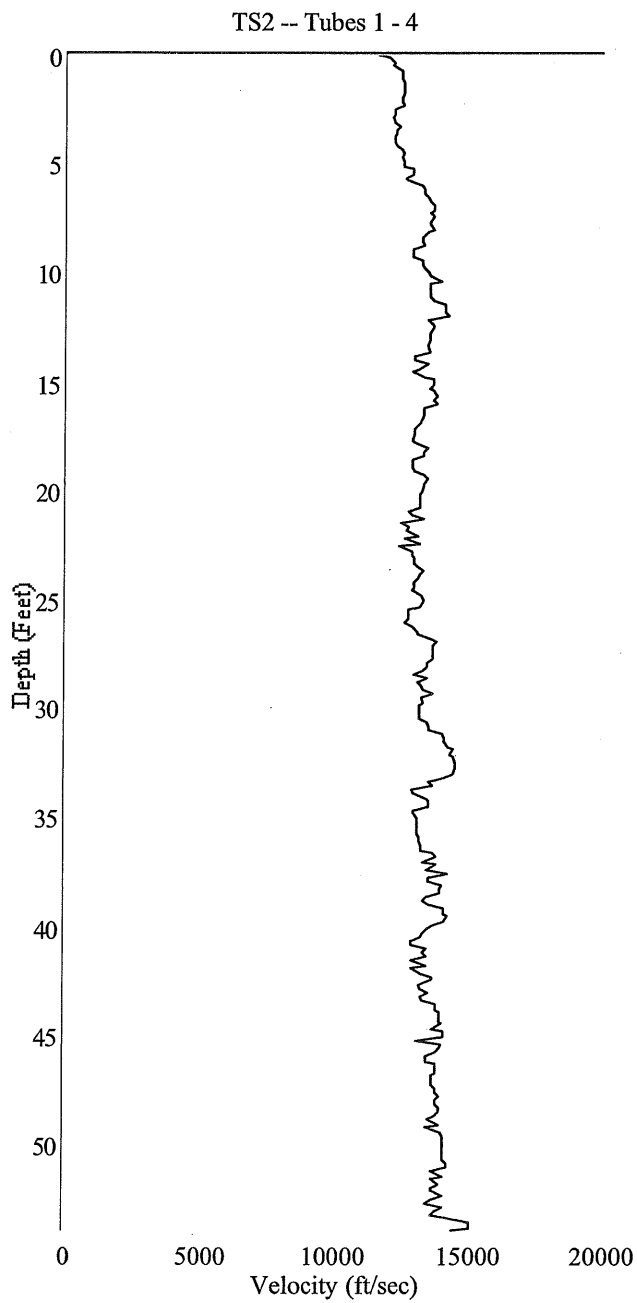
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
Time (micro seconds)

Figure 18



Tube Spacing : 47.28 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

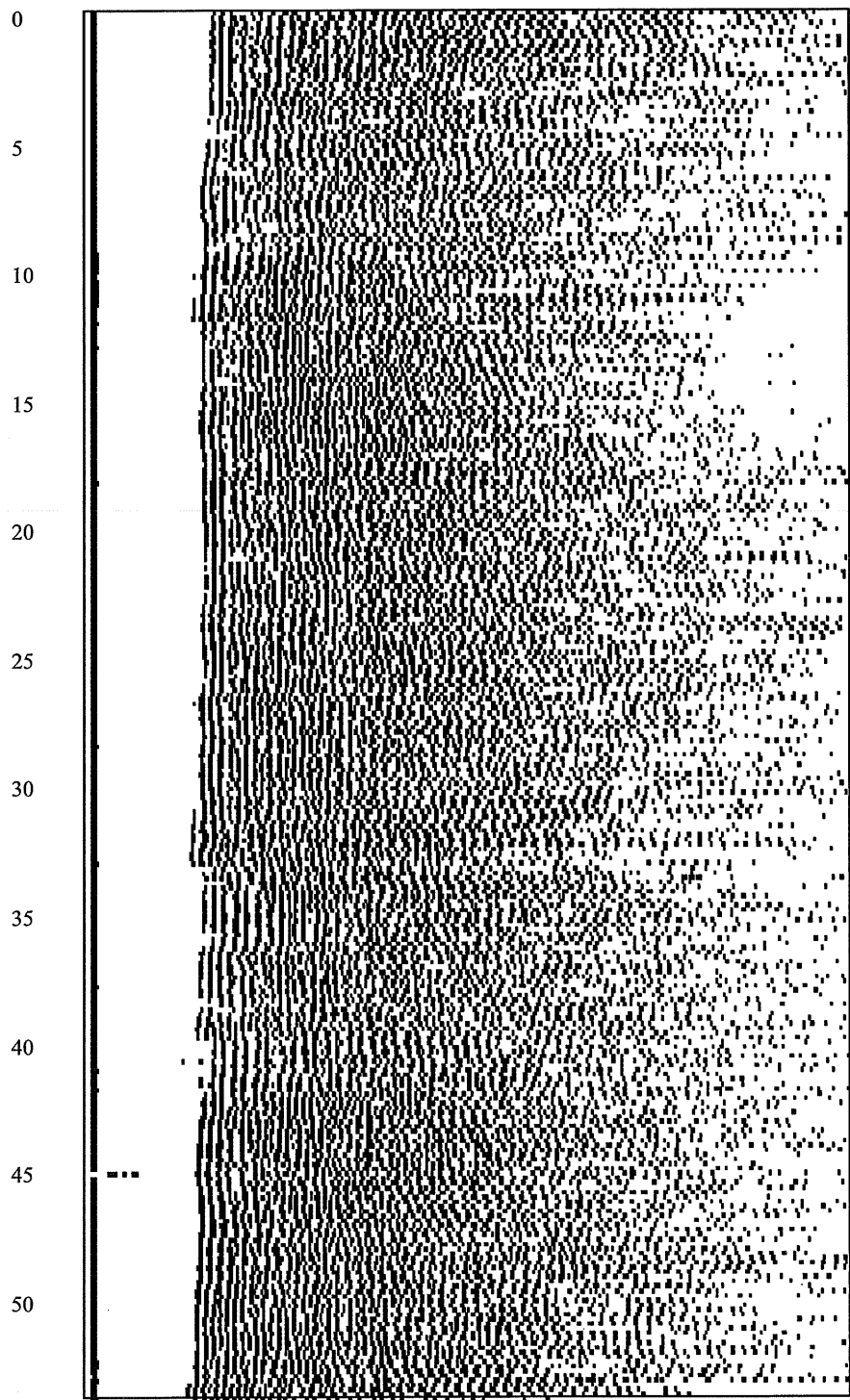
Figure 19



Tube Spacing : 47.28 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 20

Depth (ft)



Shaft Name: TS2

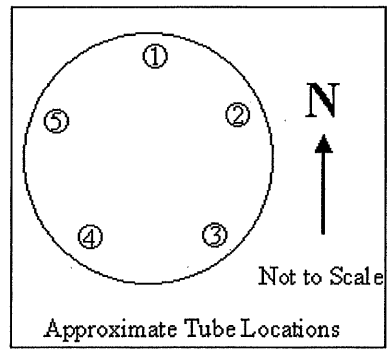
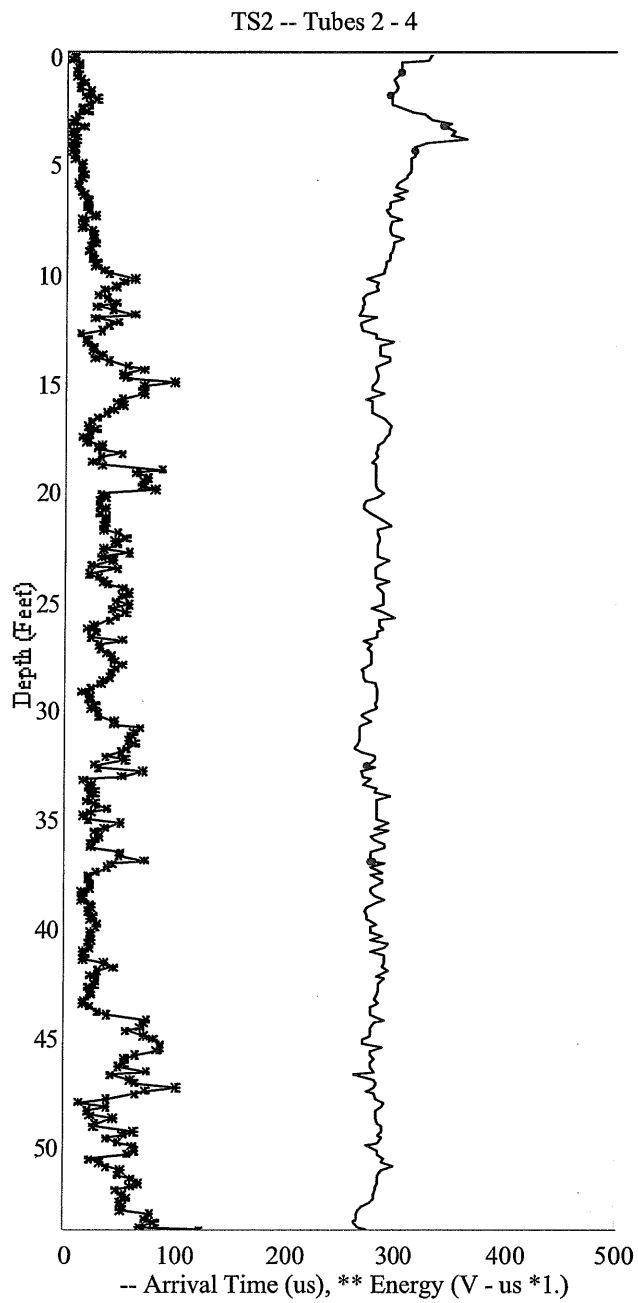
Tubepair: 1 - 4

Number of Tubes: 5

Tube Spacing: 47.28 inches

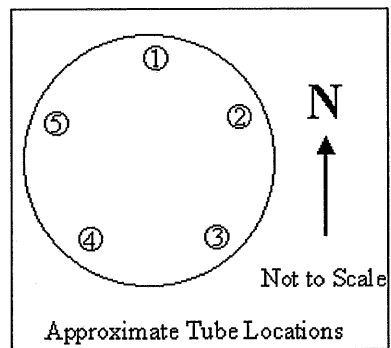
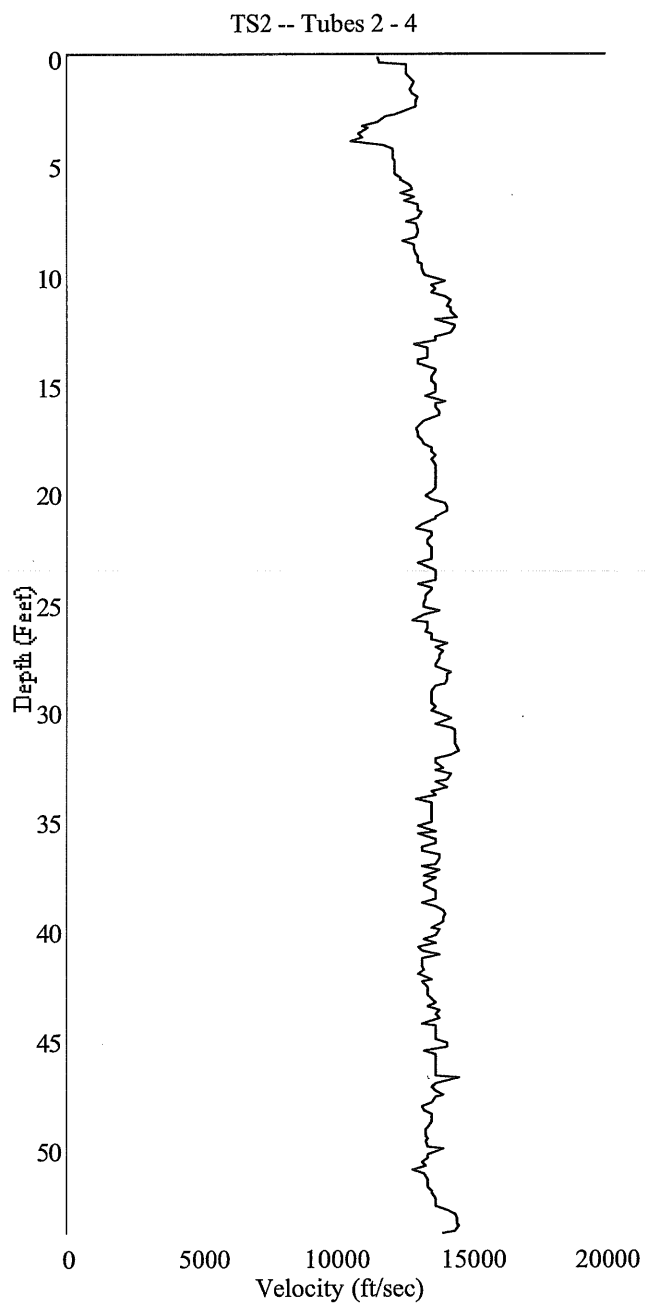
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
Time (micro seconds)

Figure 21



Tube Spacing : 45.60 inches
 Signal Gain : 100
 Threshold : 1.50
 NSE: 1000

Figure 22



Tube Spacing : 45.60 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 23

Depth (ft)

0

5

10

15

20

25

30

35

40

45

50



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900

Time (micro seconds)

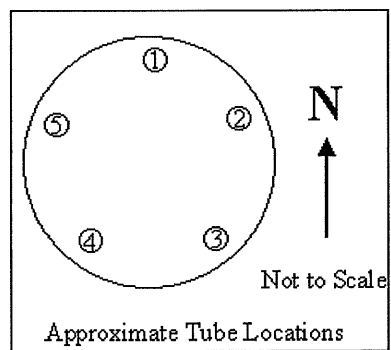
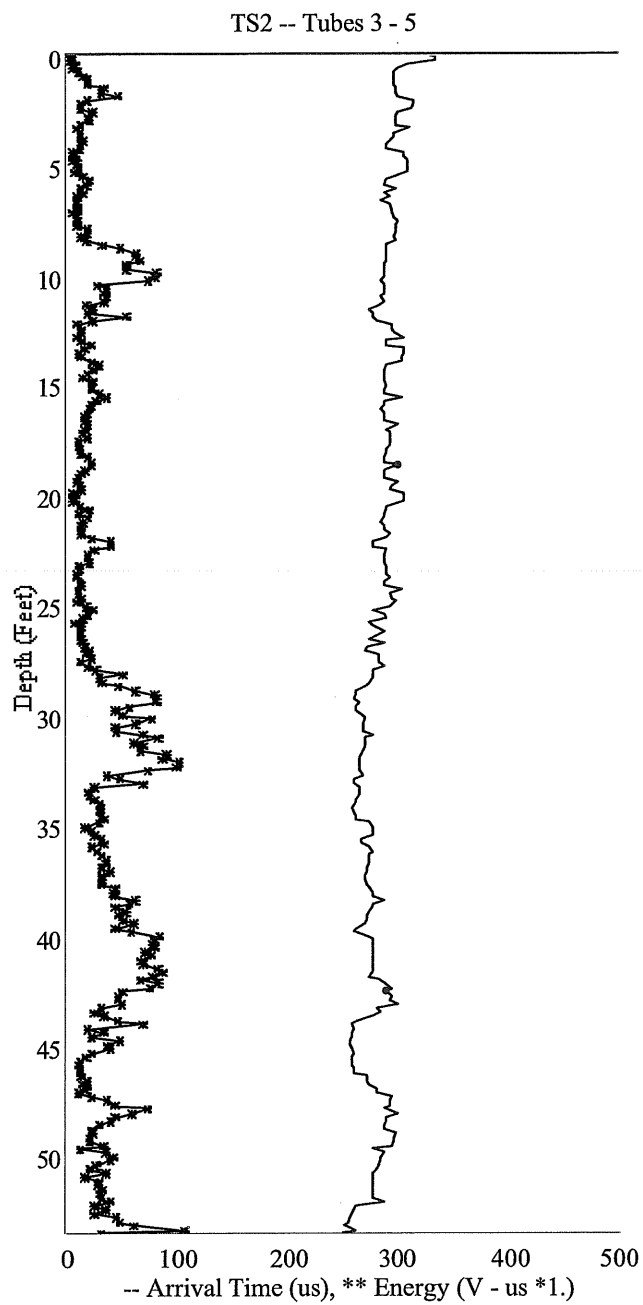
Shaft Name: TS2

Tube pair: 2 - 4

Number of Tubes: 5

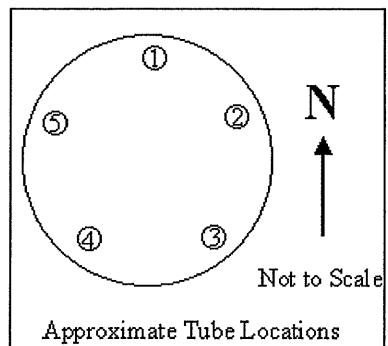
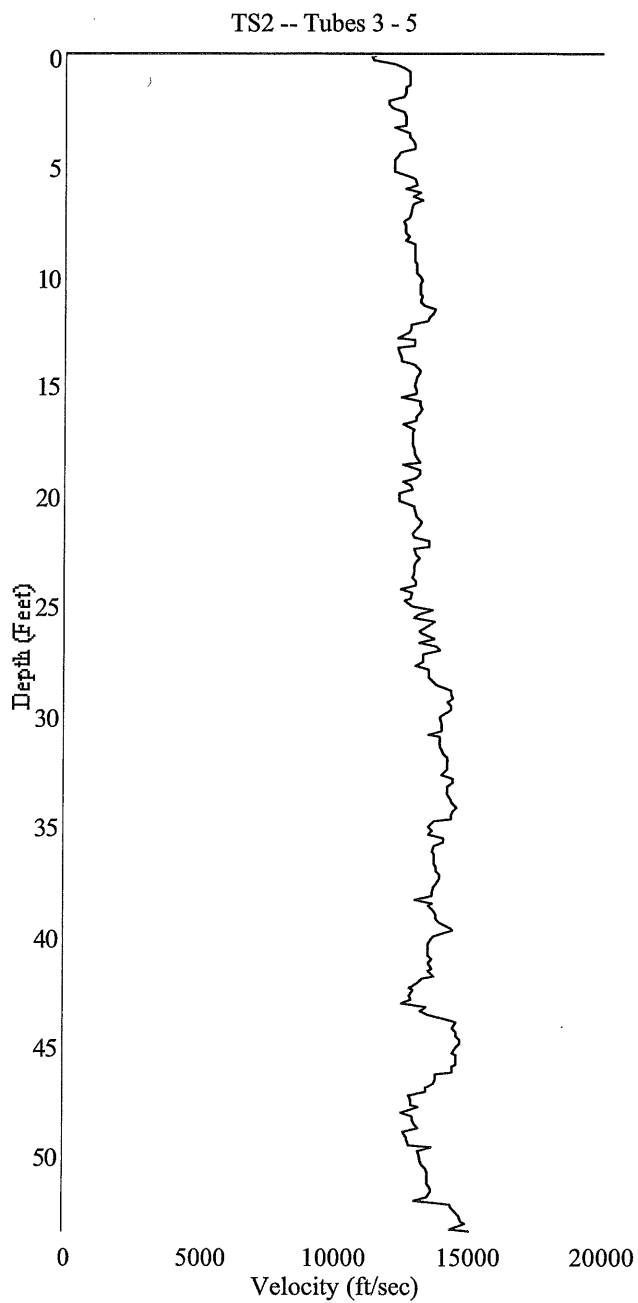
Tube Spacing: 45.6 inches

Figure 24



Tube Spacing : 45.00 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 25



Tube Spacing : 45.00 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 26

Depth (ft)

0

5

10

15

20

25

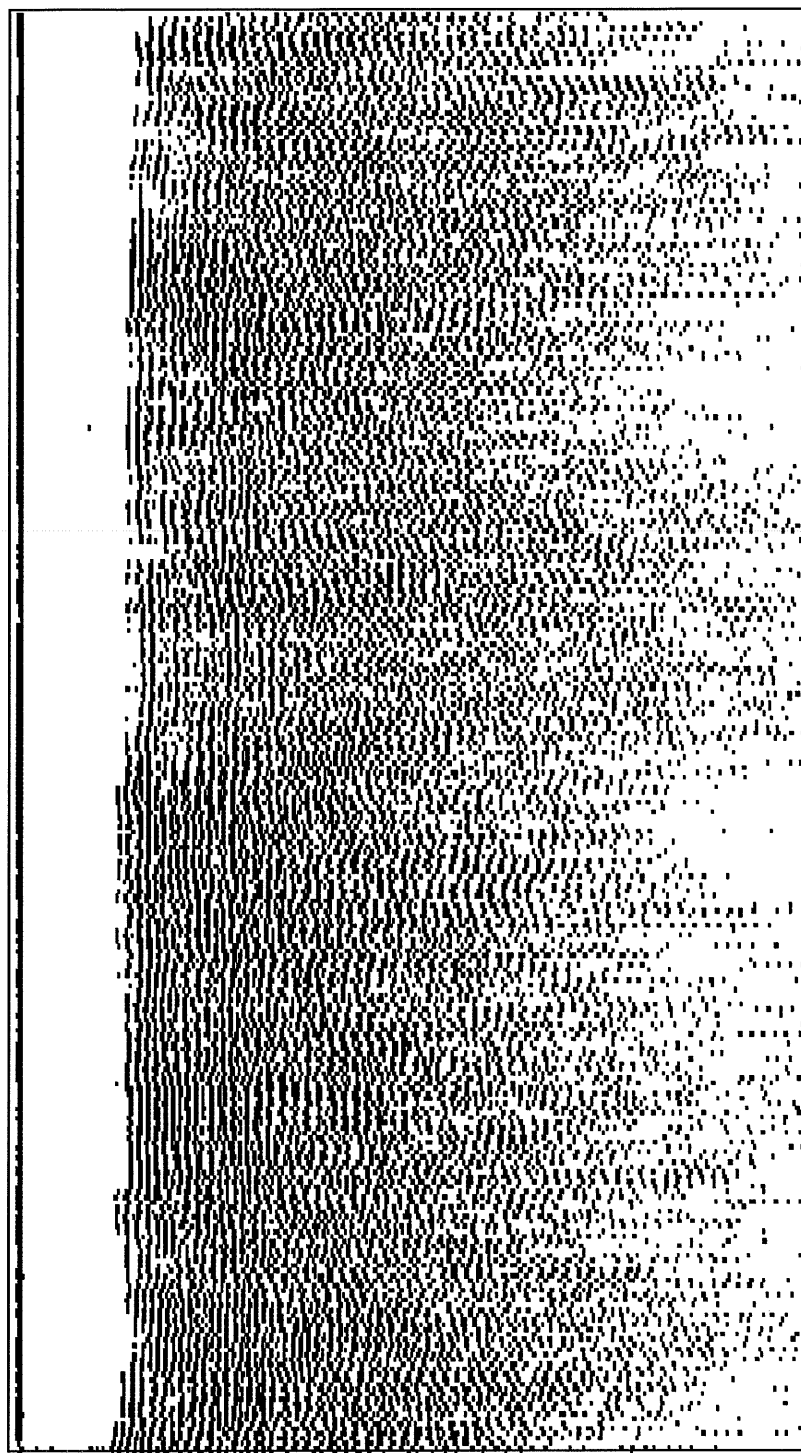
30

35

40

45

50



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900

Time (micro seconds)

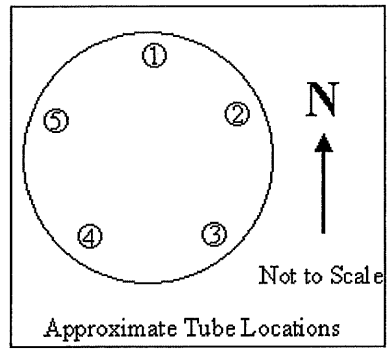
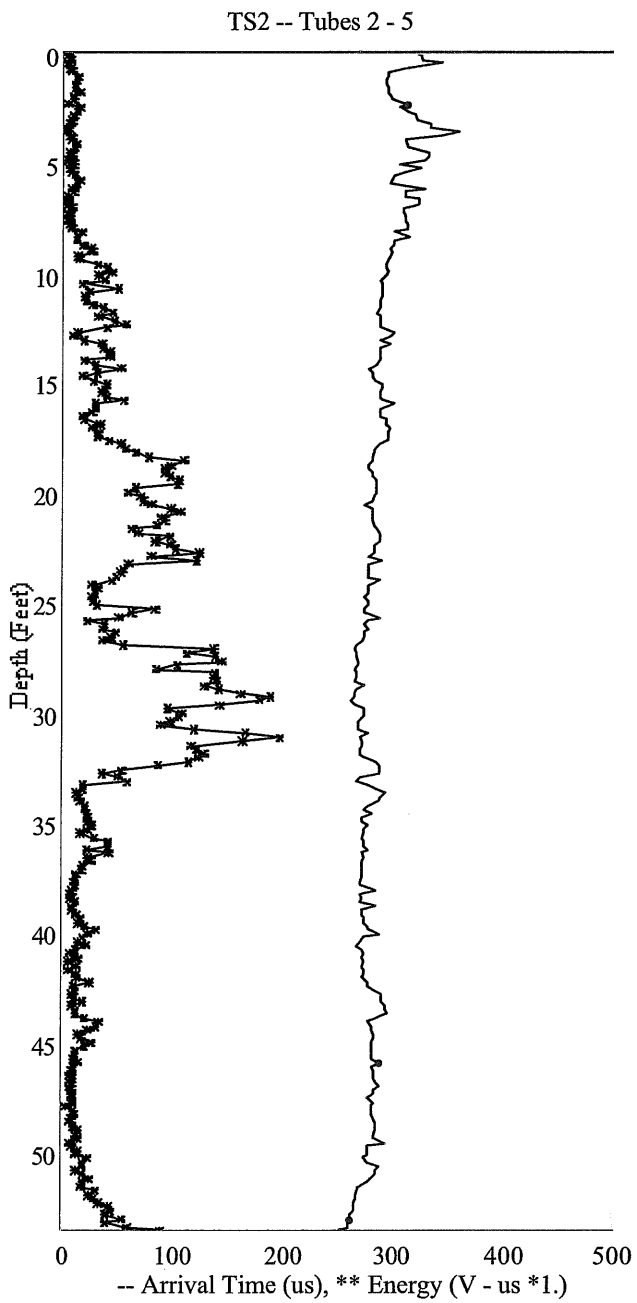
Shaft Name: TS2

Tubepair: 3 - 5

Number of Tubes: 5

Tube Spacing: 45. inches

Figure 27



Tube Spacing : 45.36 inches
Signal Gain : 100
Threshold : 1.50
NSE: 1000

Figure 28

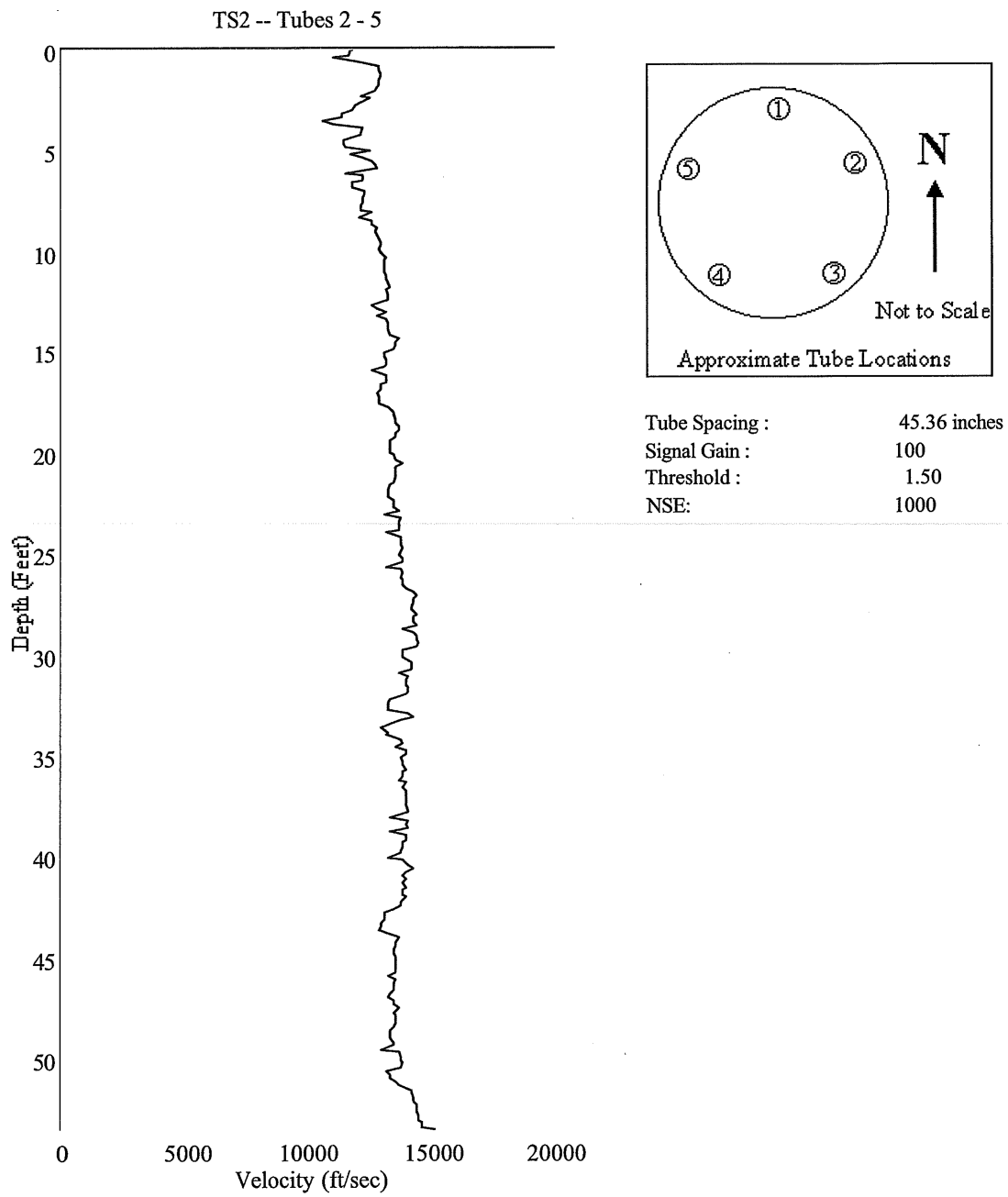


Figure 29

Depth (ft)

0

5

10

15

20

25

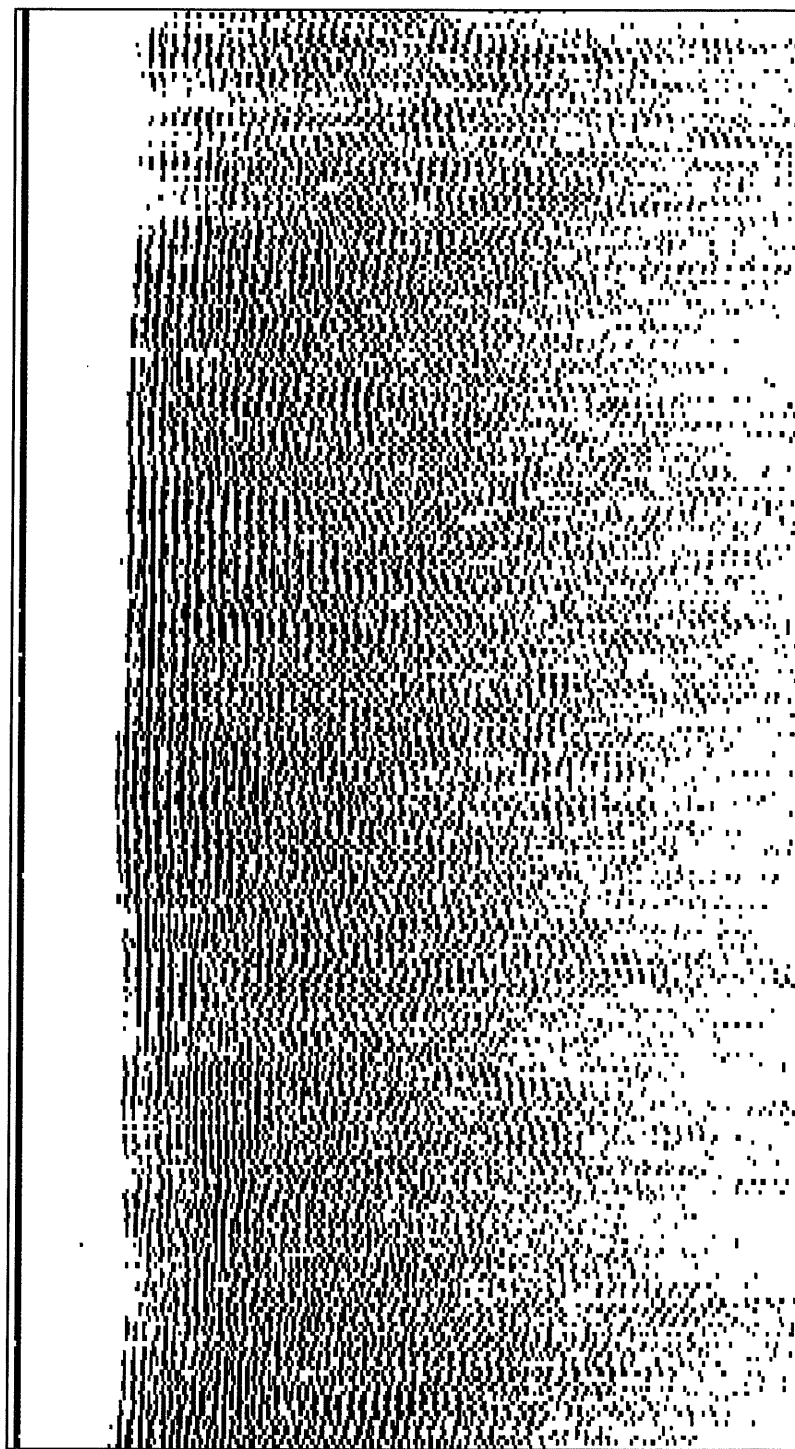
30

35

40

45

50



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900

Time (micro seconds)

Shaft Name: TS2

Tube pair: 2 - 5

Number of Tubes: 5

Tube Spacing: 45.36 inches

Figure 30