WATTS BAR NUCLEAR PLANT

TECHNICAL INSTRUCTION

TI-31.13

WALL THICKNESS MEASUREMENT OF PIPING, TANKS, AND VESSELS

CURRENT REVISION LEVEL 0

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Revised By N/A

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Supervisor

PORC Review Date 7/6/87

Approved By
Plant Manager

Date Approved 7/6/87

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OS/6

HISTORY OF REVISION/REVIEW

REV. NO.	DATE	REVISED PAGES	REASON FOR CURRENT REVISION (INCLUDE ALL TEMPORARY CHANGE NUMBERS)
0	7/6/84	N/A	New Procedure

WALL THICKNESS MEASUREMENT OF PIPING, TANKS AND VESSELS

1.0 SCOPE

This instruction is for ultrasonic examination of piping, tanks, and vessels for wall thinning conditions such as pitting, erosion and corrosion. This procedure is for thicknesses up and including 1/2 inch.

2.0 REFERENCES

2.1 DPM N80E3, procedure N-UT-26

2.2 Inspection program TS 09.01.01.14.02

3.0 TEST EQUIPMENT

3.1 Krautkramer-Branson Model USL-38 with ~~dual~~ single element 3/8" diameter search unit. (above 1/2 inch is fine; single below 1/2")

3.2 Couplant material (petroleum jelly or ultra gel), TI-35 approved.

3.3 Calibration standards (standard step wedge .1" - .5" thick in .1" graduations).

3.4 Form TVA 7931 for ultrasonic test inspection. (See Attachment 1.)

4.0 PRECAUTIONS AND PREREQUISITES

4.1 Notify the SRO prior to start of test.

4.2 Use proper ear and eye protection.

4.3 Prior to working in any suspected radiation or contaminated areas notify HP for assistance.

4.4 Personnel must be qualified Level II or III for reading scope.

5.0 INSTRUCTIONS

5.1 Couple the probe to the 0.1" step of the step wedge and adjust the fine sweep control so that the back reflection appears at the second major screen division.

5.2 Couple the probe to the 0.5" step of the step wedge and adjust the delay controls so that the back reflection appears at the tenth major screen division.

5.3 Repeat steps 5.1 and 5.2 until the respective echoes from each step appear at their correct position on the horizontal sweep scale.

NOTE: The instrument is now calibrated.

5.4 For each surface being inspected, make an appropriate grid, number it and record this grid on page 2 of TVA 7931. (See Attachment 1.) Esure the location is described so it can be located at a later date.

5.5 Ensure the examination surface is free of any roughness that interferes with sound transmission or transducer movement. Conduct the general scanning with the instrument adjustment that will produce a first reflection from the I.D. surface of a defect-free area of the component to 100 percent full screen height. Several areas of the component should be checked to ensure a defect-free area is located. Record this value as SR_1 on Attachment 2.

NOTE: When scanning curved surfaces, the acoustic barrier between the transducers shall be oriented parallel to the longitudinal axis of the component and scanning shall be in the circumferential direction.

Areas of suspected pitting, erosion, and corrosion shall be examined over the entire area. Each pass of the search unit shall overlap a minimum of ten percent of the transducer dimension. The rate of the transducer movement shall not exceed six inches per second.

5.6 Measure each area of the grid and record this value as SR_2 on Attachment 2.

5.7 Notify the SRO of completion of examinations.

5.8 Fill in remaining information on Attachments 1 and 2. For line 5, specify either schedule or nominal wall.

5.9 Record wall thickness values for each area in their respective area on Attachment 1.

5.10 Return the test package to Mechanical Engineering for review and filing.

6.0 ACCEPTANCE CRITERIA

6.1 Piping shall be evaluated for continued operation when wall loss reaches 0.080 inch or greater.

NOTE: The Metallurgy and Codes Section will assist in evaluating UT data, making material recommendations, or evaluating continued operation beyond 0.080 inch wall loss (as needed).

6.2 Notify the Metallurgy and Codes Section for evaluation of tank's and vessel's wall losses.

ATTACHMENT 2

$\frac{SR_2}{SR_2}$ x t = wall thickness

$(1 - \frac{SR_2}{SR_1})$ x t = wall loss

SR_1 = Sweep reading established on defect-free area of component. (Step 5.5)

SR_2 = Sweep reading obtained on probable defective area of component. (Step 5.6)

t = Nominal component wall thickness established from drawing, design thickness, pipe size, and schedule, etc.

Examined By: _____
Date: _____
Reviewed By: _____
Mech Engg

	SR_1		

LOCATION	SR_2	WALL LOSS	WALL THICKNESS

ATTACHMENT 1

GRID NO. _____ INITIALS _____ DATE _____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A																			
B																			
C																			
D																			
E																			
F																			
G																			
H																			
I																			
J																			
K																			
L																			
M																			
N																			

ATTACHMENT 1

DATA FORM FOR ULTRASONIC TEST INSPECTION OF CARBON STEEL PIPING

1. Unit and System: _____
2. Location: _____
3. Grid No.: _____
4. Pipe Diameter: _____
5. Schedule or Nominal Wall: _____
6. Date: _____
7. Sketch of Grid Location: _____
8. Inspector (Signature): _____

Comments:

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Chief, Quality Audits Branch
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Preop Test Supv.
Public Safety Services
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Site Director
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1C Unit 1 Control Room
1C Unit 2 Control Room
Units 1 & 2 Planning
1C Watts Bar Technical Svs Library
1U Metallurgy & Codes Section-1410 CST2-C

TO: Those Listed

FROM: Document Control Supv., NUC PR, Watts Bar Nuclear Plant

DATE: 8/27/85

SUBJECT: Transmittal of Watts Bar Nuclear Plant Instructions

Due to our requirements, there is a ten-day limit:

1. to acknowledge receipt of the following material,
2. to affirm that it has been placed in the appropriate manual,
3. to update the table of contents, and
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INSTRUCTION #	REMOVE AND DESTROY PAGES	INSERT PAGES	DATE/REVISION
TI-31.13	All	All	8/23/85 R1

Return to: Document Control Supv., TSOB, NUC PR, Watts Bar Nuclear Plant

Signature/Date

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT
TECHNICAL INSTRUCTION MANUAL
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EFFECTIVE AUG 27 1985
(Date)