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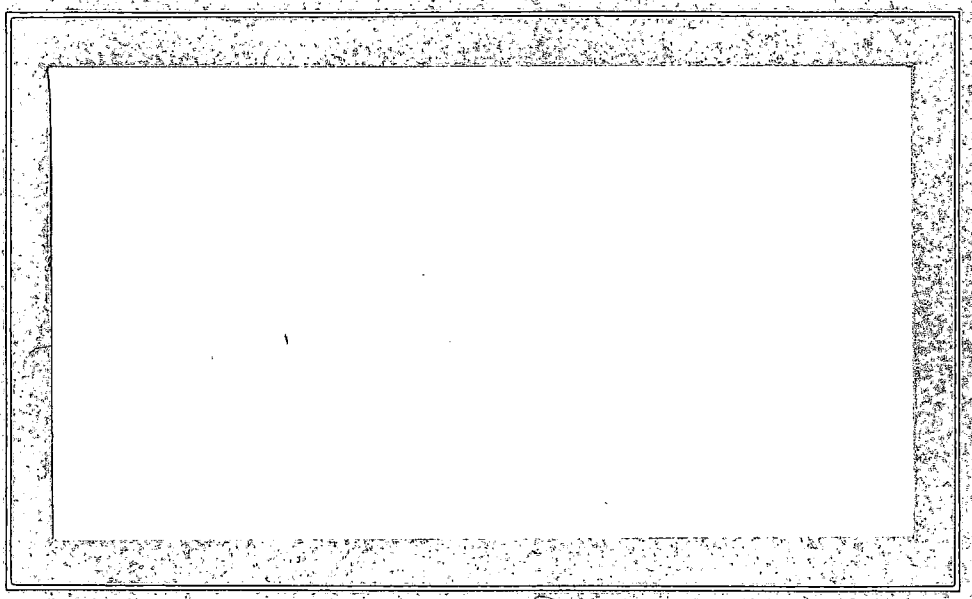

United States Testing Company, Inc.

UNITED STATES TESTING COMPANY, INC.

REPORT OF

INDEPENDENT NONDESTRUCTIVE EVALUATION

NRC LICENSED FACILITY

WATTS BAR NUCLEAR STATION

UNITED STATES TESTING COMPANY PROJECT 1047

MAY 17, 1978

PREPARED FOR

UNITED STATES NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

NRC CONTRACT NO. NRC-05-78-304

BY

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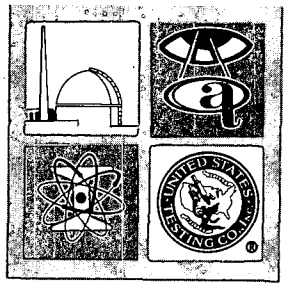

quality assurance
program audits
vendor surveillance
concrete testing
on-site inspection
nondestructive testing
environmental evaluations
training programs

Project 1047

NRC Contract No. NRC-05-78-304
Task II

ABSTRACT

United States Testing Company performed an independent nondestructive examination on selected welds at the Nuclear Regulatory Commission licensed facility, Watts Bar Nuclear Station, near Spring City, Tennessee. The methods used during this project were radiographic examination of thirty-three (33) welds, liquid penetrant examination of five (5) welds and visual examination of ten (10) welds. The purpose of these examinations was to determine the feasibility of conducting direct inspections as a means of ensuring that NRC licensed reactor facilities are constructed in such a manner as to protect the health and safety of the public. The procedures used were basic United States Testing Company procedures revised to reflect code requirements of the components being examined. Personnel assigned to the task were certified to ANSI N45.2.6 and SNT-TC-1A as applicable. Results of the examinations were compared with those of the licensee. Test procedures, personnel qualifications and test results are included in this report. Also included is an analysis comparing the cost for work performed by an independent contractor against the capital expenditure that would be required if the NRC were to perform the examinations.

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INTRODUCTION

The objective of Task II was to determine the feasibility of conducting direct inspections using a contractor experienced in nondestructive examination as a means of ensuring that NRC licensed reactor facilities are constructed in such a manner as to protect the health and safety of the public. This task involves the actual radiographic, liquid penetrant and visual examination of pressure-retaining welds in components and piping at an NRC licensed facility selected by the NRC.

The reactor facility selected by the NRC for evaluation was the Watts Bar Nuclear Station, located approximately eight miles southeast of Spring City, Tennessee. Licensee of this facility is the Tennessee Valley Authority.

The United States Testing Company performed the examinations for the NRC at the above facility and compared the UST/NRC test results with the records and radiographs of the licensee. The field operation, examination and comparison were performed under the surveillance of Mr. B. Crowley, NRC Region II Inspector.

In addition to the field activities, a cost estimate was developed to aid the NRC in determining the feasibility of continuing this program by using a contractor to perform the examinations, or by establishing an NRC task force to perform the examinations.

In this report the United States Testing Company details the method of operation, results of the examination, results of the comparison between UST/NRC examination data and those already recorded by the licensee, problem areas, recommendations and cost analysis.

SCOPE OF TESTING

The scope of testing involved radiographic examination of thirty-three (33) welds, liquid penetrant examination of five (5) welds and visual examination of ten (10) welds.

Welds for radiographic examination were selected on the following basis:

A. Eleven (11) field piping welds within the reactor coolant boundary (no more than four (4) welds in any one pipe size);

B. Ten (10) field welds in safety related piping systems outside the reactor coolant boundary (no more than two (2) welds in any one system);

C. Six (6) field welds in the containment structure within the containment;

D. Six (6) field welds in safety-related structures.

In addition to radiographic examination, the following examinations were performed:

A. Liquid penetrant examination of five (5) Class I welds in the reactor coolant boundary;

B. Visual examination of ten (10) Class II welds in the safety related piping systems outside the reactor coolant boundary;

C. Comparison of all UST/NRC radiographs with the radiographs of the licensee.

Welds selected represented a balance with respect to difficulty of examination, difficulty of welding position, wall thickness and difficulty of accessibility.

No examinations were performed that had not previously been performed by the licensee or a subcontractor of this utility.

PERSONNEL

The United States Testing Company assigned the following personnel to perform Task II for the NRC:

Charles Sheridan: Project Director - Certified Level III ANSI N45.2.6 and SNT-TC-1A, Level II Liquid Penetrant

Joseph Dreibelbis: Technician - Certified Level III SNT-TC-1A, Radiographic and Liquid Penetrant

Peter Shaub: Technician - Certified Level II SNT-TC-1A, Radiographic and Liquid Penetrant

Aaron Siggins: Technician - Certified Level II SNT-TC-1A, Radiographic and Liquid Penetrant

Copies of certification on the above personnel are included in this report as Appendix A.

Test Equipment

The following equipment was used to perform all tests.

Radiographic Test Equipment

Camera: Tech Ops.
Model Number: 533
Serial Number: 133

Source: Automation Industries
Type: Iridium 192
Size: 1/8" X 3/32"
Model Number: 3790
Serial Number: 11577
Leak tested: 4/12/78

Densitometer: X-Right Company
Model Number: 301
Serial Number: 01238
Calibration: Step wedge No. 10185 (traceable to the National Bureau of Standards)

Liquid Penetrant Test Material

Manufacturer: Magnaflux Corporation

Penetrant: SKL-HF/S Formula B
Batch No.: 78A-052

Developer: SKD-NF Formula B
Batch No.: 78C-026

Cleaner: SKC-NF Formula B
Batch No.: 78C-022

Certification of the above materials to be within sulfur/halogen requirements and free of mercury contamination was supplied by the Magnaflux Corporation on Purchase Order Number 35533.

In addition to the preceding, the United States Testing Company supplied a laboratory trailer (includes developing tanks, drying oven, and interpretation room), pick-up truck, chemicals, film and all other necessary test materials.

Test Procedures

Testing was performed to standard United States Testing procedures which had been previously submitted to the NRC for review. Revision of the standard procedures was necessary to comply with licensee code commitments and was performed by our Level III personnel on site.

Procedures used during the testing and revisions listed as attachments are included in this report as follows:

Radiographic Procedures Appendix B

- UST-RT-2
- Attachment NRC 1
- Attachment NRC 2
- Attachment NRC 3
- Attachment NRC 4

Liquid Penetrant Procedure Appendix C

- UST-PT-3
- Attachment NRC 1

Site Operations

The United States Testing personnel and Mr. B. Crowley reported to the Watts Bar Nuclear Station on April 17, 1978. A pretesting meeting was held at this facility with TVA site personnel.

During the day of April 17, 1978 the mobile laboratory was set in position and TVA construction provided the necessary blocking, water and electric service. While the laboratory was being prepared, the initial weld joints were selected for testing.

Testing began on the third shift on April 17, 1978 on a planned schedule of 11 P.M. to 7 A.M. to prevent interference with plant construction. Testing operations were conducted as planned each day from the start through April 30, 1978.

On May 1 and 2, 1978, after testing was complete, comparison of the UST/NRC test results with results of tests performed by the licensee was conducted by the United States Testing and Nuclear Regulatory Commission personnel.

At 2:30 P.M., May 2, 1978 an exit interview was conducted by NRC personnel and attended by United States Testing.

Nondestructive Examination

Results of the testing conducted during Task II at the Watts Bar Nuclear Station are divided into groups as specified in the Scope of Testing section of this report.

Field Welds Within the Reactor Coolant Pressure Boundary

Radiographic testing was performed to UST-RT-2 and Attachment NRC 1. A summary of the test results follows:

Weld Joint Number: 1-68D-W001-02

System: Reactor Coolant Hot Leg

Weld Position: 6G

Material: Centrifugal Cast Stainless Steel to Steam Generator

Specified Wall Thickness: 2.60 inches

Specified I.D.: 31 inches

Location: Unit 1 reactor building

Code requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test results: No relevant indications

Technique and reader sheets included in Appendix D, number D1.

Weld Joint Number: 1-068F-W003-01

System: Reactor Coolant Crossover

Weld Position: 6G

Material: Centrifugal Cast Stainless Steel to Steam Generator

Specified Wall Thickness: 2.60 inches

Specified I.D.: 31 inches

Location: Unit 1 reactor building

Code requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D2

Weld Joint Number: 1-068B-W003-02

System: Reactor Coolant Cold Leg

Weld Position: 5G

Material: Centrifugal Cast Stainless Steel to Reactor Coolant Pump

Specified Wall Thickness: 2.32 inches

Specified I.D.: 27½ inches

Location: Unit 1 Reactor building

Code requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D3

Weld Joint Number: 1-074B-D055-14

System: Residual Heat Removal

Weld Position: 5G

Material: Stainless Steel Pipe to Valve Body

Specified Wall Thickness: .719 inches

Specified I.D.: 6 inches

Location: Unit 1 Reactor building

Code requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D4

Weld Joint Number: 1-063B-D091-06

System: Safety Injection

Weld Position: 5G

Material: Centrifugal Cast Stainless Steel to Valve Body

Specified Wall Thickness: 1.000 inch

Specified I.D.: 10 inches

Location: Unit 1 Reactor building

Code Requirement: ASME Section III, Subsection NB, 1971 Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D5

Weld Joint Number: 1-063B-D090-10

System: Safety Injection

Weld Position: 5G

Material: Centrifugal Cast Stainless Steel to Valve Body

Specified Wall Thickness: 1.000 inch

Specified I.D.: 10 inches

Location: Unit 1 Reactor building

Code Requirements: ASME Section III, Subsection NB, 1971 Summer 1973 Addenda

Test Results: No relevant indication

Technique and reader sheets included in Appendix D, number D6

Weld Joint Number: 1-087B-D040-08

System: Upper Head Injection

Weld Position: 5G

Material: Stainless Steel Pipe to Tee

Specified Wall Thickness: .812 inch

Specified I.D.: 8 inches

Location: Unit 1 Reactor building

Code Requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D7

Weld Joint Number: 1-063B-D092-10

System: Safety Injection

Weld Position: 6G

Material: Stainless Steel Cast Elbow to Stainless Steel Cast Tee

Specified Wall Thickness: 1.000 inch

Specified I.D.: 10 inches

Location: Unit 1 Reactor building

Code Requirements: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D8

Weld Joint Number: 1-063B-D092-09

System: Safety Injection

Weld Position: 2G

Material: Stainless Steel Pipe to Stainless Steel Cast Tee

Specified Wall Thickness: .719 inch

Specified I.D.: 6 inches

Location: Unit 1 Reactor building

Code Requirement: ASME Section III, Subsection NC, 1971 Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D9

Weld Joint Number: 1-074B-D054-10

System: Residual Heat Removal

Weld Position: 5G

Material: Stainless Steel Pipe to Stainless Steel Pipe

Specified Wall Thickness: .906 inch

Specified I.D.: 8 inches

Location: Unit 1 Reactor building

Code Requirement: ASME Section III, Subsection NC, 1971 Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D10

Weld Joint Number: 1-074B-D053-01

System: Residual Heat Removal

Weld Position: 6G

Material: Stainless Steel Cast Pipe to Tee

Specified Wall Thickness: 1.250 inch

Specified I.D.: 14 inches

Location: Unit 1 Reactor building

Code Requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D11

In addition to the radiographic examination, the following welds in the reactor coolant pressure boundary were also examined by the liquid penetrant method.

1-068F-W003-01 - Size 31"

1-074B-D055-14 - Size 6"

1-063B-D091-06 - Size 10"

1-087B-D040-08 - Size 8"

1-074B-D053-01 - Size 14"

No relevant indications were noted during the examination of the above welds.

Liquid Penetrant Test Reports are included in this report as Appendix E.

Testing was performed to Procedure UST-PT-3 and Attachment NRC-1 included in this report as Appendix C.

Field Welds in Safety Related Piping Outside the Reactor Coolant Boundary

Radiographic examination of the welds in this category was performed to Procedure UST-RT-2 and Attachment NRC-1.

Results of tests were as follows:

Weld Joint Number: 2-063A-D120-05

System: Safety Injection

Weld Position: 5G

Material: Stainless Steel Pipe to Valve

Specified Wall Thickness: .280 inch

Specified I.D.: 6 inches

Location: Auxiliary Building Pump Room 2A-A

Code Requirement: ASME Section III, Subsection NC, 1971 Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D12

Weld Joint Number: 2-063A-D119-09

System: Safety Injection

Weld Position: 5G

Material: Stainless Steel Pipe to Elbow

Specified Wall Thickness: .237 inch

Specified I.D.: 4 inches

Location: Auxiliary Building, Pump Room 2A-A

Code Requirement: ASME Section III, Subsection NC, 1971 Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D13

Weld Joint Number: 2-074A-D026-03

System: Residual Heat Removal

Weld Position: 5G

Material: Stainless Steel Pipe to Elbow

Specified Wall Thickness: .322 inch

Specified I.D.: 4 inches

Location: Auxiliary Building, Pump Room 2A

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D14

Weld Joint Number: 1-003C-D011-07

System: Auxiliary Feed Water

Weld Position: 5G

Material: Carbon Steel Pipe to Pipe

Specified Wall Thickness: .337 inch

Specified I.D.: 4 inches

Location: Auxiliary Building, Elevation 737

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D15

Weld Joint Number: 2-072A-D037-09

System: Containment Spray

Weld Position: 5G

Material: Stainless Steel, Pipe to Pipe

Specified Wall Thickness: .375 inch

Specified I.D.: 16 inches

Location: Auxiliary Building, Heat Exchanger Room 2B

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D16

Weld Joint Number: 1-072A-D063-09

System: Containment Spray

Weld Position: 5G

Material: Stainless Steel, Elbow to Pipe

Specified Wall Thickness: .365 inch

Specified I.D.: 10 inches

Location: Auxiliary Building, Elevation 737

Code Requirement: ASME Section III, Subsection NB, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D17

Weld Joint Number: 2-062A-D117-05

System: Chemical and Volume Control

Weld Position: 5G

Material: Stainless Steel, Pipe to Tee

Specified Wall Thickness: .216 inch

Specified I.D.: 3 inches

Location: Auxiliary Building, Elevation 713

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D18

Weld Joint Number: 1-062A-D022-15

System: Chemical and Volume Control

Weld Position: 5G

Material: Stainless Steel, Pipe to Valve

Specified Wall Thickness: .280 inch

Specified I.D.: 6 inches

Location: Auxiliary Building, Charging Pump Room 1A-A

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D19

Weld Joint Number: 1-003B-D003-06

System: Feedwater

Weld Position: 5G

Material: Carbon Steel, Pipe to Valve

Specified Wall Thickness: .843 inch

Specified I.D.: 16 inches

Location: South Valve Room

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D20

Weld Joint Number: 2-074A-D030-06

System: Residual Heat Removal

Weld Position: 2G

Material: Stainless Steel, Pipe to Saddle

Specified Wall Thickness: .216 inch

Specified I.D.: 3 inches

Location: Auxiliary Building, Heat Exchanger Room 2A

Code Requirement: ASME Section III, Subsection NC, 1971
Summer 1973 Addenda

Test Results: No relevant indications

Technique and reader sheets included in Appendix D, number D21

In addition to radiographic examinations on the above welds, visual inspection was performed on all ten (10) welds.

Results of this examination were as follows:

A. Welds were free of slag, porosity and weld splatter.

B. Welds were free of cracks, overlap, undercut, and lack of fusion or penetration.

C. The surface finishes of all welds were suitable for radiographic examinations.

No relevant indications were noted.

Field Welds in the Containment Structure Within the Containment

Radiographic examination of the welds in this category was performed to Procedure UST-RT-2 and Attachment NRC-2.

Results of tests were as follows:

Weld Number: B1 (View 10-11)

Structure: Containment

Weld Position: 2G

Material: Carbon Steel

Specified Thickness: 1-3/8 inch

Location: Unit 2, Reactor Building Aa 325^{o}

Code Requirement: ASME Section III, Subsection NE, 1971, Winter 1971 Addenda and ASME Section VIII, Div. 1, 1971, Winter 1971, Par. UW-51

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D22

Weld Number: 2-3 (0-90°) View 22-23

Structure: Containment

Weld Position: 3G

Material: Carbon Steel

Specified Thickness: 1-3/8 inch

Location: Unit 2, Reactor Building Aa 30°

Code Requirement: ASME Section III, Subsection NE 1971, Winter 1971 Addenda and ASME Section VIII, Div. 1, 1971, Winter 1971, Par. UW-51

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D23

Weld Number: 100A (View 22-23)

Structure: Containment

Weld Position: 2G

Material: Carbon Steel

Specified Thickness: 1-3/8 inch

Location: Unit 2, Reactor Building Aa 60°

Code Requirement: ASME Section III, Subsection NE, 1971, Winter 1971 Addenda and ASME Section VIII, Div. 1, 1971, Winter 1971, Par. UW-51

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D24

Weld Number: 3-4 (90-180°) View 7-8

Structure: Containment

Weld Position: 3G

Material: Carbon Steel

Specified Thickness: 1-3/8 inches

Location: Unit 2, Reactor Building Aa 100°

Code Requirement: ASME Section III, Subsection NE, 1971, Winter 1971 Addenda and ASME VIII, Div. 1, 1971, Winter 1971, Par. UW-51

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D25

Weld Number: 1-2 (90-180°) View 15-16

Structure: Containment

Weld Position: 3G

Material: Carbon Steel

Specified Thickness: 1-3/8 inches

Location: Unit 1, Reactor Building Aa 108°

Code Requirement: ASME Section III, Subsection NE, 1971, Winter 1971 Addenda and ASME Section VIII, Div. 1, 1971, Winter 1971, Par. UW-51

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D26

Weld Number: 3A View 0-1

Structure: Containment

Weld Position: 2G

Material: Carbon Steel

Specified Thickness: 1-3/8 inches

Location: Unit 1, Reactor Building Aa 15°

Code Requirement: ASME Section III, Subsection NE, 1971, Winter 1971 Addenda and ASME Section VIII, Div. 1, 1971, Winter 1971, Par. UW-51

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D27

Field Welds in Safety Related Structures

Radiographic examination of welds in this category was performed to Procedure UST-RT-2 and Attachments NRC-3 and 4.

Results of tests are as follows:

Weld Number: 1H3

Structure: Primary Makeup H_2O Tank

Material: Carbon Steel

Specified Thickness: 5/16 inch

Location: Outdoor Storage Yard, Unit 1

Code Requirement: ASME Section III, Subsection ND, 1974, Winter 1975 Addenda ND 5200 and 5281

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D28

Weld Number: 1H4

Structure: Refueling H_2O Storage Tank

Material: Stainless Steel

Specified Thickness: 5/16 inch

Location: Outside Storage Yard, Unit 1

Code Requirement: ASME Section III, Subsection NC, 1974, Winter 1975 Addenda NC 5200 and Section V

Test Results: No relevant indications

Techniques and reader sheets are included in Appendix D, number D29

Weld Number: 2V2

Structure: Refueling H_2O Storage Tank

Material: Stainless Steel

Specified Thickness: 5/16 inch

Location: Outside Storage Yard, Unit 1

Code Requirement: ASME Section III, Subsection NC, 1974, Winter 1975 Addenda NC 5200 and Section V

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D30

Weld Number: 1-2 Girth (90-180°)

Structure: Chemical & Volume Control Holding Tank No. 74-3743

Material: Stainless Steel

Specified Thickness: 5/16 inch

Location: Auxiliary Building, Elevation 692

Code Requirement: ASME Section III, Subsection ND, 1974, Appendix X NA 5322

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D31

Weld Number: A1 (View 6-7)

Structure: Chemical & Volume Control Holding Tank No. 74-3744

Material: Stainless Steel

Specified Thickness: 5/16 inch

Location: Auxiliary Building, Elevation 692

Code Requirement: ASME Section III, Subsection ND, 1974, Appendix X ND 5321

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D32

Weld Number: C1 (View 3-4)

Structure: Chemical & Volume Control Holding Tank No. 74-3744

Material: Stainless Steel

Specified Thickness: 5/16 inch

Location: Auxiliary Building, Elevation 692

Code Requirement: ASME Section III, Subsection ND, 1974, Appendix X
ND 5321

Test Results: No relevant indications

Technique and reader sheets are included in Appendix D, number D33

Comparison of Radiographic Examination Results

After completion of all examinations a comparision of the UST/NRC radiographs with those of the licensee was performed.

Results of this comparison are as follows:

	Comments
Weld Number: 1-68D-W001-02 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used overlap panoramic. TVA used 3 penetrameters in alternate locations.
Weld Number: 1-068F-W003-01 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used overlap panoramic. TVA used 3 penetrameters in alternate locations.

	Comments
Weld Number: 1-068B-W003-02 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used overlap panoramic technique. TVA used 3 penetrameters in alternate locations.
Weld Number: 1-074B-D055-14 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used two exposures and pentrameters in weld. TVA used penetrameter and shim.
Weld Number: 1-063B-D091-06 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 1-063B-D090-10 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Unsatisfactory* Technique: Same	*Views 3-0 and 0-1 fail to meet density requirements of +30%, -15%. United States Testing used penetrameter in weld in alternate locations to qualify density.

	Comments
Weld Number: 1-087B-D040-08 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used Type T film. TVA used M film.
Weld Number: 1-063B-D092-10 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used two exposures with penetrameter in weld area. TVA used shimmed penetrameter.
Weld Number: 1-063B-D092-09 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used two penetrameters without shims and M film. TVA used shimmed penetrameter and R film.
Weld Number: 1-074B-D054-10 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	

	Comments
Weld Number: 1-074B-D053-06 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 2-063A-D120-05 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 2-063A-D119-09 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used 4½" X 10" M film. TVA used 5" X 7" R film.
Weld Number: 2-074A-D026-03 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	

	Comments
Weld Number: 1-003C-D011-07 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 2-072A-D037-09 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used double wall technique. TVA used single wall technique.
Weld Number: 1-072A-D063-09 Duplication of Weld: Yes Penetrameter Requirement: Unsatisfactory* Density Requirement: Accept Technique: Same	*Use of #17 penetrameter instead of #10 fails to meet code requirements.
Weld Number: 2-062A-D117-05 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used M film. TVA used R film.

	Comments
Weld Number: 1-062A-D022-15 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 1-003B-D003-06 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used double wall technique and AA film. TVA used single wall technique and M film.
Weld Number: 2-074A-D030-06 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: United States Testing used M film. TVA used R film.
Weld Number: B1 (View 10-11) Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: Processing artifacts.

	Comments
Weld Number: 2-3 (View 22-23) Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 100A (View 22-23) Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 3-4 (View 7-8) Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 1-2 (View 15-16) Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	

	Comments
Weld Number: 3A (View 0-1) Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 1H3 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: See note. Technique: Accept.	Note: Film shows 4T hole on penetrameter. Marginal sensitivity and film quality.
Weld Number: 1H4 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: 2U2 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: Poor film quality.

	Comments
Weld Number: 1-2 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: See note	Note: TVA appeared to use X-ray for radiograph.
Weld Number: A1 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	
Weld Number: C1 Duplication of Weld: Yes Penetrameter Requirement: Accept Density Requirement: Accept Technique: Same	

Comparison of the radiographs may be summarized as follows:

A. All radiographs could be interpreted.

B. All weld joints were identifiable as being duplicated.

C. One (1) TVA radiograph did not show the correct penetrameter.

D. One (1) TVA radiograph failed to meet the +30%, -15% density requirement.

Problem Areas

During the examination performed by the United States Testing Company at the Watts Bar Station, problems were encountered in the following areas:

A. The capacity of the thickness gauge supplied by the United States Testing Company was not great enough to determine accurately the thickness of the heavy wall centrifugal cast stainless steel piping in the reactor coolant loops.

B. Punch marks used for location were not always the same distance from the edge of the welds; consequently they did not in every case define the area of interest, resulting in the need to reshoot several of the welds.

C. Manual developing of film, during peak periods of examination, required full time attention from one member of the radiograph team.

D. Additional sets of penetrameters would have simplified the technique required to qualify the radiographs of stainless steel piping on which the deposited weld metal and the pipe O.D. were ground to the same plane.

E. It was difficult to modify standard procedures on site because of the amount of time and clerical personnel required and the availability of ASME codes.

Recommendations for Improvement in Future Assignments

To increase the efficiency of future operations, the United States Testing Company recommends that:

A. A planning meeting be held prior to arrival of the Laboratory on site. Objectives of this meeting include:

1. Selection of systems and welds to be examined.
2. Determination of Code class, wall thickness, size, material type and configuration of welds to be examined.

B. A thickness gauge sufficient to measure the selected material and wall thickness be supplied as part of the laboratory equipment.

C. Extra penetrameter sets be supplied as determined necessary during the planning meeting.

D. Necessary revisions to procedures be developed before arrival of the examination personnel on site.

E. Three (3) testing personnel be assigned to the radiographic team. The principle duty of one (1) man would be development and interpretation of film. During testing at Watts Bar Station it was necessary to add the additional man.

Cost Analysis

The estimated cost to the NRC for an independent examination of ten (10) nuclear sites per year is one hundred thirty-nine thousand three hundred eighty dollars ($139,380.00). This figure represents a total for all costs including equipment, personnel, supervision and profit. Breakdown of the above is listed in Table A.

The estimated cost to the NRC for equipment for an examination program for ten (10) nuclear sites to be performed by them is fifty-one thousand eighty nine dollars ($51,089.00). Breakdown of the equipment cost is listed in Table B.

The cost of the licenses, fees and insurance required for the NRC to implement its own program is estimated to be five thousand dollars ($5,000.00) in addition to the equipment costs listed in Table B.

No estimate of the labor and overhead costs involved can be prepared with the information available to our organization. We estimate, however, that a total of three thousand nine hundred twenty (3,920) man hours would be required to complete the program.

It should be noted that no estimate is included in this report for development and implementation of the following:

A. Radiation Safety Program.

B. Nondestructive Examination Procedures.

C. Test Equipment Calibration Program.

All of the above would be required if the NRC were to develop its own Task Force.

TABLE A

Independent Contractor Cost Summary Per Year:

Radiographic Examination		$96,504.00
Magnetic Particle Examination		12,063.00
Liquid Penetrant Examination		12,063.00
Miscellaneous Equipment		11,500.00
Trailer, Truck		7,250.00
	Total	$139,380.00

TABLE B

Equipment Cost to the NRC:

Cobalt 60 Camera (30 Curie Source)		$8,339.00
Iridium 192 Camera (5 new 100 curie sources @ $550.00 each)		2,850.00
Liquid Penetrant		2,750.00
Equipment & Material (includes film, chemistry, dosimeters, densitometer, etc.)		500.00
Trailer (darkroom)		15,650.00
Truck		13,500.00
	Total	7,500.00
		$51,089.00

Conclusion

We believe that the program developed in Task II should be continued by an independent NDE contractor. Verification that safety-related systems have been inspected and examined in accordance with project specifications and code requirements will provide the confidence that the Nuclear Power Plants are constructed in such a manner as to protect the health and safety of the public.

Additionally, if nonconformances such as those disclosed on this task exist, corrective action can be taken prior to such time as detrimental effects could result, and with minimal delays in construction.

The cost analysis shows that if the NRC were to pursue the program with its own task force, increased staffing and a large capital expenditure for equipment would be required. In addition, the necessary development of an entire radiation safety program, test procedures and a calibration program would be a formidable task. The cost and effort involved to develop the above would not be justified for a short-term project.

If continued through the use of a contractor, the program will necessitate no capital expenditures or staff increases for the NRC. Safety and calibration programs have already developed and implemented. Basic test procedures have already been developed. Personnel and equipment are scheduled on an "on-call" basis.

Thus an effective program can be implemented at minimum cost to the NRC and with the flexibility required to fit the licensees' construction schedules.

Appendix A

PERSONNEL QUALIFICATIONS

UNITED STATES TESTING COMPANY, INC.

PROFESSIONAL RECORD

SHERIDAN, CHARLES A.

Quality Assurance Engineer

ACADEMIC TRAINING:

Cornell University - Industrial Relations Arbitration

Rutgers University - Grievance Handling

Rockland Community College - Management Skills, Supervisory Skills in Modern Management Administration of Human Resources.

ASME Courses in the requirements of Section III & XI

United States Testing Course - Non-Destructive Examination

EMPLOYMENT RECORD:

Dates	Company	Position
1972 - Present	United States Testing Co., Inc.	Quality Assurance Engineer
1969 - 1972	Phelps Dodge Cable and Wire	Quality Assurance Superintendent
1967 - 1969	Wilcox & Gibbs Company	Supervisor of Field Engineering
1964 - 1967	Wilcox & Gibbs Company	Technical Supervisor
1955 - 1964	Wilcox & Gibbs Company	Manufacturing Supervisor

PROFESSIONAL EXPERIENCE:

United States Testing Co., Inc.

Mr. Sheridan is directly responsible for the operation of United States Testing projects involving on-site testing and surveillance during construction, operations and plant outages. These projects include Indian Point Nuclear Units 1, 2 and 3, Millstone Unit 1, Midland Units 1 and 2, Zimmer Nuclear Unit, and James A. Fitzpatrick Nuclear Unit.

PROFESSIONAL EXPERIENCE:

United States Testing Co., Inc. (cont'd)

Duties also involve the project coordination of surveillance activities for the Cofrentes Nuclear project and audit-management of the Clinton Nuclear project.

Mr. Sheridan specializes in quality assurance system evaluation and fabrication engineering. His responsibilities include contractor quality control and assurance surveillance, evaluation of materials, welding and fabrication applications at vendor facilities and Nuclear Plant Construction Sites.

Phelps Dodge Cable and Wire

Manufacture of high voltage power cable. Mr. Sheridan's duties as Q. A. Superintendent included supervision and responsibility for material inspection, final testing, customers representatives and certified test reports.

Wilcox & Gibbs Company

Supervisor of field engineering, responsiblities included equipment design development and field testing of new and improved automatic machinery using mechanical hydraulic and electrical systems, trouble shooting and evaluation of customers' complaints.

Supervised scheduling, production, quality control, cost control of high value, close tolerance components. Responsible to Vice President of Manufacturing.

Supervised 45 men in manufacturing, heat treating, welding, brazing, hand finishing, tumbling, inspection, milling, turret lathe, drilling, precision grinding, assembly, punchpress, painting, tool making.

PROFESSIONAL AFFILIATION

Chamber of Commerce, Nyack, New York.

Industrial Management Club of Rockland County.

United States Testing Company, Inc.

DOCUMENT OF QUALIFICATION

(ANSI N45 - 2.6)

This is to certify that CHARLES A. SHERIDAN

has been and is qualified to perform inspection and testing services in the following areas: Mechanical Equipment and facility inspection including Nuclear Power Generation component fabrication and facility construction. ASME Section II, III, V, VIII, IX, & XI.

His capability in these areas is Level III

Basis for Certification:

Formal Education Various programs at Cornell University, Rutgers University, and Rockland Community College.

Related Training ASME training seminars in the requirements of Section XI (I.S.I.) and Section III (Nuclear Components) United States Testing Course in Non-Destructive Examination. Training program in structual fabrication, welding, ASME Code requirements, 10CFR50 App. B, Coast Guard Standards, NASA Specifications. ANSI N 45.2 requirements and NRC regulatory Guides.

Related Experience: 1972 - Present - United States Testing Co. Assigned as Project Coordinator to the Indian Point, Millstone, Pilgrim, & Fitzpatrick Nuclear Station projects. Responsible during modification, maintenance, and refueling for the interface between the Utility QA/QC personnel and the United States Testing personnel assigned to the site. Project coordinator on the Zimmer and Midland Nuclear Stations, responsible during construction for the liaison between the utility, and the United States Testing Co. Project Coordinator of the Cofrentes Project. Responsibilities include coordination of vendor surveillance assignments of all inspections, review of vendor procedures, purchase orders and specifications and the preparation of Inspection Point Programs. Responsible for quality assurance system evaluation and fabrication engineering. Responsibilities include contractor quality control and assurance surveillance, evaluation of materials, welding, and fabrication applications at vendor facilities and Nuclear Power Plant Construction Sites.

Date: Revised 1/19/77
Page 1 of 2

By: Edward Sheridan
Designated Representative
United States Testing Company, Inc.

United States Testing Company, Inc.

DOCUMENT OF QUALIFICATION

(ANSI N45 - 2.6)

This is to certify that CHARLES A. SHERIDAN

has been and is qualified to perform inspection and testing services in the following areas:

His capability in these areas is Level III

Basis for Certification:

Formal Education

Related Training

Related Experience (cont'd) Responsible for the development and implementation of inspection programs. 1969 - 1972 Phelps Dodge Cable and Wire Company. Quality Assurance Superintendent for manufacture of high voltage power cable, including supervision and responsibility for material inspection, final testing, customers representatives and certified test reports. 1955 - 1967 - Wilcox & Gibbs Company. Supervisor of field engineering, production and quality control, fabrication, heat treating, welding, etc.

Date: Revised 1/19/77

By: [signature]
Designated Representative
United States Testing Company, Inc.

Form USTF - TQ-1.4

United States Testing Company, Inc.

NONDESTRUCTIVE EXAMINATION DIVISION

430 Little Clinton Street, Reading, Pa. 19601 (215) 376-7434

NDE PERSONNEL CERTIFICATION RECORD

NAME Charles Sheridan ADDRESS Nyack, New York

EDUCATION

SCHOOL	LOCATION	DATES	CURRICULUM
Nyack High School	Nyack, N. Y.	1939-1943	Academic
Rockland Comm.Coll	Rockland County		Management
Cornell & Rutgers			Management

TECHNICAL TRAINING

CONDUCTED BY	LOCATION	DATES	METHODS
U.S. Testing Co.	Reading, Pa.	April 1973	NDE Methods
U.S. Testing Co.	Hoboken, N.J.	October 1975	Penetrant

EXPERIENCE

EMPLOYER	ADDRESS	DATES	METHODS
U.S. Testing Co.	Hoboken, N.J.	1972 to present	
Phelps Dodge Corp.	Yonkers, N.Y.	1969-1972	
Willcox & Gibbs	Nyack, N.Y.	1946-1969	

EXAMINATION RESULTS

METHOD	RADIOGRAPHY	ULTRASONIC	LIQUID PENETRANT	MAG. PARTICLE
GENERAL			93.3 x.3 = 27.9	
SPECIFIC			100 x.3 = 30.0	
PRACTICAL			100 x.4 = 40.0	
COMPOSITE			97.2	
EYE EXAM.			6/18/75	
APPROVED LEVEL			II	
DATE			10/20/75	
EXAMINER III			H. C. Plumstead	

UNITED STATES TESTING COMPANY, INC.

PROFESSIONAL RECORD

DREIBELBIS, JOSEPH W.

SNT-TC-1A, Level III, PT,RT,UT,MT

ACADEMIC TRAINING

Reading High School - Reading, Pa. 1965

Penn State University - Wyomissing, Pa. 1966

TECHNICAL TRAINING

United States Testing Co., Inc.
Radiation Safety, 40 hours - 1966

Krautkramer, Stratford, Conn.
Ultrasonic inspection and measuring
- 40 hours - 1970

ASNT sponsored Ultrasonic course,
Level I - 40 hours - 1971

Empire Steel Co. -
Level II - MT,PT, in accordance with
QCP-106 - 1970

Berks Vocational Technical School
Blue print and reading - 27 hours - 1971

ASNT sponsored Radiography course,
Level II - 40 hours - 1973

United States Testing Co., Inc. :

Radiation Safety, 16 hours - 1975

Level II MT,PT in accordance with
UST-TC-1A, Rev. 3 - 1975

UNITED STATES TESTING COMPANY, INC.

PROFESSIONAL EXPERIENCE

United States Testing Company, Inc.

July 1965 - April 1968

Operated as a qualified radigrapher using Ir192, Co60, portable X-ray units and 2.5 Mev Linear accelerator. The majority of activity associated with steel castings. Radiography including casting layout and establishing techniques.

Empire Steel Castings, Inc.

April 1968 - Sept. 1972

Operated as NDE Technician using radiography, magnetic particle, ultrasonic and liquid penetrant examinations on steel castings. Promoted January 1972 to NDE Supervisor. Responsibilities included:

1) Final interpretation of all specification work in RT,UT, MT and PT.
2) Adherence to applicable NDE codes and specifications.
3) Developed RT and UT techniques on castings.
4) Implemented UT testing procedures for flaw detection and thickness measurement on steel castings.
5) Initiated UT inspection and procedures in areas of plant for final inspection to assure minimum wall dimenstion and aid in design layout.

United States Testing Company, Inc.

Sept. 1972 - Sept. 1974

Responsibilities during this period included:

1) Radiographic inspection of pipe welds and various components at Eddystone and Martin's Creek Power Generating Stations.
2) Casting layout, establishing techniques and radiographic interpretation.

Sept. 1974 - March 1975

Responsibilities during this period included:

1) Functioned as Supervisor responsible for writing procedures and establishing techniques on NDE menthods used on inspection of fabricated welds for Omega Tower Transmission Station.

PROFESSIONAL EXPERIENCE (cont'd)

2) Developed various UT techniques on pipe welds, plate, castings.
3) Various field assignments in RT,MT,UT and PT in accordance with codes such as ASME, AWS, API, MIL-STD 271, etc.

March 1975 - Oct. 1976

Responsibilities during this period included:

1) Nondestructive examination supervisor with total responsibility for casting layout, establishing techniques, interpretation of results, defect mark-up and weld documentation for casting upgrading department.
2) Functioned as Radiation Operations Supervisor assisting in maintaining NRC rules and regulations and isotope safety training programs.

Oct 1976 to Present

Responsibilities during this period include:

Qualified by written examination in accordance with SNT-TC-1A to Level III certification and also designated as Radiation Protection Officer.

1) Practical and classroom training of personnel for qualification in RT,PT,MT and UT Level I, Level II per SNT-TC-1A guidelines.
2) Write NDE procedures and develope technqiues.
3) Insure compliance to customer Quality Assurance requirements including selection of test methods.
4) Insure NDE and casting upgrading is performed in accordance with U. S. Testing Co., Inc. Quality Assurance Manual.
5) Maintain equipment calibration.
6) Maintain all NRC rules and regulations.
7) Training of personnel in radiation safety per Company Procedures.

United States Testing Company, Inc.

NONDESTRUCTIVE EXAMINATION DIVISION

430 Little Clinton Street, Reading, Pa. 19601 (215) 376-7434

NDE PERSONNEL CERTIFICATION RECORD

NAME Dreibelbis, Joseph W. ADDRESS Shillington, Pa.

Certification Card #147

EDUCATION

SCHOOL	LOCATION	DATES	CURRICULUM
Reading High School	Reading, Pa.	1965	
Penn State Univ.	Reading, Pa.	1966	Electronics

TECHNICAL TRAINING

CONDUCTED BY	LOCATION	DATES	METHODS
ASNT sponsored	Reading, Pa.	40 hrs. 1973	Lvl II, Radiograph
ASNT sponsored	Reading, Pa.	30 hr. 1971	Lvl I, Ultrasonics
Krautkramer	Conn.	40 hr. 1970	Ultrasonics
U.S.Testing Co.	Reading, Pa.	16 hr. 1975	Radiation Safety

EXPERIENCE

EMPLOYER	ADDRESS	DATES	METHODS
U.S.Testing Co.,Inc.	Reading, Pa.	9/72 to present	RT-MT-UT-PT
Empire Stl Casting	Reading, Pa.	4/68 thru 9/72	RT-MT-UT-PT
U.S.Testing Co.,Inc.	Reading, Pa.	7/66 thru 4/68	Radiography

EXAMINATION RESULTS

METHOD	RADIOGRAPHY	ULTRASONIC	LIQUID PENETRANT	MAG. PARTICLE
GENERAL	84.5x.3=25.4	96 x.3=28.8	93 x.3= 27.9	94 x.3=28.2
SPECIFIC	100 x.3=30	100x.3=30	86.5x.3= 26	84 x.3=25.2
PRACTICAL	100 x.4=40	100x.4=40	95 x.4= 38	98 x.4=39.2
COMPOSITE	95.4%	98.8%	91.9%	92.6%
EYE EXAM.	1-03-73	1-03-73	1-03-73	1-03-73
APPROVED LEVEL	III	III	III	III
DATE	10-26-76	10-27-76	10-23-76	10-20-76
EXAMINER III	J.B. Dumstead	J.B. Dumstead	J.B. Dumstead	J.B. Dumstead

UNITED STATES TESTING COMPANY, INC.

PROFESSIONAL RECORD

SHAUB, PETER G.

Nondestructive Examination Technician

ACADEMIC TRAINING

Reading High School - Reading, Pa. 1971

Reading Area Community College - Reading, Pa. 1973

Liberal Arts - Associate Degree (two-year course)

TECHNICAL TRAINING

Reading-Muhlenberg VO-TECH - Design & Drafting 1971

United States Testing Co., Inc.:

Radiation Safety, 16 hours - 1973

Radiography Level I, 30 hours - 1974. In accordance with UST-TC-1A, Rev. 3.

Radiation Safety, 16 hours - 1975

Radiography Level II, 40 hours - 1975. In accordance with UST-TC-1A, Rev. 3.

Magnetic Particle, Level II, 20 hours - 1975. In accordance with UST-TC-1A, Rev. 3.

Liquid Penetrant, Level II, 12 hours - 1977. In accordance with UST-TC-1A, Rev. 5.

PROFESSIONAL EXPERIENCE

United States Testing Company, Inc.

July 1973 - December 1973

Operated a qualified radiographer using iridium 192, Co60, beryllium window x-ray machine, 300 Kv x-ray machine and 2.5 mev. linear accelerator. The majority of activity was associated with casting radiography.

PROFESSIONAL EXPERIENCE (cont'd)

United States Testing Company, Inc.

December 1973 - August 1974

Functioned as a working supervisor responsible for maintaining a quality control system of electronic components through the use of radiography, an AQL of 0.3 was maintained during the duration of the contract.

August 1974 - September 1975

Functioned as a crew leader on various field site jobs. Field experience includes Martin's Creek Generating Station, Eddy Stone Generating Station, and nuclear components.

September 1975 - April 1976

Operated as a Level II site supervisor for pipe line assignment located in Fishkill, New York. Responsible for radiographic and magnetic particle examination.

April 1976 - June 1977

Operated as a Level II radiographer. Activity consisted of field work and in-house casting radiography including layout and establishing techniques; also performing vendor surveillance. Appointed to the position of radiation operating supervisor in June 1976.

June 1977 - September 1977

Operated as Level II site supervisor assigned to Power Authority of the State of New York and responsible for final acceptance of radiograph. Radiographic and magnetic particle examination performed on newly constructed reboiler system and various in-service components.

September 1977 to Present

Operating as Level II in radiography, magnetic particle and liquid penetrant examination on various assignments in accordance with ASME, AWOS, API, and military codes.

Duties include:

1) Writing NDE procedures and developing techniques.

2) Assisting in maintaining equipment calibration and compliance to customer quality assurance requirements.

3) Performing vendor surveillance for various customers which includes third party evaluation of radiograph.

United States Testing Company, Inc.

NONDESTRUCTIVE EXAMINATION DIVISION

430 Little Clinton Street, Reading, Pa. 19601 (215) 376-7434

NDE PERSONNEL CERTIFICATION RECORD

NAME Shaub, Peter G. ADDRESS Reading, Pa.

EDUCATION

SCHOOL	LOCATION	DATES	CURRICULUM
Reading High School	Reading, PA	1971	College Prep.
Rdg Area Comm. Coll.	Reading, Pa.	9/71 thru 6/73	Assoc. Degree
			Liberal Arts

TECHNICAL TRAINING

CONDUCTED BY	LOCATION	DATES	METHODS
U.S.Testing Co.	Reading, Pa.	October 1973	16 hrs. Radiation
			Safety
U.S.Testing Co.	Reading, Pa.	March 1974	RT-Level-I-30 hrs
U.S.Testing Co.	Reading, Pa.	April 1975	16 hrs. Radiation
U.S.Testing Co.	Reading, Pa.	20 hrs MT, 1975	Safety

EXPERIENCE

EMPLOYER	ADDRESS	DATES	METHODS
U.S.Testing Co.	Reading, PA	12/75 to present	RT-II,MT-II
U.S.Testing Co.	Reading, PA	3/74-12/75	RT-I, MT-II
U.S.Testing Co.	Reading, PA	7/73-3/74	Asst.Technician

EXAMINATION RESULTS

METHOD	RADIOGRAPHY	ULTRASONIC	LIQUID PENETRANT	MAG. PARTICLE
GENERAL	91 x.3=27.3		86.7x.3=26.0	84.x.3 =25.3
SPECIFIC	88 x.3=26.4		89.5x.3=26.9	95 x.3 =38.5
PRACTICAL	93 x.4=37.2		90.9x.4=38.0	90 x.4 =36.0
COMPOSITE	90.9%		90.9%	89.5%
EYE EXAM.	01-16-78		01-16-78	01=16-78
APPROVED LEVEL	II		II	II
DATE	12-8-75		2-2-78	5-02-75
EXAMINER III				

UNITED STATES TESTING COMPANY, INC.

PROFESSIONAL RECORD

SIGGINS, AARON

Nondestructive Examination Technician
Level II, RT,UT,MT,PT

ACADEMIC TRAINING

Oley Valley High School	- 1975
Kutztown State College, Kutztown,Pa.	- 1976

TECHNICAL TRAINING

United States Testing Co., Inc.

Radiation Safety, 16 hours	- 1976
Radiography Level I in accordance with UST-TC-1A, Rev. 5	- 1976
Radiography Level II, in accordance with UST-TC-1A, Rev. 5	- 1977
Liquid penetrant and magnetic particle examination in accordance with UST-TC-1A, Rev. 5	- 1977
Ultrasonic examination in accordance with UST-TC-1A, Rev. 5	- 1977

PROFESSIONAL EXPERIENCE

United States Testing Co., Inc.

September 1976 - Present

Functioned as a qualified technician in radiography, ultrasonics, magnetic particle and liquid penetrant examination. Thoroughly familiar with operation and establishing techniques using radioactive isotopes, low energy xray machines and 2.5 Mev linear accelerator.

UNITED STATES TESTING COMPANY, INC.

PROFESSIONAL EXPERIENCE

United States Testing Co., Inc.

September 1976 - Present

Functioned in the capacity of Lead Technician on various field assignments using RT,MT,PT and UT examination methods.

Operated as a Level II Ultrasonic Technician under contract with Kaiser Engineering at Perry Nuclear Power Plant. Testing performed on imbedded plate located in reactor housing wall in accordance with ASME Sect. III.

In addition conducted classroom instruction on ultrasonics to on-site personnel from Kaiser, Gilbert's, CEI and Newport News.

Conducted classroom practical demonstration on RT,UT,MT and PT for DCAS Representatives taking NDE training course.

United States Testing Company, Inc.

NONDESTRUCTIVE EXAMINATION DIVISION

430 Little Clinton Street, Reading, Pa. 19601 (215) 376-7434

NDE PERSONNEL CERTIFICATION RECORD

NAME Aaron Siggins ADDRESS Fleetwood, Pa.

EDUCATION

SCHOOL	LOCATION	DATES	CURRICULUM
Oley Valley High	Oley, Pa.	1975	Academic
Kutztown St. Coll.	Kutztown, Pa.	1976	1 yr (math)

TECHNICAL TRAINING

CONDUCTED BY	LOCATION	DATES	METHODS
U.S.Testing Co.,Inc.	Reading, Pa.	Sept. 1976	Radiation Safety
			16 hours
U.S.Testing Co.,Inc.	Reading, Pa.	Sept. 1976	
		Feb. 1977	UT,MT,PT,RT

EXPERIENCE

EMPLOYER	ADDRESS	DATES	METHODS
U.S.Testing Co., Inc.	Reading, Pa.	9/76 to present	Level II
			UT,MT,PT,RT

EXAMINATION RESULTS

METHOD	RADIOGRAPHY	ULTRASONIC	LIQUID PENETRANT	MAG. PARTICLE
GENERAL	90x.3= 27.0	85x.3= 25.5	100x.3= 30.0	78.4x.3=23.5
SPECIFIC	88x.3= 26.4	100x.3=30.0	100x.3= 30.0	92.3x.3=27.6
PRACTICAL	90x.4= 36.0	95x.4 =38.0	99x.4= 39.6	95 x.4=38.0
COMPOSITE	89.4%	93.5%	99.6%	89.1%
EYE EXAM.	01/16/78	01/16/78	01/16/78	01/16/78
APPROVED LEVEL	2W	II	II	II
DATE	6-18-77	10-19-77	8-18-77	8-19-77
EXAMINER III	Joseph W. Dreibelbis	Joseph W. Dreibelbis	Joseph W. Dreibelbis	Joseph W. Dreibelbis

Appendix B

RADIOGRAPHIC PROCEDURE AND ATTACHMENTS

U. S. TESTING CO.

READING, PA. 19606

Procedure for Radiographic Examination

PROCEDURE NO.	REVISION	Page
UST-RT-2	-	1 of 17

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DA
R. P. Indap			3-2-77

U. S. TESTING CO. Procedure for Radiographic Examination	PROCEDURE NO. UST-RT-2

RECORD OF REVISIONS

REV.	PREPARED BY	APPROVED BY & EFFECTIVE DATE	DESCRIPTION OF REVISION
1	J.Dreibelbis	L. E. Moll	7.2 Update to latest addenda
1	J.Dreibelbis	L. E. Moll	10.1 Revise fig. 1,2,3
1	J.Dreibelbis	L. E. Moll	12.5.1 Update to latest addenda

1.0 Scope

1.1 This procedure will be used when radiographic examination is to be performed in accordance with ASME Code, Section V, article 2.

2.0 Safety Requirements

2.1 Each person operating radiographic equipment shall comply with the Company procedures and applicable safety codes to insure adequate protection from radiation hazard.

3.0 Personnel Qualification

3.1 Radiographic personnel shall be qualified and certified in accordance with the latest revision of UST-TC-1A, "Personnel Qualification Procedures for Certification in Nondestructive Testing Methods".

3.2 UST-TC-1A is in complience with the guidelines provided in following documents. American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A (1975 addition). MIL-STD 271E (ships) "Nondestructive Testing Requirements for Metals".

4.0 Surface Preparations

4.1 Materials - Surfaces shall satisfy the requirements of the applicable materials specifications, with additional conditioning, if necessary, by any suitable process to a degree that surface irregularities cannot mask or be confused with discontinuities.

4.2 Welds - The weld ripples or weld surface irregularities on both the inside (where accessible) and outside, shall be removed by any suitable process to such a degree that the resulting radiographic image due to any irregularities cannot mask or be confused with the image of any discontinuity.

4.3 Surface Finish - The finished surface of all butt-welded joints may be flush with the base material or may have reasonably uniform crowns, with reinforcement not to exceed that specified in the referencing Code Section.

5.0 Type of Films

5.1 Radiographs shall be made using industrial radiography film type 1 or 2. A particular choice of film (from type 1 or 2) will depend upon radiographic quality level and maximum economically permissable exposure time.

6.0 Processing of Films

6.1 Films will be processed either by manual processing or automatic processor. All radiographs shall be free from mechanical, chemical or other blemishes to the extent that they cannot mask or be confused with the image of any discontinuity in the object being radiographed.

7.0 Density Limitations of Radiographs

7.1 The transmitted film density through the radiographic image of the body of the appropriate penetrameter and the area of interest shall be 1.8 minimum for single film viewing for radiographs made with an X-ray source and 2.0 minimum for radiographs made with a gamma-ray source. For composite viewing of double film exposures, the minimum density shall be 2.6. Each radiograph of a composite set shall have a minimum density of 1.3. The maximum density shall be 4.0 for either single or composite viewing.

7.2 Densitometers shall be used for assuring complience with film density requirements and step wedge calibration films traceable to a national standard shall be used for checking densitometer calibration. A tolerance of .05 in density is allowed for variations between different density readings.

8.0 Intensifying Screens

8.1 Lead foil screens should be used for energies exceeding 125 KV. The screens should have a minimum of 0.005 inch thickness and a maximum of 0.020 inch thickness. Lead screens should be free of scratches, wrinkles, pits and oxide coating which may interfere with good radiographic resolution.

8.2 Fluorescent screens shall not be used.

9.0 Back Scattered Radiation

9.1 Effects of back-scattered radiation can be reduced by confining the radiation beam to the smallest practical cross section and by using lead screens.

9.2 As a check on back-scattered radiation, a lead symbol "B", preferably with minimum dimensions of 1/2 inch in height and 1/16 inch in thickness, shall be attached to the back of each film holder. If the image of the "B" appears on the radiograph, protection from back-scatter is insufficient and the radiograph should be considered unacceptable. Additional precaustions should be taken to eliminate the problem.

10.0 Selection of Energy of Radiation

10.1 Fig. 1, 2 & 3 provide guidelines on maximum voltage which should be used in the radiography steel, copper and aluminum.

10.2 Minimum thickness for which radioactive isotopes may be used are given in Table 1.

10.3 When it not practical to perform radiography within voltage ranges specified in 10.1 or when a radioactive isotope source is to be used to radiograph thicknesses less than minimum indicated in 10.2 or when isotopes other than Iridium or Cobalt are to be used, a special technique shall be prepared and proved satisfactory by actual demonstration of penetrameter resolution on minimum thickness of the material to be radiographed.

10.4 The maximum thickness for use of radioactive isotopes is primarily dictated by exposure time, and upper limits are consequently not specified.

11.0 Geometrical Unsharpness Limitations

11.1 Geometric unsharpness of the radiograph shall not exceed the following:

Material thickness, in.	Geometrical unsharpness, in.
Under 2	0.020
2 through 3	0.030
Over 3 through 4	0.040
Greater than 4	0.070

12.0 Selection and Use of Penetrameters

12.1 Penetrameters described in Fig. 4 shall be used. They shall be manufactured in accordance with the requirements of SE-142 (ASME Code Section V).

12.2 Thickness of penetrameters - Penetrameters as designated in Table 2 or 3 as applicalbe shall be used for indicated thickness range. For any material thickness range, a thinner penetrameter than listed for that range may be used, provided all other requirements for radiography are met. For welds, the thickness on which the penetrameter is based is the single-wall thickness plus any reinforcement. Backing rings or strips are not to be considered as part of the weld or reinforcement thickness in penetrameter selection.

12.3 Penetrameter sensitivity - Radiography shall be performed within a technique of sufficient sensitivity to display the penetrameter image and the specified hole, which are essential indications of the image quality of the radiographs.

12.4 Placement of penetrameters - The penetrameter shall be placed adjacent to the weld seam except in instances where the weld metal is not radiographically similar to the base material or the geometric configuration makes it impractical in which case, the penetrameter may be placed over the weld metal. Where inaccessibility prevents hand placing the penetrameter on the source side, a film side penetrameter shall be placed on the film side of the joint, and a letter "F" at least as high as the identification number shall be placed adjacent to the penetrameter. When configuration or size prevents placing the penetrameter on the object being radiographed, it may be placed on a separate block, provided the block is of radiographically similar material, the same thickness as the object and is placed as close as possible to the object being radiographed.

12.5 Number of Penetrameters

12.5.1 Except as provided in 12.5.2 and 12.5.3 one penetrameter shall be used for each radiograph. Each penetrameter shall represent an area of essentially uniform radiographic density as judged by a densitometer. If the density of the radiograph anywhere through the area of interest varies by more than minus 15% or plus 30%, from the density through to the penetrameter, then an additional penetrameter shall be used for each exceptional area or areas and the radiograph re-taken. The required densities are stated in 7.1. Calculations may be rounded off to the nearest o.1 of the requirements of 7.0.

12.5.2 If more than one penetrameter is used, one shall be in the lightest area of the radiograph and the other in the darkest. The density in the areas of interest controlled by each penetrameter shall meet the requirements of 12.5.1. The intervening densities on the radiograph are acceptable. The additional penetrameter need not be normal to the radiation source.

12.5.3 Where more than one film is used for an exposure, a penetrameter image shall appear on each radiograph except where the source is placed on the axis of the object and a complete circumference radiographed with a single expsoure (panoramic exposure) in which case at least three equally spaced penetrameters shall be used. Where portions of longitudinal welds adjoining the circumferential weld are being examined simultaneously with the circumferential weld, additional penetrameters shall be placed on the longitudinal welds at the ends of the sections of those welds being radiographed. When an array of objects in a circle is radiographed, at least one penetrameter shall show on each object image.

12.5.4 If the penetrameter image does not show on one radiograph in double-film technique but does show in composite viewing, interpretation shall be done by double-film viewing.

12.6 Shims Under Penetrameters- If the weld reinforcement and/or backing strip are not removed, a shim of material radiographically similar to the weld metal shall be placed under the penetrameter. The shim thickness shall be selected so the total thickness being radiographed under the penetrameter is essentially the same as the total weld thickness plus backing strip, if used and not removed, and other thickness variations such as in nozzle geometrics.

13.0 Techniques for radiography of parts, components and butt welds in tubular products, nozzles, valves, flanges and similarly shaped cylindrical objects.

13.1 Single Wall Viewing - Radiographic examination of circumferencial butt welds shall be done with single-wall viewing only except as permitted in 13.2. The radiation may pass through one or both walls. Where the source is located outside the cylinder, a minimum of four exposures separated by 90° shall be required for single-wall viewing. When the radiation must pass through two walls of a cylinder, the penetrameter given in Table 3 may be used.

13.2 Double-Wall Viewing - Welds joining items with an outside diameter of 3½ in. or less may be radiographed using a technique in which radiation passes through two walls, and the weld in both walls is viewed for acceptance on the same film. The penetrameter shall be placed on the source side. The radiation beam may be offset from the

13.2 plane of the welds centerline at an angle sufficient to separate the images of the source-side and film-side portions of the weld so there is no overlap of the areas to be interpreted, in which case a minimum of two exposures taken at 90° to each other shall be made for each weld joint. As an alternate, the weld may be radiographed with the radiation beam positioned so the images of both walls are superimposed, in which case at least three exposures shall be made at 60° to each other. Penetrameters may be selected from Table 3.

13.3 Film Side Penetrameter - If the radiation passes through one wall and inaccessibility prevents source-side placement of the penetrameter, a film-side penetrameter may be used from Table 2. When the radiation must pass through two walls of a cylinder, the penetrameter given in Table 3 may be used.

14.0 Identification of Radiographs

14.1 System of identification. A system of radiograph identification shall be used to produce permanent identification on the radiograph. Identification shall include Company name, Company work order (which is traceable to customer's purchase order), component heat number and/or serial number, weld or weld seam or part number, date of radiograph. This identification will be included on the radiograph using imprint card flasher unit and/or white ink or lead numbers. In any case, this information shall not obscure the area of interest.

15.0 Location Markers

15.1 Lead location markers which are to appear as radiographic images on the film, shall be placed on the part - not on the film holder/cassette and their locations shall be marked on the surface of the part being radiographed or on a map in a manner permitting the area of interest on a radiograph to be accurately located on the part, and providing evidence on the radiograph that the required coverage on the region being examined has been obtained. The location markers shall be placed on the source-side of the section being radiographed. They may be placed on the film-side of the section if inaccessibility precludes placement on the source-side by hand.

16.0 Records and Documentation

16.1 Radiographer shall complete job radiation report form (Fig. 5) and radiographic technique form (Fig. 6). These forms will provide such information as radiographic specification, source type, source strength

16.1 or voltage, source size, material type and thickness, lead screen thickness, film size, film type, source to film distance, exposure time, description of set-up and shooting sketch if necessary. Radiographer interpretating radiograph shall fill out interpretation form (Fig. 7). Interpretation will be performed using acceptance criteria given in customer's specifications or the applicable attachment prepared by U. S. Testing Co. for that specification.

16.2 Customer will be given a complete set of radiographs, copy of completed radiographic technique form and interpretation report form and shooting sketch if necessary.

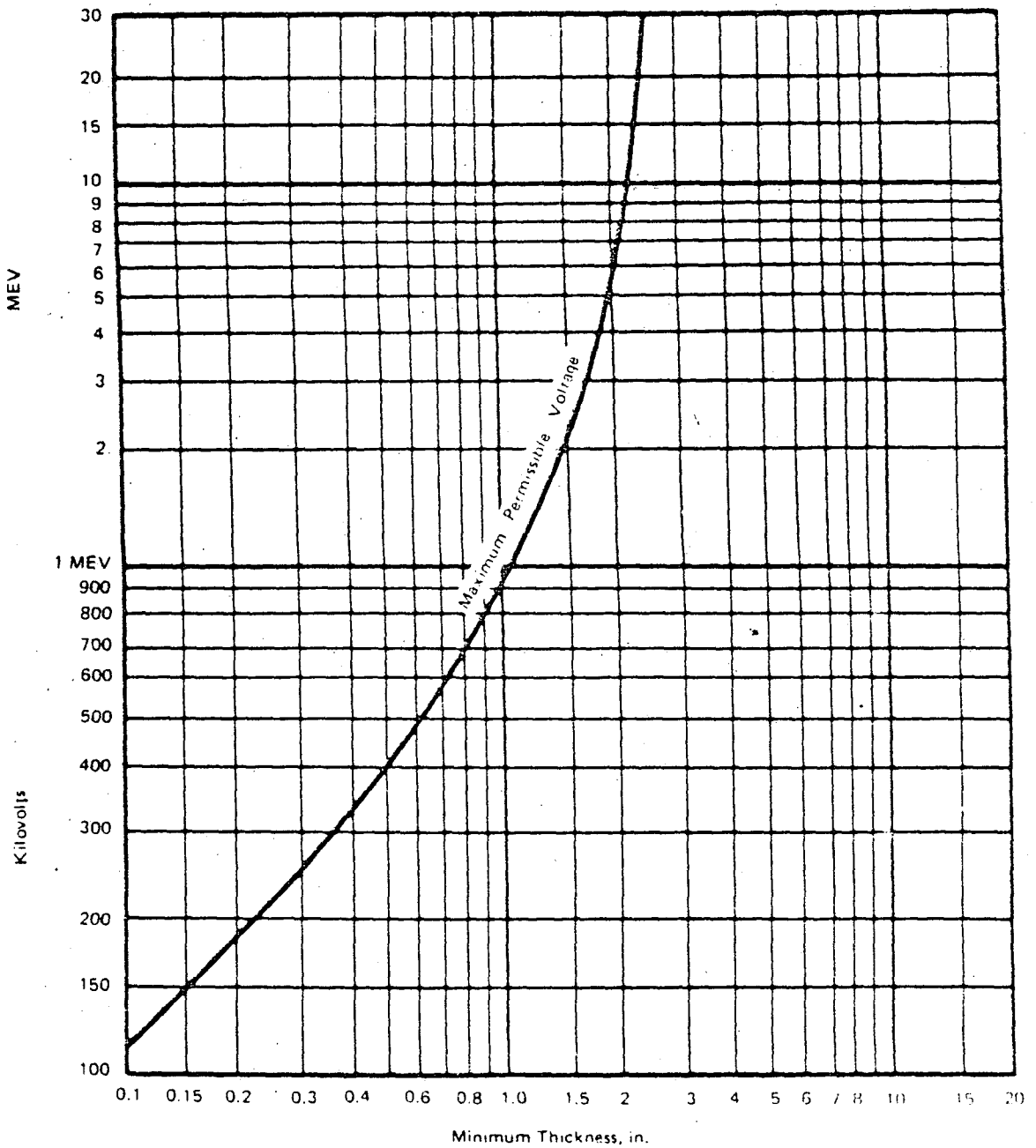


FIG. 1 MAXIMUM VOLTAGE FOR STEEL

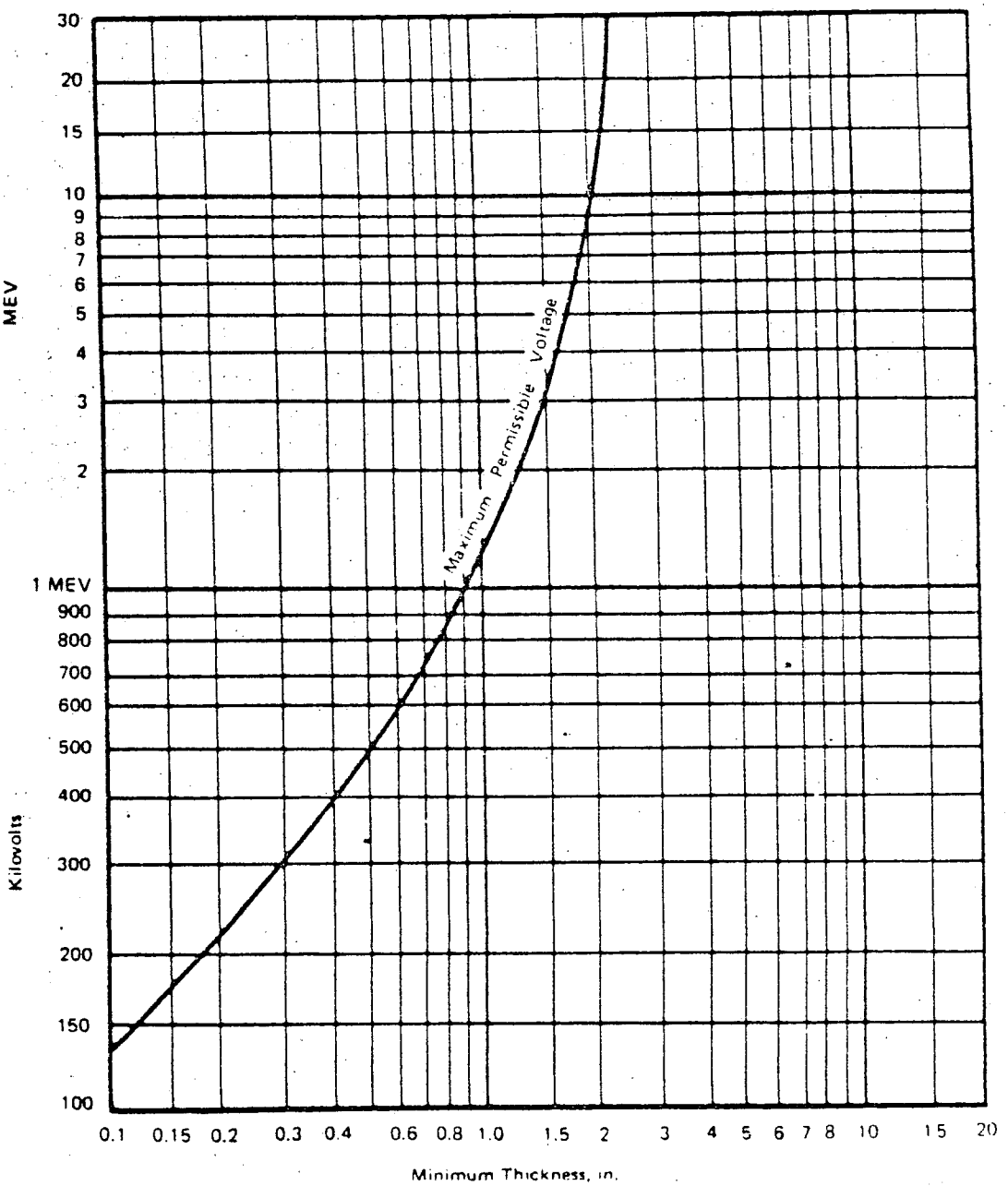


FIG. 2 MAXIMUM VOLTAGE FOR ALLOYS OF COPPER AND/OR HIGH NICKEL

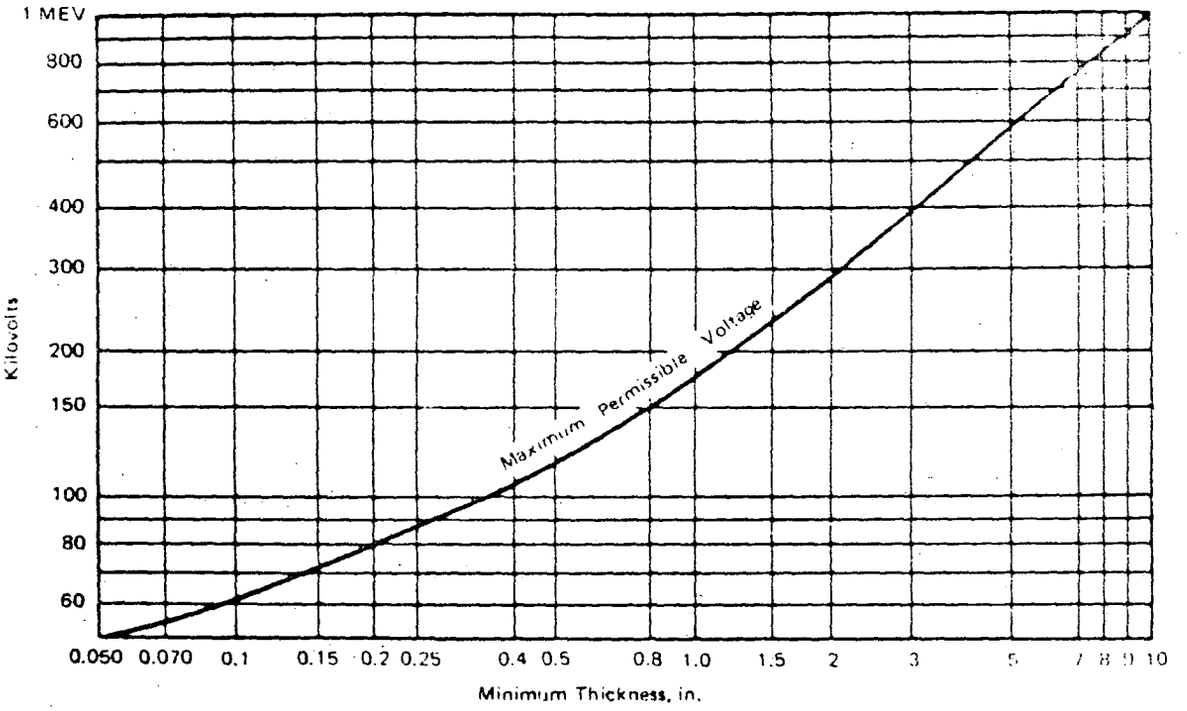
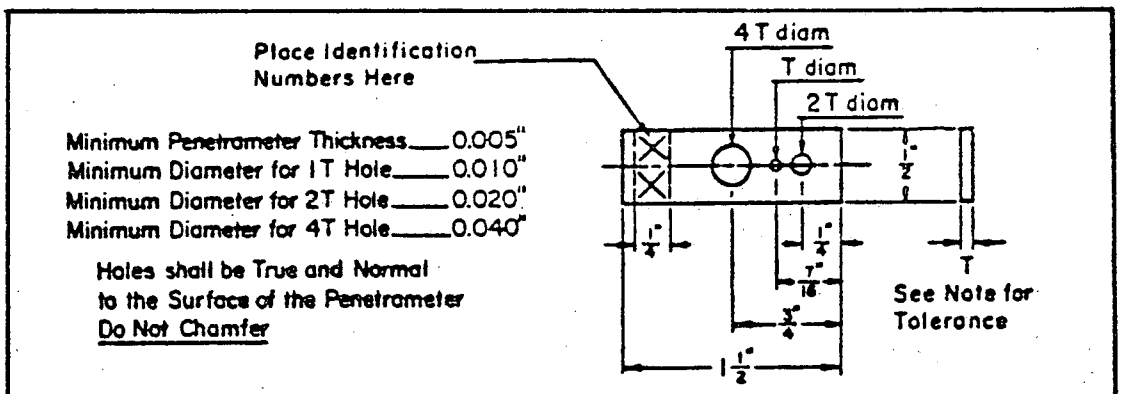


FIG 3 MAXIMUM VOLTAGE PERMITTED FOR ALUMINUM AND ALUMINUM ALLOYS

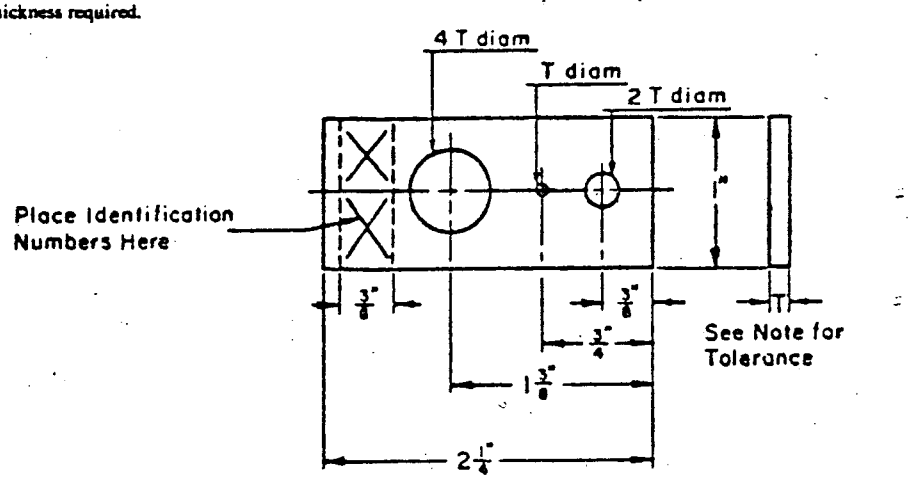
Table 1

Minimum Thickness for Radioactive Isotopes

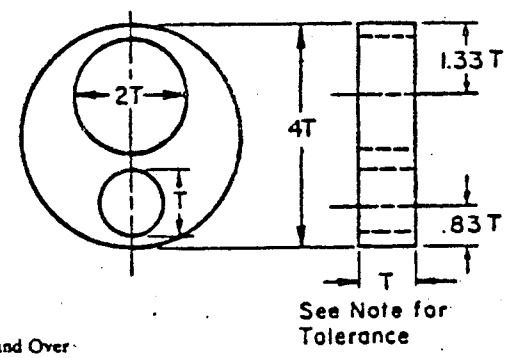
Material	Minimum Thickness	
	Iridium 192	Cobalt 60
Steel	0.75 in.	1.50 in.
Copper or High Nickel	0.65 in.	1.30 in.
Aluminum	2.50 in.	-



Design for Penetrameter Thickness from 0.005 in. and including 0.050 in.
From 0.005 in. through 0.012, in. see Table I
From 0.012 in. through 0.020 in. Made in 0.0025 in. Increments
From 0.020 in. through 0.050 in. Made in 0.005 in. increments
Penetrameter thicknesses between the increments indicated are permitted, provided they do not exceed the maximum thickness required.



Design for Penetrameter Thickness from 0.060 in. to and Including 0.160 in.
Made in 0.010 in. Increments.



Design for Penetrameter Thickness of 0.180 in. and Over
Made in 0.020 in. Increments

NOTE 1—Tolerances on penetrameter thickness and hole diameter shall be ±10 percent or one half of the thickness increment between penetrameter sizes, whichever is smaller.
NOTE 2—1 in. = 25.4 mm.

Fig 4 Penetrameter Design

Table 2

Material Thickness, penetrameter designations, and essential holes for single-wall radiographic technique

Nominal Single-Wall Material-Thickness Range, in.	Penetrameter			
	Source side		Film Side	
	Designation	Essential Hole	Designation	Essential Hole
Up to .25 incl.	10	4T	7	4T
Over .25 thru .375	12	4T	10	4T
Over .375 thru .50	15	4T	12	4T
Over .50 thru .625	15	4T	12	4T
Over .625 thru .75	17	4T	15	4T
Over .75 thru .875	20	4T	17	4T
Over .875 thru 1.00	20	4T	17	4T
Over 1.00 thru 1.25	25	4T	20	4T
Over 1.25 thru 1.50	30	2T	25	2T
Over 1.50 thru 2.00	35	2T	30	2T
Over 2.00 thru 2.50	40	2T	35	2T
Over 2.50 thru 3.00	45	2T	40	2T
Over 3.00 thru 4.00	50	2T	45	2T
Over 4.00 thru 6.00	60	2T	50	2T
Over 6.00 thru 8.00	80	2T	69	2T
Over 8.00 thru 10.00	100	2T	80	2T
Over 10.00 thru 12.00	120	2T	100	2T
Over 12.00 thru 16.00	160	2T	120	2T
Over 16.00 thru 20.00	200	2T	160	2T

Table 3

Material thickness, penetrameter designations, and essential holes for double-wall radiographic technique

Nominal Single-Wall Material Thickness Range in.	Film or Source Penetrameter	
	Designation	Essential Hole
0 thru 0.375	10	4T
Over 0.375 thru 0.625	12	4T
Over 0.625 thru 0.875	15	4T
Over 0.875 thru 1.00	17	4T
Over 1.00 thru 1.50	25	2T
Over 1.50 thru 2.50	30	2T
Over 2.50 thru 3.00	35	2T
Over 3.00 thru 4.00	40	2T
Over 4.00 thru 6.00	50	2T

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER

DATE

	CUSTOMER	27	SOURCE TYPE
	PURCHASE ORDER NO.	28	SOURCE SIZE
	DESCRIPTION OF SPECIMEN	29	QUALITY LEVEL
	DRAWING AND/OR PATTERN NO.	30	LEAD SCREEN THICKNESS
	SERIAL NO.	31	RADIOGRAPHIC SPEC.
	HEAT NO.	32	INTERPRETATION SPEC.
	TYPE OF MATERIAL	33	NUMBER OF FILMS
	FABRICATION PROCESS	34	NUMBER OF EXPOSURES ORIGINAL REX
		35	TYPE OF FILM USED
9	TIME FINISHED JOB:	36	SOURCE MODEL NO./SERIAL NO.
10	TIME STARTED ON JOB: -	37	SURVEY METER MODEL/SERIAL NO.
11	TIME SPENT ON JOB:	38	RADIATION LEVEL SOURCE BEFORE UNLOCKING ____ MR/HR
	ROUND TRIP TRAVEL TIME: +	39	AFTER LOCKING ____ MR/HR
	DELAY AND/OR STANDBY TIME: + ; EXPLAIN:		
14	TOTAL MAN/HOURS		
15	RADIOGRAPHER	40	ASST. RADIOGRAPHER
16	DOSIMETER NO.	41	DOSIMETER NO.
17	DOSIMETER READING	42	DOSIMETER READING
18	FILM BADGE NO.	43	FILM BADGE NO.

COMPLETE THE FOLLOWING FOR FIELD JOBS IN addition TO ABOVE:

19	CONTRACTOR PERSONNEL INFORMED OF TESTING: (SIGNATURE)
20	SURVEY METER READING AT BARRICADES:
21	BARRICADE EQUIPMENT USED:
22	ROUND TRIP MILEAGE:
23	LOCATION OF JOB:
24	REIMBERSABLE EXPENSES (EXPLAIN):
25	REMARKS:
26	REPORT FILED BY:

Fig. 5

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER

DATE

	CUSTOMER	I	SOURCE TYPE
	PURCHASE ORDER NO.	J	SOURCE SIZE
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS
E	SERIAL NO.	M	RADIOGRAPHIC SPEC.
F	HEAT NO.	N	INTERPRETATION SPEC.
G	TYPE OF MATERIAL	O	NUMBER OF FILMS
H	FABRICATION PROCESS	P	NUMBER OF EXPOSURES

	VIEWS	FILM SIZE	FILM TYPE	CURIE / VOLTAGE	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:

RADIOGRAPHERS	UST APPROVAL: DATE	CUSTOMER APPROVAL: DATE

Fig. 6

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER

DATE

	CUSTOMER	I	SOURCE TYPE
B	PURCHASE ORDER NO.	J	SOURCE SIZE
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS
E	SERIAL NO.	M	RADIOGRAPHIC SPEC.
F	HEAT NO.	N	INTERPRETATION SPEC.
G	TYPE OF MATERIAL	O	NUMBER OF FILMS
H	FABRICATION PROCESS	P	NUMBER OF EXPOSURES

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER:	UST REVIEWER: DATE	CUSTOMER REVIEWER: DATE
	Fig. 7 17	

INTERPRETATION REPORT

U. S. TESTING CO.

READING, PA. 19606

PROCEDURE NO.	REVISION	Page
UST-RT-2-NRC Attachment 1	0	_____ of _____

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DATE
Joseph W. Dreibelbis	C Sheridan	J. Dreibelbis UST-TC-1A Lev III	4/17/78

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-1

1.0 SCOPE

1.1 This attachment will be used in conjunction with the radiographic procedure UST-RT-2.

1.2 This attachment shall comply with the requirements of ASME Section III, 1971 edition, Summer 1973 addenda, sub-sections NB and NC requirements for Class 1 and Class 2 components and be in accordance with the requirements of IX-3300 Section III Appendix IX.

2.0 SELECTION OF PENETRAMETERS

2.1 Penetrameters shall be in accordance with ASTM E-142-64.

2.2 Except as permitted by UST-RT-2 Table 2 and Table 3, the images of the identifying numbers, the pentrameter outline and of the 2t hole are all essential indexes of image quality on the radiograph.

2.2.1 Penetrameters 5, 7, and 10 shall have a .010" X .25" slit which shall appear on the radiograph as the essential index of image quality.

3.0 RADIOGRAPHIC ACCEPTANCE STANDARDS

3.1 Evaluation of Indications

3.1.1 Welds that are shown by radiography to be any of the following types of discontinuities are unacceptable:

3.1.1.1 Any type of crack or zone of incomplete fusion or penetration.

3.1.1.2 Any other elongated indication which has a length greater than:

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Attachment NRC-1

3.0 Radiographic acceptance standards (continued)

1/4 inch for t up to 3/4 inch, inclusive.
1/3t for t from 3/4 inch to 2-1/4 inch inclusive.
3/4 inch for t over 2-1/4 inch.

where t is the thickness of the thinner portion of the weld.

3.1.1.3 Any group of indications in line that have aggregate length greater than t in a length of 12t except where the distance between the successive indication exceeds 6L where L is the longest indication in the group.

3.1.1.4 Porosity in excess of that shown as acceptable in ASME Section 3 Appendix VI.

U. S. TESTING CO.

READING, PA. 19606

PROCEDURE NO.	REVISION	Page
UST-RT-2-Nrc Attachment 2	0	_____ of _____

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DATE
Joseph W. Dreibelbis	C. Christian	J. Dreibelbis UST-TC-1A Lev III	4/17/78

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-2

1.0 SCOPE

1.1 This attachment will be used in conjunction with the radiographic procedure UST-RT-2.

1.2 This attachment shall comply with the requirements of ASME Section III, Sub-section NE, 1971 edition, Winter 1971 addenda and be in accordance with the requirements of Section VIII, Division 1, 1971 edition, Winter 1971 addends, paragraph UW-51.

2.0 SELECTION OF PENETRAMETERS

2.1 Penetrameters shall be as shown in figure 1.

2.2 The 5, 7 and 10 penetrameters shall have a slit with dimensions .010" X .25".

2.3 The 2t hole or the slit are essential indexes of image quality.

3.0 DENSITY REQUIREMENTS

3.1 Minimum film density shall be 1.3 single film and 2.0 composite viewing.

4.0 ACCEPTANCE STANDARDS

4.1 The following types of discontinuities are unaccpetable.

4.1.1 Any type of crack, or zone of incomplete fusion or penetration.

4.1.2 Any elongated slag inclusion which has length greater than

1/4 in. for t up to 3/4 in.
1/3t for t from 3/4 in. to 2-1/4 in.
3/4 in. for t over 2-1/4 in.
where t is the thickness of the weld.

4.1.3 Any group of slag inclusions in line that have an aggregate length greater than t in a length of 12t, except when the distance between the successive

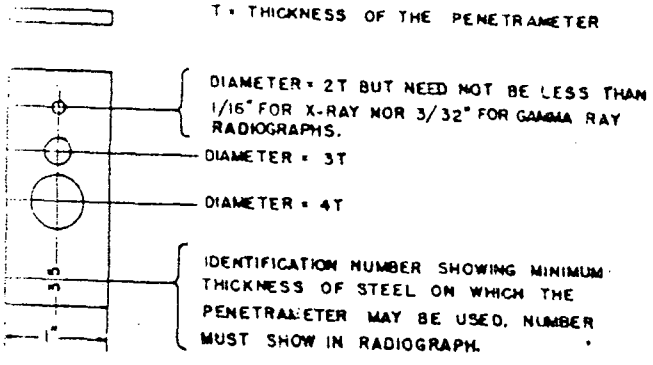
UNITED STATES TESTING COMPANY, INC.

Attachment NRC-2

4.0 Acceptance standards (continued)

imperfections exceeds 6L where L is the length of the longest imperfection in the group.

4.1.4 Porosity in excess of that specified by the acceptance standards given in Appendix IV.



PENETRAMETER FOR THICKNESSES EXCEEDING 2 1/2 IN.

PENETRAMETERS SHALL BE MADE OF CARBON STEEL.

FIGURE 1

U. S. TESTING CO.

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PROCEDURE NO.	REVISION	Page
UST-RT-2-NRC Attachment 3	0	_____ of _____

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DATE
Joseph W. Dreibelbis	C. Sheridan	J. Dreibelbis UST-TC-1A Level III	4/17/78

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-3

1.0 SCOPE

1.1 This attachment will be used in conjunction with the radiographic procedure UST-RT-2.

1.2 This attachment shall comply with the requirements of ASME Section III, Sub-section ND, 1974 edition, Appendix X and paragraphs ND 5321, ND 5322.

2.0 SELECTION OF PENETRAMETERS

2.1 Penetrameters shall be as shown in figure 1.

2.2 The 5, 7 and 10 penetrameters shall have a slit with dimensions .010" X .250".

2.3 The 2t hole or the slit are essential indexes of image quality.

3.0 ACCEPTANCE STANDARDS

3.1 100% radiographic requirement.

3.1.1 Welds that are shown by radiography to have any of the following types of discontinuities are unacceptable:

3.1.1.1 Any type of crack or zone of incomplete fusion or penetration.

3.1.1.2 Any other elongated indication which has a length greater than:

1/4 in. for t up to 3/4 in., inclusive.
1/3t for t from 3/4 in. to 2-1/4 in., inclusive.
3/4 in. for t over 2-1/4 in.
where t is the thickness of the thinner portion of the weld.

3.1.1.3 Any group of indications in line that have an aggregate length greater than t in a length of 12t except where the distance between the successive indication exceeds 6L where L is the longest indication in the group.

3.1.1.4 Porosity in excess of that shown as acceptable in Appendix VI.

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-3

3.0 Acceptance standards (continued)

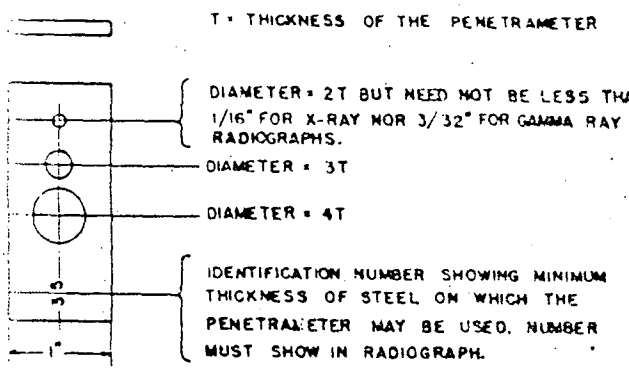
3.2 Spot radiographic requirement

The acceptability of welds examined by spot radiography shall be determined by (a), (b) and (c) below.

(a) Welds in which the radiograph shows any type of crack or zone of incomplete fusion or penetration shall be unacceptable.

(b) Welds in which the radiographs show slag inclusions or cavities shall be unacceptable if the length of any such imperfection is greater than 2/3T where T is the thickness of the thinner plate welded. If several imperfections within the above limitations exist in line, the welds shall be judged acceptable if the sum of the longest dimensions of all such imperfections is not more than T in a length of 6T or proportionately for radiographs shorter than 6T and if the longest imperfections considered are separated by at least 3L of acceptable weld metal, where L is the length of the longest imperfection. The maximum length of acceptable imperfections shorter than 1/4 in. shall be acceptable for any plate thickness.

(c) Porosity is not a factor in the acceptability of welds not required to be fully radiographed.



PENETRAMETER
FOR THICKNESSES
EXCEEDING 2 1/2 IN.

PENETRAMETERS SHALL BE MADE OF CARBON STEEL.

FIGURE 1

U. S. TESTING CO.

READING, PA. 19606

PROCEDURE NO.	REVISION	Page
UST-RT-2-NRC Attachment 4	0	_____ of _____

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DATE
Joseph W. Dreibelbis	[signature]	J. Dreibelbis MST TC IA Lev. III	4/17/78

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-4

1.0 SCOPE

1.1 This attachment will be used in conjunction with the radiographic procedure UST-RT-2.

1.2 This attachment shall comply with the requirements of ASME Section III, Sub-section NC, 1974 Edition, ASME Section V and paragraph NC 5300.

2.0 SELECTION OF PENETRAMETERS

2.1 Penetrameters shall be in accordance with ASTM E-142-64.

2.2 Except as permitted by UST-RT-2 Table 2 and Table 3, the images of the identifying numbers, the penetrameter outline and of the 2t hole are all essential indexes of image quality on the radiograph.

2.2.1 Penetrameter 5, 7 and 10 shall have a slit with dimensions .010" X .250" which shall appear on the radiograph as essential index of image quality.

3.0 ACCEPTANCE STANDARDS

3.1 Evaluation of Indications (100% Radiography)

Welds that are shown by radiography to have any of the following types of discontinuities are unacceptable:

3.1.1 Any type of crack or zone of incomplete fusion or penetration.

3.1.2 Any other elongated indication which has a length greater than:

1/4 in. for t up to 3/4 in., inclusive.
1/3t for t from 3/4 in., to 2-1/4 in., inclusive.
3/4 in. for t over 2-1/4 in. where t is the thickness of the thinner portion of of the weld.

3.1.3 Any group of indications in line that have an aggregate length greater than t in a length of 12t except where the distance between the successive indication exceeds 6L where L is the longest indication in the group.

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-4

3.0 Acceptance standards (continued)

3.1.4 Porosity in excess of that shown as acceptable in Appendix VI.

Appendix C

LIQUID PENETRANT PROCEDURE AND ATTACHMENTS

U. S. TESTING CO.

READING, PA. 19606

Procedure for Liquid Penetrant Examination

PROCEDURE NO.	REVISION	Page
UST-PT-3	0	1 of 12

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DA
R. P. Indap		J. Dreibelbis	8-15-77

U. S. TESTING CO. Procedure for Liquid Penetrant Examination	PROCEDURE NO. UST-PT-3

RECORD OF REVISIONS

REV.	PREPARED BY	APPROVED BY & EFFECTIVE DATE	DESCRIPTION OF REVISION

1.0 SCOPE

1.1 This procedure describes methods and techniques to be used to perform liquid penetrant examination on nonporous metallic materials (ferrous and nonferrous), nonmetallic materials (ceramics, plastics and glass).

1.2 The procedure covers color contrast (visible dye) and fluorescent penetrant methods of following types:

a) Water washable
b) Post-emulsifying
c) Solvent removable

1.3 The procedure permits to use any one of the methods from 1.2 to perform penetrant examination. The use of a particular method will be at the discretion of U. S. Testing, unless a specific method is defined on the applicable drawing or purchase order, or governing specification.

1.4 Following standards and documents form a part of this procedure:

a) ASME Boiler & Pressure Vessel Code Section I, III, V and VIII.
b) ASTM Standard E-165-65 Methods for Liquid Penetrant Inspection.
c) AWS D1.1
d) ANSI B31.1 & B31.3

2.0 PERSONNEL QUALIFICATIONS

2.1 Personnel performing penetrant examination shall be qualified and certified in accordance with the latest revision of UST-TC-1A, "Personnel Qualification Procedures for Certification in Nondestructive Testing Methods".

2.2 UST-TC-1A is in complience with the guidelines provided in the document SNT-TC-1A, published by American Society for Nondestructive Testing.

3.0 SURFACE PREPARATIONS

3.1 Customer shall be responsible for surface preparations other than basic cleaning.

3.0 Surface Preparations (continued)

3.2 In general, satisfactory results may be obtained when the surface is in the as-welded, as-rolled, as-cast, or as-forged condition but surface preparation by grinding or machining or other methods may be necessary in some instances where irregularities could otherwise mask indications of unacceptable discontinuities. Blasting with shot or dull sand may peen discontinuities at the surface and should not be used.

3.3 Prior to liquid penetrant examination, the surface to be examined and all adjacent areas within at least 1 inch shall be dry and free of any dirt, grease, lint, scale, welding flux, weld spatter, oil or other extraneous matter that could obscure surface openings or otherwise interefere with the examination.

3.4 After mechanical preparation is complete, each surface to be examined shall be dipped, sprayed, wiped or brushed with trichloro ethylene or unused or redistilled acetone.

3.5 All surfaces to be examined shall be dried using a clean, dry cloth or paper towel and the remaining solvent allowed to evaporate for a minimum period of five minutes before applying penetrant.

4.0 PENETRANT MATERIALS

4.1 The penetrant examination materials shall be certified in accordance with the requirements of ASTM D129-64 and ASTM D808-63. The residual amount of total sulfur or halogens shall not exceed one percent by weight.

4.2 Certifications shall make reference to the material identifications and batch number.

4.3 The components of a penetrant family shall not be intermixed with those of another manufacturer.

5.0 APPLICATION OF PENETRANT

5.1 Surface to be examined shall be completely coated with penetrant by spraying, brushing or immersion and kept wetted for the required penetration (dwell) time.

5.2 Penetration time will generally be as recommended in ASTM E-165 standard unless otherwise specified by drawing or purchase order. Suggested penetration time given in ASTM E-165 are reproduced in Table 1 & 2.

5.0 Application of Penetrant (continued)

5.3 The use of a fluorescent penetrant material following a visible dye (color contrast) penetrant examination is forbidden. This situation may arise when a retest is required due to repair or rework.

5.4 The ambient temperature will determine the temperature of penetrant materials and the test part which should not be less than 60° F nor exceed 125° F.

5.5 Localized heating or cooling of the specimen shall be permitted provided the temperature range noted above is maintained. Any commercial temperature indicator that will provide a control will be used.

5.6 When it is not practical to make liquid penetrant examination within the temperature range 60° F to 125° F, the examination procedure at the proposed temperature requires further qualification. This qualification shall be performed in accordance with the paragraph T-660, Article 6 of ASME Code, Section V.

6.0 REMOVAL OF PENETRANT

6.1 Water Washable Type - After adequate penetration time, remove the surface film of penetrant on the part by a water rinse. This rinsing must be complete and thorough so that the only penetrant remaining will be within discontinuities of the part. Water temperature should not exceed 110° F. For fluorescent penetrant, the rinsing should be done under black light to make it easier to see when all surface penetrant has been removed.

6.2 Post-Emulsifying Type - In the post-emulsifying type penetrant, there is an added step required before rinsing. Since the penetrant is not water washable as applied on the part, an emulsifier which combines with the surface penetrant and makes mixture water washable is applied.

6.2.1 Apply the emulsifier either by dipping the part into it or by flowing or spraying it on the part.

6.2.2 The length of time that the emulsifier is allowed to remain on the part is critical, particularly for detecting shallow scratch-like discontinuities. Emulsification period may vary from 10 seconds to 5 minutes depending upon the surface of the part and the type of discontinuities sought. The average time should be about 2 to 3 minutes.

6.0 Removal of Penetrant (continued)

6.2.3 Final rinsing should be done as described in Para. 6.1. If the part cannot be completely washed because of insufficient emulsification of the penetrant, it should be completely re-processed, with longer emulsification period.

6.3 Solvent Removable Type - After adequate penetration time, remove excess penetrant by wiping with a clean, dry cloth or absorbent paper. The remaining penetrant shall be removed using cloth or paper moistened with solvent. Care shall be taken not to use an excess of solvent. Flushing of the test surface with any substance is prohibited.

7.0 DRYING

7.1 Water Washable and Post-Emulsifying Fluorescent Type Penetrant System - During the preparation of parts for inspection, drying is necessary either following the application of wet developer or to dry the rinse water preceding the use of dry developers. Hot air used for drying should not exceed 200° F.

7.2 Water Washable and Post-Emulsifying Visible Dye Penetrant System - Parts are usually dried before application of the developer. Hot air used for drying should not exceed 200° F.

7.3 Solvent Removable Penetrant System - A period of five minutes shall be allowed for evaporation of solvents prior to development. Since the solvent evaporates rapidly, leaving a uniform film of developer on the surface, no additional drying step is necessary. However, a period of five minutes shall be allowed for evaporation of solvents prior to development.

8.0 DEVELOPING - After washing off the surface penetrant in the rinse operation, developer is applied to the part to blot back to the surface any penetrant that may have found discontinuities. This is a blotting action, and either a wet developer or a dry developer can be used. Use of a developer is not generally practiced when preparing ceramic parts for inspection.

8.0 Developing (continued)

8.1 Water Washable and Post-Emulsifying Fluorescent Penetrant System

8.1.1 Wet Developer

8.1.1.1 Wet developer is purchased as a dry powder which is then mixed with water to form a liquid suspension. Its concentration shall be maintained in accordance with manufacturer's instructions.

8.1.1.2 Parts shall be dipped or sprayed or brushed immediately after rinse operation and shall be dried as stated in para. 7.1. Excess wet developer mix should drain off the part, and part should be positioned to prevent pools of developer from forming.

8.1.2 Dry Developer

8.1.2.1 Apply dry developer after the rinsed part has been dried. Dry developing powder requires a dry surface before it is applied or it will mat heavily in the water remaining on the part. Excess powder may be knocked off by shaking or tapping the part gently. Developing time should be at least half the time allowed for penetration. However, excessively long developing time may cause the penetrant in large deep discontinuities to bleed back, making a broad smudgy indication.

8.2 Water Washable and Post-Emulsifying and Solvent Removable Visible Dye Penetrant System

8.2.1 After excess penetrant has been removed and parts have been thoroughly dried, spray a thin even coating of developer on the area being inspected. The developer is a liquid suspension of a powdered material which should be thoroughly agitated both before using and periodically during application. Spray application of the developer usually used provides a thin, even coating, precluding laps and runs. Brushing, swabbing or dipping may also be used.

8.0 Developing (continued)

8.2.2 After the developer has been applied and is drying, if the parts have an excessive pink hue, clean the parts thoroughly and repeat the entire penetration process.

9.0 EVALUATION OF INDICATIONS

9.1 Fluorescent Penetrant System - Evaluation shall be conducted in a darkened area using a "Black Light" lamp. The lamp shall emit ultraviolet radiation within 3300 to 3900 angstrom unit range and shall have a light intensity of at least 90 foot-candles at the surface to be examined. A five minute warm-up period shall be allowed prior to use of the lamp.

9.2 Visible Dye Penetrant System - Examination can be visually accomplished either in natural or artifical light. Sufficient time should be allowed for all discontinuities to be revealed. A good rule of thumb is that the developing time should not be less than minimum penetration time shown in Table 1 & 2.

10.0 ACCEPTANCE STANDARD - Acceptance standard shall be in accordance with applicable specification or purchase order. Few of the more widely used acceptance standards are given in following paragraphs.

10.1 Section III Class I Components, Castings and Forgings NB-2546

10.1.1 Only indications with major dimensions greater than 1/16 in. shall be considered relevant.

10.1.2 The following relevant indications are unacceptable:

a) Any linear indications greater than 1/16 in. long for materials less than 5/8 in. thick, greater than 1/8 in. long for materials from 5/8 in. thick to under 2 in. thick and 3/16 in. long for materials 2 in. thick and greater;

b) Rounded indications with dimensions greater than 1/8 in. for thicknesses less than 5/8 in. and greater than 3/16 in. for thicknesses 5/8 in. and greater.

10.0 Acceptance Standard (continued)

c) Four or more indications in a line separated by 1/16 in. or less edge to edge;

d) Ten or more indications in any 6 sq in. of area whose major dimension is no more than 6 in. with the dimensions taken in the most unfavorable location relative to the indications being evaluated.

10.2 Section III, Class 1 Components, Fabrication Welds, NB-5352

10.2.1 Unless otherwise specified in this Subsection, the following relevant indications are unacceptable.

a) Any cracks or linear indications;

b) Rounded indications with dimensions greater than 3/16 in.;

c) Four or more rounded indications in a line separated by 1/16 in. or less edge to edge;

d) Ten or more rounded indications in any 6 sq. in. of surface with the major dimension of this area not to exceed 6 in. with the area taken in the most unfavorable location relative to the indications being evaluated.

10.2.2 Indications with major dimensions greater than 1/16 in. shall be considered relevant.

11.0 RECORDS AND REPORTS

11.1 Results of liquid penetrant examination will be recorded on the form UST-PT-3-1(Fig. 1). This record shall include following information:

a) Brand name and specific type (number or letter designation if available) of penetrant, penetrant remover, emulsifier, and developer.

b) Method of pre-examination cleaning and drying, including cleaning materials used and time allowed for drying.

11.0 Records and Reports (continued)

c) Method of penetrant application; the length of time that the penetrant remains on the surface; and the temperature of the surface and penetrant during the examination if not within the 60 to 125° F range.

d) Method of removing excess penetrant from the surface and of drying the surface before applying the developer.

e) Method of applying the developer and length of developing time before examination.

Table 1 Classification of Liquid Penetrant Inspection Methods and Types

Method A - Fluorescent, Liquid Penetrant Inspection
Type 1- water washable Type 2-post-emulsifiable Type 3-solvent-removable
Method B - Visible, Liquid Penetrant Inspection
Type 1 - water-washable Type 2 - post-emulsifiable Type 3 - solvent-removable

Table 2 Recommended Dwell Time

aterial	Form	Type of Discontinuity	Dwell Times (in minutes) for Methods A-1,A-2,A-3, B-1,B-2,B-3a,b	
			Penetrant	Developer
luminum, magnesium, teel, brass and ronze, titanium and igh-temperature lloys	cast-castings and welds	cold shuts, porosity, lack of fusion, cracks (all forms)	5	7
	wrought-extrusions, forgings,plate	laps, cracks (all forms)	10	7
Carbide-tipped tools		lack of fusion, porosity,cracks	5	7
Plastic	all forms	cracks	5	7
Glass	all forms	cracks	5	7
eramic	all forms	cracks,porosity	5	7

a-For temperature range from 60 to 125° F (15 to 50° C)
b-All dwell times given are recommended minimums.
c-Maximum penetrant dwell time 60 min.
d-Development time begins directly after application of dry developer and as soon as wet developer coating has dried on surface of parts (recommended minimum).

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER _____

DATE _____

LIQUID PENETRANT EXAMINATION REPORT

1.	CUSTOMER	7.	PT PROCEDURE AND PT METHOD
2.	LOCATION	8.	PENETRANT - BRAND NAME & DESIGNATION
3.	PART IDENTIFICATION (HEAT NO. SERIAL NO., ETC.)	9.	PENETRANT REMOVAL - BRAND NAME & DESIGNATION
4.	MATERIAL SPECIFICATION	10.	EMULSIFIER - BRAND NAME & DESIGNATION
5.	PT SPECIFICATION	11.	DEVELOPER - BRAND NAME & DESIGNATION
6.	ACCEPTANCE CRITERIA		

PRECLEANING BY _____

METHOD OF PENETRANT APPLICATION & PENETRATION TIME _____

METHOD OF REMOVING PENETRANT _____

METHOD OF APPLYING DEVELOPER & DEVELOPING TIME _____

REA OF EXAMINATION	DESCRIPTION OF INDICATION	ACCEPT	REJECT	REMARKS

SKETCH (IF NECESSARY)

XAMINATION PERFORMED BY:	EVALUATION PERFORMED BY:	CUSTOMER WITNESS:
UST-TC-1A LEVEL	UST-TC-1A LEVEL	DATE _____

U. S. TESTING CO.

READING, PA. 19606

PROCEDURE NO.	REVISION	Page
UST-PT-3-NRC Attachment 1	0	_____ of _____

PREPARED BY	REVIEWED BY	APPROVED BY	EFFECTIVE DATE
C Sheridan	Joseph W. Dreibelbis	J. Dreibelbis UST-TC IA Lev III	4/17/78

UNITED STATES TESTING COMPANY, INC.

Attachment NRC-1

1.0 DRYING

Excess cleaning solvent shall be allowed to evaporate for a minimum of 5 minutes.

2.0 PENETRATION TIME

After application of penetrant a minimum of 10 minutes shall elapse prior to penetrant removal.

3.0 APPLICATION OF DEVELOPER

Shall be applied within 10 minutes after removal of excess penetrant.

4.0 EXAMINATION

Evaluation of indications shall be made after a minimum of 7 minutes and not more than 30 minutes after application of the developer.

5.0 ACCEPTANCE STANDARDS

The following types of relevant indications are not acceptable.

5.1 Any cracks and linear indications.

5.2 Rounded indications greater than 3/16 inch.

5.3 Four or more rounded indications in a line, separated by 1/16 or less edge to edge.

5.4 Ten or more rounded indications in any 6 sq. in. of area or surface. The minor dimension of this area shall be no less than one inch and the area selected shall be taken in the most unfavorable location relative to the indications being evaluated.

Appendix D

TECHNIQUE AND READER SHEETS

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

DATE 4/20/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO. NRC-05-78-309	J	SOURCE SIZE 1/2 x 3/32
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-68D-W001-02	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1 Sum.
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1977 1973 add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~OTHER~~	CURIE-MIN MILLIAMP-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	7X17	AA/AA	84	1680	20 min	2.6*	45**	185"	⊥
2	2-3									
3	3-4									
4	4-5									
5	5-6									
6	6-7									
7	7-8									
8	9-1									
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS: ** Panaramic Technique * design thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P. Shaub UST-TCIA Lev II	Joseph W. Dierbeck	4/20/78		

RADIOGRAPHIC TECHNIQUE UST-TCIA Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232 D1

DATE 4/20/78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.: NRC-05-78-304	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN:	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.:	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 1-680-W001-02	M	RADIOGRAPHIC SPEC.: UST-RT-2 at 1
F	HEAT NO.:	N	INTERPRETATION SPEC.: ASME III 1971 Sum 73 add
G	TYPE OF MATERIAL: SS	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~KVOLT-DT~~	CURIE-MIN / MILIAMP-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE / OFFSET
1	1-2	7x17	AA/AA	84		20 min	2.6*	45	19.5"	1
2	3-4	↓	↓	↓		↓	↓	↓	↓	↓
3	5-6									
4	7-8									
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS: Technique Qualification * 2.6 Design Thickness

RADIOGRAPHERS: P Shaub UST-TC1A Lev II

UST APPROVAL: Joseph W. Dreibelbis DATE 4/20/78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TC1A Lev II

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WORK ORDER NUMBER 20232

DATE 4/20/78

A	CUSTOMER NRC	I	SOURCE TYPE I_r^{192}
B	PURCHASE ORDER NO. NRC-05-78-304	J	SOURCE SIZE 1/8 x 3/32"
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-068D-W001-02	M	RADIOGRAPHIC SPEC. UST-RT-2aH1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III 1971 Summer
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	3.64-35	✓									Scratch(1 film)
2	2-3	3.3-3.9	✓									N.A.D
3	3-4	3.5-4.1	✓									N.A.D.
4	4-5	3.5-3.9	✓									N.A.D.
5	5-6	3.5-3.8	✓									Scratch(1 film)
6	6-7	3.6-4.1	✓									N.A.D.
7	7-8	3.4-3.8	✓									N.A.D.
8	8-1	3.5-3.6	✓									artificats(1 film)
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: P Shaub UST-TCIA LEVII

UST REVIEWER: Joseph W. Dreibelbis DATE 4/20/78
UST-TCIA LEVEL III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232 D2

DATE 4-18-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO. NRC-05-78-304	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-68F-W003-01	M	RADIOGRAPHIC SPEC. UST RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT. III 1977
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 8

	VIEWS	FILM SIZE	FILM TYPE	CURIE / VOLTAGE	CURIE-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	7x17	AA/AA	85Ci	1700	20min	2.6"**	45*	18.5"	1
2	2-3									
3	3-4									
4	4-5									
5	5-6									
6	6-7									
7	7-8									
8	8-1									
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:
* panoramic technique
** design thickness

RADIOGRAPHERS		USI APPROVAL	DATE	CUSTOMER APPROVAL	DATE
P. Shaub	UST-TC1A Lev II	J.W. Dreibelbis UST-TC1A Lev III	4-18-78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232 D2

DATE 4/19/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO. NRC-05-78-304	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-68F-W003-01	M	RADIOGRAPHIC SPEC. UST-RT2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sec III 1971, 1973 Sum Add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / VOLTAGE	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	7x17	AA/AA	85	1700	20min	2.6*	45	18.5"	⊥
2	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	5-6									
4	7-8									
5										
6										
7										
8										
9										
10										
11										
12										
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15										
16										
17										
18										
19										
20										
21										

REMARKS: Technique Qualification * Design Thickness.

RADIOGRAPHERS	UAT APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC 1A Lev II	J. Durbelli UST TC 1A Lev III	4/19/78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20,232 D2

DATE 4/18/78

A	CUSTOMER	NRC	I	SOURCE TYPE	Ir 192
B	PURCHASE ORDER NO.	NRC-05-78-304	J	SOURCE SIZE	1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN		K	QUALITY LEVEL	2-2T
D	DRAWING AND/OR PATTERN NO.		L	LEAD SCREEN THICKNESS	.010 / .010
E	SERIAL NO.	1-68F-W003-01	M	RADIOGRAPHIC SPEC	UST-RT-2a+ 1973 Sum Add.
F	HEAT NO.		N	INTERPRETATION SPEC.	ASME SEC III 1971
G	TYPE OF MATERIAL	SS	O	NUMBER OF FILMS	16
H	FABRICATION PROCESS	WELD	P	NUMBER OF EXPOSURES	1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.72-3.1	✓									N.A.D.
2	2-3	2.4-3.1	✓									artifacts, Acc.
3	3-4	2.8-3.2	✓									N.A.D.
4	4-5	2.7-3.2	✓									N.A.D.
5	5-6	2.6-3.0	✓									N.A.D.
6	6-7	2.2-2.9	✓									N.A.D.
7	7-8	2.6-3.1	✓									N.A.D.
8	8-1	2.2-3.0	✓		✓							Acc
9												
10												
11												
12												
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RADIOGRAPHER	UST REVIEWER	DATE	CUSTOMER REVIEWER	DATE
P Shaub UST TC/A Lev II	Joseph W. Dreibelbis UST-TC/A Lev III	4-18-78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D3

DATE 4-19-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO. NRC-05-78-304	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Weld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-068B-W003-02	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME III 1971 Ed. Sum. 1973 addd.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE ~~TC-IRS~~	CURIE-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	7x17	AA/AA	84 Ci	3360	40 min	2.32*	40**	15.5"	1
2	2-3									
3	3-4									
4	4-5									
5	5-6									
6	6-7									
7	7-8									
8	8-1									
9										
10										
11										
12										
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16										
17										
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19										
20										
21										

REMARKS:
*design thickness **panoramic technique

RADIOGRAPHERS		UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P. Shaub	UST-TC IA Lev. II	Joseph W. Durbelli	4-19-78		

RADIOGRAPHIC TECHNIQUE

UST-TC IA-Lev II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D3

DATE 4-19-78

A	CUSTOMER NRC	I	SOURCE TYPE I_{Y}^{192}
B	PURCHASE ORDER NO. NRC-05-78-304	J	SOURCE SIZE 1/8 x 3/32
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-068B-WC03-02	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1971 Sum. 73 Add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE/~~VOLTAGE~~	CURIE-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	7X17	AA/AA	84 Ci	3360	40 min	2.32*	40	55"	1
2	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	5-6	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	7-8	↓	↓	↓	↓	↓	↓	↓	↓	↓
5										
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20										
21										

REMARKS: Technique Qualification * design thickness

RADIOGRAPHERS	UST-TC1A Lev I	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub		Joseph W. Durbelli	4/19/78		

RADIOGRAPHIC TECHNIQUE

UST-TC1A-Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

NUMBER 20232

DATE 4-19-78

D3
D3

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO. NRC-05-78-304	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Weld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-068B-W003-02	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III 1971 Sum '73 Add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.0-2.8	✓									artifact ; film
2	2-3	1.9-2.9	✓									N.A.D.
3	3-4	1.9-2.8	✓			✓						Acc.
4	4-5	1.9-2.7	✓		✓							Acc.
5	5-6	2.0-2.7	✓									N.A.D.
6	6-7	1.9-2.9	✓									N.A.D.
7	7-8	1.8-2.8	✓									N.A.D.
8	8-1	1.9-2.6	✓									N.A.D.
9												
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11												
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14												
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16												
17												
18												
19												
20												
21												

RADIOGRAPHER	UST REVIEWER	DATE	CUSTOMER REVIEWER	DATE
P Shaub UST-TC1A Lev II	Joseph W. Dreibelbis UST-TC1A Lev III	4-19-78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY
NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

NUMBER 20454 D4

DATE 4/22/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 3/32" x 1/8"
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-074B-0055-14	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1971, S73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 8

	VIEWS	FILM SIZE	FILM TYPE	CURIE / [illegible]	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10"	M/M	94			.719	15F	7"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
6										
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REMARKS:

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC-1A Level II	Joseph W. Doubleday	4-25-78		

RADIOGRAPHIC TECHNIQUE

UST-TC-1A Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D4

DATE 4-22-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-074B-0055-14	M	RADIOGRAPHIC SPEC. UST RT-2 att. 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1971, S'73 addg
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 8

	VIEWS	DENSITY	ACCEPT	REJECT	GAS (POROSITY)	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.9	✓									Surf. artifact
2	2-3	2.6	✓									Surf.
3	3-4	2.9	✓			✓						Acc.
4	4-1	2.5	✓									N.A.D.
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P. Shoults UST-TC/A Level II	Joseph W. Dreibelbis	4/22/78		

UST-TC/A Level III

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

NUMBER 20232

DATE 4/22/78

D5

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN 10" Pipeweld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-063B-0091-06	M	RADIOGRAPHIC SPEC. UST-RT-2 at 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1971 S'73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 20
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 10

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ———	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	T/T	84	840	10 Min	1"	17F	11"	1
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	4-5	↓	↓	↓	↓	↓	↓	↓	↓	↓
5	5-1	↓	↓	↓	↓	↓		↓	↓	↓
6										
7										
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20										
21										

REMARKS:

RADIOGRAPHERS: P Shaub UST-TCIA Level II

UST APPROVAL: Joseph W. Dreibelbis DATE 4/22/78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TCIA Level II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D5

DATE 4/22/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN 10" Pipe Weld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-063B-D091-06	M	RADIOGRAPHIC SPEC. UST RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1971 S 73a
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 20
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 10

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	1.3+	✓									* N.A.D
2	2-3	1.3+	✓									* N.A.D.
3	3-4	1.3+	✓									* art. N.A.D
4	4-5	1.3+	✓									* N.A.D
5	5-1	1.3+	✓									* N.A.D.
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

* Double view where necessary

RADIOGRAPHER	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P. Shultz UST-TC/A Lev II	Joseph W. Dreibelbis UST-TC/A Lev II	4/22/78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D6

DATE 4-30-78

A	CUSTOMER	NRC	I	SOURCE TYPE	Ir^{192}
B	PURCHASE ORDER NO.		J	SOURCE SIZE	1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	Safety Injection	K	QUALITY LEVEL	2-2T
D	DRAWING AND/OR PATTERN NO.		L	LEAD SCREEN THICKNESS	.010/.010
E	SERIAL NO.	1-063B-D090-10	M	RADIOGRAPHIC SPEC.	UST-RT-2 att 1
F	HEAT NO.		N	INTERPRETATION SPEC.	ASME SECT III NB 1971, S73 add.
G	TYPE OF MATERIAL	S.S.	O	NUMBER OF FILMS	16
H	FABRICATION PROCESS	Weld	P	NUMBER OF EXPOSURES	8

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ———	CURIE-MIN MILLIAMP-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x17	T/T	75	525	9 min	*1.00	17	12"	⊥
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	4-1	↓	↓	↓	↓	↓	↓	↓	↓	↓
5										
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21										

REMARKS:

* Design Thickness

RADIOGRAPHERS: P Shaub UST-TC-1A Lev II

UST APPROVAL: Joseph W. Dreibelbis 4/30/78 DATE

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TC-1A Lev II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D6

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE I_r 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Safety Injection	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-063B-D090-10	M	RADIOGRAPHIC SPEC. UST RT-2 at #1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III NB1971 S73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 8

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEAR	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.6-3.0	✓									N.A.D.
2	2-3	2.6-3.6	✓									N.A.D.
3	3-4	2.9-3.7	✓									N.A.D.
4	4-1	2.6-3.6	✓									N.A.D.
5												
6												
7												
8												
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10												
11												
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RADIOGRAPHER: PShaub UST-TC IA Lev II

UST REVIEWER: Joseph W. Driebell DATE 4/30/78
UST-TC IA Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D7

DATE 4/22/78

A	CUSTOMER NRC	I	SOURCE TYPE I^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN 8" Weld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-087B-D040-08	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1971 S73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~KVP~~	CURIE-MIN. ~~MA-MIN.~~	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	T/T	84Ci	59.8	7min	.812	15F	9"	⊥
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	4-1	↓	↓	↓	↓	↓	↓	↓	↓	
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REMARKS:

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
PShaub UST-TC1A Level II	Joseph W. Dreibelbis	4/22/78		

RADIOGRAPHIC TECHNIQUE

UST-TC1A-Level II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D7

DATE 4/22/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO	J	SOURCE SIZE 1/8 x 3/32
C	DESCRIPTION OF SPECIMEN 8" pipe weld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO 1-087B-DC40-08	M	RADIOGRAPHIC SPEC UST-RT-2 att 1
F	HEAT NO	N	INTERPRETATION SPEC ASME Sect III 1971 S73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.2-2.5	✓									N.A.D.
2	2-3	2.7-3.0	✓									N.A.D.
3	3-4	2.7-3.2	✓		✓							Acc.
4	4-1	2.2-2.5	✓			✓						Acc.
5												
6												
7												
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RADIOGRAPHER	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub UST-TC/A Level II	Frederick W. Dreibelbis UST-TC/A Level III	4/22/78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D8

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE I_{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Safety Injection	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 10" Pipe weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-063B-D092-10	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECTION III N8 1971 S73
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 10
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 5

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	T/T	84			1.00*	17F	12"	0
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-5	↓	↓	↓			↓	↓	↓	↓
5	5-1	↓	↓	↓			↓	↓	↓	↓
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
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18										
19										
20										
21										

REMARKS: * Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
PS Shaub UST-TCIA Lev II	Joseph W. Lindell	4/25/78		

RADIOGRAPHIC TECHNIQUE

"UST-TCIA Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D8

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Safety Injection	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-063B-0092-10	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECTION III NB 1971 S73
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 10
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 5

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	1.9-2.8	✓									* N.A.D.
2	2-3	1.8-3.0	✓									* N.A.D.
3	3-4	1.9-2.8	✓									* N.A.D.
4	4-5	1.9-3.0	✓									* N.A.D.
5	5-1	1.8-3.0	✓									* N.A.D.
6												
7												
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21												

* Double view where necessary

RADIOGRAPHER: P Shaub UST-TC IA Lev II

UST REVIEWER: Joseph N. Dreibelbis DATE 4-25-78

CUSTOMER REVIEWER: DATE

UST-TC IA Lev II

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D9

DATE 4/22/79

A	CUSTOMER NRC	I	SOURCE TYPE I_r 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN 6" Pipe weld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-063B-0092-09	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III 1973 S71 addl
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN. ~~MILLIAMP-MIN~~	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	M/M	93	166	2 min	.719	15F	7"	1
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	4-1	↓	↓	↓	↓	↓	↓	↓	↓	↓
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REMARKS:

RADIOGRAPHERS:	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC/A Lev II	Joseph W. Dunkelberger	4/22/79		

RADIOGRAPHIC TECHNIQUE

UST-TC/A Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D9

DATE 4/22/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN 6" Pipeweld	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-0638-0092-09	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III 1971, S7 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	1.4-2.6	✓									* N.A.D.
2	2-3	1.5-2.6	✓									* N.A.D.
3	3-4	1.9-3.1	✓									* N.A.D.
4	4-1	2.0-2.4	✓									* N.A.D.
5												
6												
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21												

* Double view where necessary

RADIOGRAPHER	UST-TC/A Lev	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
PShaub	2	J. Driskell	4/22/78		

UST-TC/A Lev II

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D10

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN RHR	K	QUALITY LEVEL 2-4T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-074B-D054-10	M	RADIOGRAPHIC SPEC. UST RT 2 at 1
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III NB 1971 S23 add
G	TYPE OF MATERIAL S.S	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ———	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	M/M	75			.906	10	9"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4									
4	4-1									
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REMARKS:

RADIOGRAPHERS: P Shaub UST-TC-1A Lev II

UST APPROVAL: Joseph W. Dorbelli 4/30/78 UST-TC-1A Lev III DATE

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D10

DATE 4-30-78

A	CUSTOMER	NRC	I	SOURCE TYPE	Ir^{192}
B	PURCHASE ORDER NO.		J	SOURCE SIZE	1/8" x 3/32
C	DESCRIPTION OF SPECIMEN	RHR	K	QUALITY LEVEL	2-4T
D	DRAWING AND/OR PATTERN NO.		L	LEAD SCREEN THICKNESS	.010/.010
E	SERIAL NO.	1-074B-D059-10	M	RADIOGRAPHIC SPEC.	UST RT-2 at 1
F	HEAT NO.	N/A	N	INTERPRETATION SPEC.	ASME SECT III NB 1971, S73add
G	TYPE OF MATERIAL	SS	O	NUMBER OF FILMS	8
H	FABRICATION PROCESS	Weld	P	NUMBER OF EXPOSURES	4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.0-2.8	✓									Surface
2	2-3	2.0-2.8	✓									Surface
3	3-4	2.3-2.5	✓									N.A.D.
4	4-1	1.8-2.4	✓									* Surface
5												
6												
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* Double view where necessary

RADIOGRAPHER: PShaub UST TC IA Lev II

UST REVIEWER: Joseph W. Dreibelbis DATE 4-30-78

CUSTOMER REVIEWER: DATE

UST-TC-1A

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D11

DATE 4/20/18

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-074B-D053-01	M	RADIOGRAPHIC SPEC. UST-RT-2 at 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III 1971 Sum. 73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 8

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~OUTAGE~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	7X17	AA/AA	84	890	10Min	1.25" *	25F	15"	1
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	4-1	↓	↓	↓	↓	↓	↓	↓	↓	↓
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21										

REMARKS:

* Design thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
J Dardell UST-TC/A Level III	Joseph W. Dardell 4/20/18			

RADIOGRAPHIC TECHNIQUE

UST-TC/A Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 2032

D11

DATE 4/20/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD-SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-074B-D053-01	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME Sect III 1977 Sum 78
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 16
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 8

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.0+	✓									N.A.D.
2	2-3	2.0+	✓									N.A.D.
3	3-4	2.0+	✓									N.A.D.
4	4-1	1.5+*	✓									N.A.D.
5												
6												
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21												

* double view where necessary

RADIOGRAPHER:	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub UST-TC1A Level II	Joseph W. Darbell UST-TC1A-Level III	4/22/78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D12

DATE 4-25-79

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: Safety Injection	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: 6" Pipe Weld	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 2-063A-0120-05	M	RADIOGRAPHIC SPEC.: UST-RT-2 att 1
F	HEAT NO.: -	N	INTERPRETATION SPEC.: ASME SECTION III NC 1971 S73
G	TYPE OF MATERIAL: S.S.	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~KV~~	CURIE-MIN. MILIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4 1/2 x 10"	M / M	83			*.280	10F	7"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
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REMARKS:
* Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
PShaub UST-TC IA Level	Joseph W. Dreshell	4/25/79		

RADIOGRAPHIC TECHNIQUE UST-TC IA Level

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232 D12

DATE 4-25-78

A	CUSTOMER: NRC	I	SOURCE TYPE: I^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: Safety Injection	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: 6" Pipe Weld	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 2-063A-0120-05	M	RADIOGRAPHIC SPEC.: UST-RT-2 att 1
F	HEAT NO.: —	N	INTERPRETATION SPEC.: ASME SECT III NC1971.53
G	TYPE OF MATERIAL: SS	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.3-2.5	✓									*N.A.D.
2	2-3	2.3-2.6	✓									* N.A.D.
3	3-4	2.3-2.4	✓									* N.A.D.
4	4-1	2.2-2.5	✓									* Surface
5												
6												
7												
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19												
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21												

* Double view where necessary

RADIOGRAPHER:	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub UST-TCIA Level II	Joseph W. Driebell UST-TCIA Level II	4-25-78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D13

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Safety Injection	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 4" Pipe weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-063A-D119-09	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III NC 1971, S73 add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN. MILIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	M/M	83			*.237"	10F	5"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4									
4	4-1									
5										
6										
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21										

REMARKS:
* Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC/A Lev III	Joseph W. Dreibelbis	4-25-78		

RADIOGRAPHIC TECHNIQUE

UST-TC/A Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D13

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Safety Injection	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 4 Pipe Weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-063A-D119-09	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO. -	N	INTERPRETATION SPEC. ASME SECT III NC1971, S73 Ed
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.1-2.5	✓		✓							* Surf.
2	2-3	1.9-2.6	✓		✓							* Acc.
3	3-4	2.0-2.5	✓									* Surf.
4	4-1	2.2-2.7	✓		✓							* Acc.
5												
6												
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21												

* Double view where necessary

RADIOGRAPHER:	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub UST-TC/R Lev II	Joseph W. Driebelbis	4-25-78		

UST-TC/R Lev II

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D14

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN RHR	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 8" Pipe weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-074A-D026-03	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III NC 1971E&S Tad
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE/~~KILOVOLTAGE~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	M/M	83			*.322	10F	9"	⊥
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
6										
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REMARKS:
* Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
PShaub UST TC1A Lev II	Joseph W. Dalhelle	4-25-78		

RADIOGRAPHIC TECHNIQUE

UST-TC1A LEV III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D14

DATE 4-25-78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.:	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: RHR	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: 8" Pipe weld	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 2-074A-D026-03	M	RADIOGRAPHIC SPEC.: UST-RT-2 at 1
F	HEAT NO.:	N	INTERPRETATION SPEC.: ASME SECT III NC 1971, 573d
G	TYPE OF MATERIAL: SS	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS-POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.2-2.5	✓									*Surf.
2	2-3	2.0-2.5	✓									*N.A.D.
3	3-4	2.2-2.5	✓									*Surf.
4	4-1	1.8-2.3	✓									*Surf
5												
6												
7												
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20												
21												

* Double view where necessary

RADIOGRAPHER: PShaub UST TC/A Lev I

UST REVIEWER: Joseph N. Drachelli DATE 4-25-78

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D15

DATE 4-25-78

A	CUSTOMER: NRC	I	SOURCE TYPE: I^{192}
B	PURCHASE ORDER NO.:	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: Aux Feed Water	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: 4" Pipe weld	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 1-003C-D011-07	M	RADIOGRAPHIC SPEC.: UST-RT-2 att 1
F	HEAT NO.:	N	INTERPRETATION SPEC.: ASME Sec III NC 1971 S73 Add
G	TYPE OF MATERIAL: carbon St	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN: MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x10	M/M	82 Ci			.337 *	10F	5"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
6										
7										
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21										
22										

REMARKS:
* design thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
PShaub UST-TCIA Lev II	Joseph W. Drenbella	4/25/78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 70232

D15

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8 x 3/32
C	DESCRIPTION OF SPECIMEN Aux. Feed Water	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 4" Pipe Weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-003C-D011-07	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT III NC 1971, S73
G	TYPE OF MATERIAL carbon St.	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.5-3.3	✓									N.A.D.
2	2-3	2.7-2.9	✓									Surf.
3	3-4	2.5-3.2	✓		✓							Surf.
4	4-1	2.0-2.6	✓									Surf.
5												
6												
7												
8												
9												
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22												

RADIOGRAPHER: P. Shaub UST TCIA LEVEL II

UST REVIEWER: Joseph W. Dreibelbis DATE 4-25-78

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D16

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8 x 3/32"
C	DESCRIPTION OF SPECIMEN Con't Spray	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 16" Pipe weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-072A-D037-09	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO. —	N	INTERPRETATION SPEC. ASME III NC 1971, S73 Add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS. Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / [illegible]	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½×17	M/M	83			*.375	10F	17"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
6										
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21										
22										

REMARKS:
* Design Thickness

RADIOGRAPHERS: P Shaub UST-TC-1A Level II

UST APPROVAL: Joseph W. Dreibelbis DATE 4-25-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D16

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Cont Spray	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 16" P.pe Weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-072A-0037-09	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO.	N	INTERPRETATION SPEC. ASME III NC 1971, 573 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.4-2.6	✓									Surf. artifacts
2	2-3	2.3-2.8	✓									Surf.
3	3-4	2.6-2.9	✓		✓							Acc.
4	4-1	2.4-2.8	✓									N.A.D.
5												
6												
7												
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12												
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22												

RADIOGRAPHER: PShaub ASNT-CP-1a-etc

UST REVIEWER: Joseph W. Donnelly DATE 4/25/78

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D17

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Spray	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-072A-0063-09	M	RADIOGRAPHIC SPEC. UST RT-2 att 1
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT. III NC 1971, S73 add
G	TYPE OF MATERIAL S.S.	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / VOLTAGE	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4 1/2 x 17	T/T	75 Ci	300	4 Min	*.365	10	11"	1
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	4-1	↓	↓	↓	↓	↓	↓	↓	↓	↓
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REMARKS:
* Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC-1A Lev II	Joseph W Dreibelbis	4-30-78		

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D17

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Spray	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-072A-D063-09	M	RADIOGRAPHIC SPEC. UST RT 2 att 1
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III NC 1971 S73 add
G	TYPE OF MATERIAL SS.	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS/POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.6-3.0	✓									Surface (artifact film)
2	2-3	2.7-3.0	✓									Surface
3	3-4	2.7-3.2	✓									Surface
4	4-1	2.6-3.1	✓									Surface, (artifacts)
5												
6												
7												
8												
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16												
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21												

RADIOGRAPHER		UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub	UST-TC-1A Lev II	Joseph W. Drabelle UST-TC-1A Lev III	4/30/78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D18

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN CVCS	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 3" Pipeweld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-062A-D117-05	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO. —	N	INTERPRETATION SPEC. ASME III NC 1971, S73 add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN MILIAMP-MIN	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	5x7	M/M	93			*.216	10F	4"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
6										
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21										

REMARKS:
* Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC/A Level II	Joseph W. Dreibelbis 4-25-78 UST-TC/A Level III			

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D18

DATE 4-25-78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE: 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN: CVCS	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: 3" Pipeweld	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 2-062A-0117-05	M	RADIOGRAPHIC SPEC.: UST RT-2 alt 1
F	HEAT NO.: —	N	INTERPRETATION SPEC.: ASME III NC 1971 S73 add.
G	TYPE OF MATERIAL: SS	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.0-2.3	✓									* S.A.T.
2	2-3	2.3-2.5	✓									* N.A.D.
3	3-4	1.8-2.0	✓									* N.A.D.
4	4-1	1.9-2.2	✓									* N.A.D.
5												
6												
7												
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21												

* Double view where necessary

RADIOGRAPHER: PShaub UST-TC/A Lev II

UST REVIEWER: Joseph W. Drachelli DATE 4-25-78
UST-TC/A Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D19

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8 x 3/32"
C	DESCRIPTION OF SPECIMEN CVCS	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 6" Pipe weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-062A-D022-15	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO. —	N	INTERPRETATION SPEC. ASME III NC 1971, S73 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~SIZE~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4 1/2 x 10"	M/M	93			.280*	10F	7"	⊥
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
6										
7										
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21										

REMARKS:
* Design thickness

RADIOGRAPHERS: P Shaub UST-TC/A Lev I

UST APPROVAL: Joseph W. Dreibelbis DATE 4-25-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TC/A Lev II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D19

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN CVCS	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 6" Pipe Weld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-062A-D022-15	M	RADIOGRAPHIC SPEC. UST-RT-2 att. #1
F	HEAT NO.	N	INTERPRETATION SPEC. ~~ASME III~~ NC1971, S73add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.2-2.5	✓									N.A.D *
2	2-3	2.3-2.5	✓									* N.A.D.
3	3-4	2.2-2.4	✓									* Surf.
4	4-1	1.8-2.1	✓									* Surf.
5												
6												
7												
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10												
11												
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* Double view where necessary

RADIOGRAPHER:	UST-TC IA Lev II	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub		Joseph W. Dreibelbis	4-25-78		

UST-TC IA Lev III

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D20

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE I_{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Feedwater	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 16" Pipeweld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-003B-D003-06	M	RADIOGRAPHIC SPEC. UST-RT-2 att 1
F	HEAT NO. -	N	INTERPRETATION SPEC. ASME III NC, 1971, S73add.
G	TYPE OF MATERIAL C'N Steel	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE ~~/VOLTAGE~~	CURIE-MIN / MILIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	4½x17	AA/AA	82			.843"	15F	13"	1
2	2-3	↓	↓	↓			↓	↓	↓	↓
3	3-4	↓	↓	↓			↓	↓	↓	↓
4	4-1	↓	↓	↓			↓	↓	↓	↓
5										
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21										

REMARKS:
* Design Thickness

RADIOGRAPHERS:	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
PShaub UST-TC1A Lev II	Joseph W. Dreibelbis, Jr.	4/25/78		

RADIOGRAPHIC TECHNIQUE UST-TC1A Iatt

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D20

DATE 4-25-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Feedwater	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 16" Pipeweld	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-003B-DC03-06	M	RADIOGRAPHIC SPEC. UST-RT-2 at 1
F	HEAT NO. -	N	INTERPRETATION SPEC. ASME SEC III NC 1971, 573.4
G	TYPE OF MATERIAL Carbon Steel	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	3.6-4.0	✓									Surf
2	2-3	3.6-3.9	✓			✓						Acc.
3	3-4	3.7-3.8	✓									N.A.D.
4	4-1	3.2-3.5	✓									N.A.D.
5												
6												
7												
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20												
21												

RADIOGRAPHER: P. Shaub UST-TC/A Level II

UST REVIEWER: Joseph W. Dreibelbis DATE 4-25-78
UST-TC/A Level III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D21

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN RHR	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2-074A-0030-06	M	RADIOGRAPHIC SPEC. UST RT 2 att 1
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME III NC 1971, S73add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 8
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 4

	VIEWS	FILM SIZE	FILM TYPE	CURIE	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	5x7	M/M	75	300	4 min	*.216	10	3.5"	1
2	2-3	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	3-4									
4	4-1									
5										
6										
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22										

REMARKS:

* Design Thickness

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC-1A Lev II	Joseph W. Drexelius UST-TC-1A Lev III	4/30/78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D21

DATE 4/30/78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir^{192}
B	PURCHASE ORDER NO.:	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: RHR	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.:	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 2-074A-D030-06	M	RADIOGRAPHIC SPEC.: UST RT-2 att 1
F	HEAT NO.: N/A	N	INTERPRETATION SPEC.: ASME SECT III NC 1971, S73 add
G	TYPE OF MATERIAL: S.S.	O	NUMBER OF FILMS: 8
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 4

	VIEWS	DENSITY	ACCEPT.	REJECT	GAS/POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS	
1	1-2	2.1-2.5	✓									Surface.	*
2	2-3	1.8-2.1	✓									N.A.D.	*
3	3-4	1.9-2.2	✓									Surface	*
4	4-1	1.6-1.9	✓									Surface	*
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													

* Double View where necessary

RADIOGRAPHER:	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub UST-TC-1A Lev II	Joseph W. Dreibelbis UST-TC 1A Lev III	4/30/78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D22

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Unit 2	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. B1	M	RADIOGRAPHIC SPEC. UST RT-2 at 2
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT VIII UW51 III NE 5100
G	TYPE OF MATERIAL carbon steel	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~M.A.~~	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	10-11	7X17	AA/AA	75Ci	750	10 Min	1 3/8"	30	30"	L
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:

RADIOGRAPHERS	UST APPROVAL	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC-1A Lev II	Joseph W. Dreibelbis UST-TC-1A Lev III	4-30-78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D22

DATE 4-30-78

A	CUSTOMER: NRC	I	SOURCE TYPE: I^{192}
B	PURCHASE ORDER NO:	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: Containment Unit 2	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO:	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO: B1	M	RADIOGRAPHIC SPEC: UST RT-2 att 2
F	HEAT NO: N/A	N	INTERPRETATION SPEC: ASME SECT VIII UW51 III NE 5100
G	TYPE OF MATERIAL: carbon steel	O	NUMBER OF FILMS: 2
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	10-11	2.1-2.5	✓			✓						Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER:	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub UST TC IA Lev II	Joseph N. Dreibelbis UST-TC IA Lev III	4/30/78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D23

DATE 4/30/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8 x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Unit 2	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. ~~Airlock~~	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. ~~10CFR~~ 2-3 (0°-90°)	M	RADIOGRAPHIC SPEC. UST RT-2 at 2
F	HEAT NO.	N	INTERPRETATION SPEC. ASME SECT VIII III UW51 NE5100
G	TYPE OF MATERIAL carbon steel	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	22-23	7X17	AA/AA	75Ci	750	10Min	1 3/8"	30	30"	1
3										
5										
7										
10										
12										
14										
16										
18										
21										

REMARKS:

RADIOGRAPHERS	UST APPROVAL:	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC-1A Lev II	Joseph W. Dreibelbis UST-TC-1A Lev III	4/30/78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232 D23

DATE 4-30-78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.:	J	SOURCE SIZE: 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN: Containment Unit 2	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: ~~Air lock~~	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: ~~2-3~~ (0°-90°)	M	RADIOGRAPHIC SPEC.: UST RT 2 at # 2
F	HEAT NO.: N/A	N	INTERPRETATION SPEC.: ASME SECT ~~VIII~~ III UW51 NE 5100
G	TYPE OF MATERIAL: carbon steel	O	NUMBER OF FILMS: 2
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	22-23	2.2-2.5	✓		✓							Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: P Shaub UST-TC/A Lev II

UST REVIEWER: Joseph W. Dreibelbis DATE: 4/30/78
UST-TC/A Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20234

D24

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Unit 2	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. N/A	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 100A	M	RADIOGRAPHIC SPEC. UST-RT-2 at 2
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT VIII DIV 1 UW51 1971 III 1971, W71 add
G	TYPE OF MATERIAL Carbon Steel	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN. ~~MA-MINUTE~~	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	22-23	7x17	AA/AA	75 Ci	750	10 Min	1 3/9"	30	30"	1
3										
5										
7										
9										
10										
12										
14										
16										
17										
19										
21										

REMARKS:

RADIOGRAPHERS: UST-TC/A Level II
P. Shaub

UST APPROVAL: Joseph W. Dreibelbis DATE 4-30-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TC/A Level II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D24

DATE 4-30-78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir^{192}
B	PURCHASE ORDER NO.:	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: Containment Unit 2	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: N/A	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 100A	M	RADIOGRAPHIC SPEC.: UST-RT-2 att 2
F	HEAT NO.: N/A	N	INTERPRETATION SPEC.: ASME SECT VIII D.W.S.1, 197 SECT III 1971, W71
G	TYPE OF MATERIAL: Carbon Stee	O	NUMBER OF FILMS: 2
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES:

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	22-23	1.7-2.1	✓		✓	✓						Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: P Shaub UST-TC/A Lev II

UST REVIEWER: Joseph W. Darnell DATE 4-30-78

UST-TC/A Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D25

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 3-9 (90°-180°)	M	RADIOGRAPHIC SPEC. USI-RT-2 alt 2
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III 1971 W71add SECT VIII W 51
G	TYPE OF MATERIAL	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE ~~/ VOLTAGE~~	CURIE-MIN ~~/ MA-MIN~~	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	7-8	7X17	AA/AA	75Ci	750	10 Min	1 3/8"	ASME 30	30"	1
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:

RADIOGRAPHERS: P Shaub UST-TCIA Lev II

UST APPROVAL: Joseph W. Dornbach DATE 4-30-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TCIA Lev II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D25

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE I_r^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Unit 2	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 3-4 (90°-180°)	M	RADIOGRAPHIC SPEC. UST RT-2 ed 2
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT VIII DIV 1 UW51 III 1971 w/addenda
G	TYPE OF MATERIAL	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	7-8	2.1-2.6	✓		✓	✓						Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P. Shaub UST-TC/A Lev II	Joseph W. Dreibelbis UST-TC/A Lev III	4-30-78		

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D26

DATE 4/30/78

A	CUSTOMER NRC	I	SOURCE TYPE I^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN Containment Unit 1	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 1-2 Girth (90°-180°)	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-2	M	RADIOGRAPHIC SPEC. UST-RT-2 at 2 VIII UW51
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III NE 5100
G	TYPE OF MATERIAL carbon steel	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	15-16	7X17	AA/AA	75Ci	750	10min	1 3/8"	30	30"	⊥
3										
5										
7										
10										
12										
14										
16										
19										
21										

REMARKS:

RADIOGRAPHERS	UST-TC-1A	UST APPROVAL	DATE	CUSTOMER APPROVAL:	DATE
PShaub Lev II		Joseph W. Dreibelbis UST-TC-1A Lev III	4/30/78		

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D26

DATE 4/30/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Containment Unit 1	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1-2 Girth (90°-180°)	M	RADIOGRAPHIC SPEC. UST-RT-2 #2
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT ~~III~~ III UW51 NE5100
G	TYPE OF MATERIAL carbon steel	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	15-16	2.4-2.8	✓			✓						Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: PShaw UST TC 1A Lev II

UST REVIEWER: Joseph W. Drexelli DATE 4/30/78
UST-TC 1A Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D27

DATE 4/30/78

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE- 4/8 x 3/32
C	DESCRIPTION OF SPECIMEN Containment Unit 1	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 3A	M	RADIOGRAPHIC SPEC. UST RT-2 at #2
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III VIII NE5100 UW51
G	TYPE OF MATERIAL Carbon Steel	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~KILOVOLTAGE~~	CURIE-MINUTES	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	0-1	7X17	AA/AA	75Ci	750	10min	1 3/8"	30	30"	⊥
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:

RADIOGRAPHERS PShaub UST-TC1A Lev II

UST APPROVAL: Joseph W. Dreifelbis DATE 4/30/78

UST-TC 1A Lev III

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D27

DATE 4/30/78

A	CUSTOMER: NRC	I	SOURCE TYPE: I_{192}
B	PURCHASE ORDER NO.:	J	SOURCE SIZE: 1/8 x 3/32
C	DESCRIPTION OF SPECIMEN: Containment Unit 1	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.:	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 3A	M	RADIOGRAPHIC SPEC.: UST RT-2 alt 2
F	HEAT NO.: N/A	N	INTERPRETATION SPEC.: ASME SECT VIII UW51 III NE 5100
G	TYPE OF MATERIAL: carbon steel	O	NUMBER OF FILMS: 2
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	0-1	2.3-2.6	✓		✓							Acc.
3												
5												
7												
9												
10												
12												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: PShaub UST TC 1A Lev II

UST REVIEWER: Joseph W Dreibelbis DATE 4-30-78
UST-TC-1A Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D28

DATE 4-28-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Tank H20	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1H3	M	RADIOGRAPHIC SPEC. UST RT 2a #4
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III 1974, W75 ND 5200, 5281
G	TYPE OF MATERIAL Carbon stee	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / VOLTAGE	CURIE-MIN. / MA-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	1-2	5x7	M/M	75 C.	375	5 min	5/16*	7	15"	⊥
3										
5										
7										
8										
10										
12										
14										
16										
17										
19										
21										

REMARKS:
* design thickness

RADIOGRAPHERS PShaub UST-TCIA Lev II

UST APPROVAL: Joseph M. Durnell DATE 4-28-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TCIA Lev II

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D28

DATE 4-28-78

A	CUSTOMER	NRC	I	SOURCE TYPE	Ir 192
B	PURCHASE ORDER NO.		J	SOURCE SIZE	1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	Tank, H_2O	K	QUALITY LEVEL	2-2T
D	DRAWING AND/OR PATTERN NO.		L	LEAD SCREEN THICKNESS	.010/.010
E	SERIAL NO.	1H3	M	RADIOGRAPHIC SPEC.	UST-RT-2 at 4
F	HEAT NO.	N/A	N	INTERPRETATION SPEC.	ASME SECT III 1974 W'75 Add ND para 5200 5281
G	TYPE OF MATERIAL	Carbon Steel	O	NUMBER OF FILMS	2
H	FABRICATION PROCESS	Weld	P	NUMBER OF EXPOSURES	1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	1-2	2.3-2.7	✓		✓	✓						Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER:	UST-TC/A Level II	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
PShaub		Joseph W. Drexell	4-28-78		

UST-TC/A Level II

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET -
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D29

DATE 4-30-75

A	CUSTOMER NRC	I	SOURCE TYPE Ir^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN Refueling Stor. Tank	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO.. Unit 1	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 1H4	M	RADIOGRAPHIC SPEC. UST-RT-2 at 4
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III NC 5200 1974 w/ 75 add.
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~OUTAGE~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	12-13	4½x17	M/M	75	1500	20min	*5/16	15	30	1
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:
* Design thickness

RADIOGRAPHERS	UST APPROVAL	DATE	CUSTOMER APPROVAL:	DATE
P Shaub UST-TC-1A Level II	Joseph W. Drebelli UST-TC-1A Level II			

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232 D29

DATE 4-30-78

A	CUSTOMER: NRC	I	SOURCE TYPE: Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: Refueling Stor. Tank	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.: Unit	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO.: 1H4	M	RADIOGRAPHIC SPEC: UST RT-2 qtH 4
F	HEAT NO.: N/A	N	INTERPRETATION SPEC.: ASME SECT III 1974 W 75 NC5200 add.
G	TYPE OF MATERIAL: SS	O	NUMBER OF FILMS: 2
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	12-13	24-29	✓		✓							Acc. Surf
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: P. Saab UST-TC-IA Lev II

UST REVIEWER: Joseph V. Drenfell DATE

UST-TC-IA Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D30

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN Refueling Storage Tank	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. Unit 1	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2V2	M	RADIOGRAPHIC SPEC. UST-RT-2 at 4
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III 1974, W75add NC 5200
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE ~~/ KVCE~~	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	5-6	4½x17	M/M	75Ci	1500	20min	5/16*	15	30"	⊥
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:
* Design Thickness

RADIOGRAPHERS: PShaub UST-TC-IA Lev II

UST APPROVAL: Joseph W. Doebell DATE 4-30-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UST-TC-IA Lev III

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D30

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32
C	DESCRIPTION OF SPECIMEN Refueling Stor. Tank	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. Unit 1	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. 2V2	M	RADIOGRAPHIC SPEC. UST-RT-2.at4
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III 1974, W75 NC5200 add
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 2.
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	5-6	2.6-33	✓			✓						Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER	UST-TC/A	UST REVIEWER	DATE	CUSTOMER REVIEWER	DATE
P Shaub	Lev II	Joseph W. Dreibelbis	4-30-78		

UST-TC/A Lev III

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D31

DATE 4-30-78

A	CUSTOMER: NRC	I	SOURCE TYPE: I^{192}
B	PURCHASE ORDER NO.	J	SOURCE SIZE: 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN: CVCS Hold up Tank	K	QUALITY LEVEL: 2-2T
D	DRAWING AND/OR PATTERN NO.	L	LEAD SCREEN THICKNESS: .010/.010
E	SERIAL NO. 74-3743 1-2 Girth 90°-180°	M	RADIOGRAPHIC SPEC. UST-RT-2 alt 3
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT. III APP 10 NB5322
G	TYPE OF MATERIAL: SS	O	NUMBER OF FILMS: 2
H	FABRICATION PROCESS: Weld	P	NUMBER OF EXPOSURES: 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~VOLTAGE~~	CURIE-MIN. / ~~MILLIAMP~~	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	0-1	4½x17	M/M	75Ci	375	14 Min	*5/16"	7	30"	1
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:
* Design Thickness

RADIOGRAPHERS: P. Shaub UST-TC-IA Lev II

UST APPROVAL: Joseph W. Donnelly 4/30/78 UST-TC-IA Lev II DATE

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D3T

DATE 4-30-78

A	CUSTOMER	NRC	I	SOURCE TYPE	I_{192}
B	PURCHASE ORDER NO.		J	SOURCE SIZE	1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN	CVCS Hold up Tank	K	QUALITY LEVEL	2-2T
D	DRAWING AND/OR PATTERN NO.		L	LEAD SCREEN THICKNESS	.010/.010
E	SERIAL NO.	74-3743 1-2 Girth 90°-180°	M	RADIOGRAPHIC SPEC.	UST RT-2 at 3
F	HEAT NO.	N/A	N	INTERPRETATION SPEC.	ASME SECT III App. X ND 5322
G	TYPE OF MATERIAL	SS	O	NUMBER OF FILMS	2
H	FABRICATION PROCESS	Weld	P	NUMBER OF EXPOSURES	1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	0-1	2.3-2.6	✓									Surface
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER	UST-TC/A Level II	UST REVIEWER:	DATE	CUSTOMER REVIEWER:	DATE
P Shaub		Joseph W. Drenbelli	4-30-78		

UST-TC/A Level III

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D32

DATE 4-30-78

A	CUSTOMER	NRC	I	SOURCE TYPE	Ir^{192}
B	PURCHASE ORDER NO.		J	SOURCE SIZE	1/8" x 3/32
C	DESCRIPTION OF SPECIMEN	CVCS Holdup Tank	K	QUALITY LEVEL	2-2T
D	DRAWING AND/OR PATTERN NO.	74-3744	L	LEAD SCREEN THICKNESS	.010/.010
E	SERIAL NO.	A1	M	RADIOGRAPHIC SPEC.	UST RT-2 at 3
F	HEAT NO.	N/A	N	INTERPRETATION SPEC.	ASME SECT III 1974 app X ND5321
G	TYPE OF MATERIAL	SS	O	NUMBER OF FILMS	2
H	FABRICATION PROCESS	Weld	P	NUMBER OF EXPOSURES	1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / [redacted]	CURIE-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	6-7	4½x17	M/M	75ci	1050	14min	*5/16	7	30"	⊥
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

REMARKS:
* Design Thickness

RADIOGRAPHERS: P. Shaub UST-TCIA Lev II

UST APPROVAL: Joseph W. Dreibelbis DATE 4-30-78

CUSTOMER APPROVAL: DATE

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232
D32
DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN CVCS Holdup Tank	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 74-3744	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. A1	M	RADIOGRAPHIC SPEC. UST-RT-2 att 3
F	HEAT NO. N/A	N	INTERPRETATION SPEC ASME SECT III ND 5321 1974 app A
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	6-7	2.5-2.9	✓		✓	✓						Surf, Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER PShaub UST-TC/A Lev II
UST REVIEWER Joseph W. Dreibelbis DATE 4/30/78
UST-TC/A Lev III
CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D33

DATE 4-30-78

A	CUSTOMER NRC	I	SOURCE TYPE Ir 192
B	PURCHASE ORDER NO.	J	SOURCE SIZE 1/8" x 3/32"
C	DESCRIPTION OF SPECIMEN CVCS Holdup Tank	K	QUALITY LEVEL 2-2T
D	DRAWING AND/OR PATTERN NO. 74-3744	L	LEAD SCREEN THICKNESS .010/.010
E	SERIAL NO. C1	M	RADIOGRAPHIC SPEC. UST RT-2 att 3
F	HEAT NO. N/A	N	INTERPRETATION SPEC. ASME SECT III ND5321 1974 App IX
G	TYPE OF MATERIAL SS	O	NUMBER OF FILMS 2
H	FABRICATION PROCESS Weld	P	NUMBER OF EXPOSURES 1

	VIEWS	FILM SIZE	FILM TYPE	CURIE / ~~KV~~	CURIE-MIN. MILLIAMP-MIN.	EXPOSURE TIME	MATERIAL THICKNESS	PENETRAMETER DESIGNATION	FFD	ANGLE OFFSET
1	3-4	4½x17	M/M	75Ci	1050	14 min	5/16*	7	30"	⊥
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

REMARKS:

* Design Thickness

RADIOGRAPHERS: P Shaub UST-TC 1A Lev II

UST APPROVAL: Joseph W. Drenbella 4/30/78 UST-TC-1A Lev III

DATE

CUSTOMER APPROVAL:

DATE

RADIOGRAPHIC TECHNIQUE

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

D33

DATE 4-30-78

A	CUSTOMER	NRC	I	SOURCE TYPE	Ir^{192}
B	PURCHASE ORDER NO.		J	SOURCE SIZE	1/8" x 3/32
C	DESCRIPTION OF SPECIMEN	CVCS Holdup Tank	K	QUALITY LEVEL	2-2T
D	DRAWING AND/OR PATTERN NO.	74-3744	L	LEAD SCREEN THICKNESS	.010/.010
E	SERIAL NO.	C1	M	RADIOGRAPHIC SPEC.	UST-RT-2 at 3
F	HEAT NO.	N/A	N	INTERPRETATION SPEC.	ASME SECT III NO5321 1974 app X
G	TYPE OF MATERIAL	SS	O	NUMBER OF FILMS	2
H	FABRICATION PROCESS	Weld	P	NUMBER OF EXPOSURES	1

	VIEWS	DENSITY	ACCEPT	REJECT	GAS POROSITY	INCLUSIONS	SHRINK	HOT TEARS	CRACKS	LACK OF FUSION	LACK OF PENETRATION	REMARKS
1	3-4	2.4-2.9	✓		✓							Acc.
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												

RADIOGRAPHER: P Shaub UST-TC1A Lev II

UST REVIEWER: Joseph W. Drebell DATE 4/30/78
UST-TC1A Lev III

CUSTOMER REVIEWER: DATE

INTERPRETATION REPORT

UNITED STATES TESTING COMPANY, INC.

Appendix E

LIQUID PENETRANT REPORTS

NITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

DATE 4/29/78

E1

LIQUID PENETRANT EXAMINATION REPORT

1.	CUSTOMER NRC	7.	PT PROCEDURE AND PT METHOD NRC ATT 1 UST PT3
2.	LOCATION Watts Bar	8.	PENETRANT - BRAND NAME & DESIGNATION Spot Check
3.	PART IDENTIFICATION (HEAT NO. SERIAL NO., ETC.) 1-068F-W003-9	9.	PENETRANT REMOVAL - BRAND NAME & DESIGNATION Spot Check
4.	MATERIAL SPECIFICATION SS	10.	EMULSIFIER - BRAND NAME & DESIGNATION N/A
5.	PT SPECIFICATION ASME	11.	DEVELOPER - BRAND NAME & DESIGNATION Spot Check
6.	ACCEPTANCE CRITERIA UST PT3 NRC ATT 1		

PRECLEANING BY AAS

METHOD OF PENETRANT APPLICATION & PENETRATION TIME Spray Can 10min

METHOD OF REMOVING PENETRANT Rags + Solvent

METHOD OF APPLYING DEVELOPER & DEVELOPING TIME Spray Can 5min

AREA OF EXAMINATION	DESCRIPTION OF INDICATION	ACCEPT	REJECT	REMARKS
Weld		✓		

SKETCH (IF NECESSARY)

EXAMINATION PERFORMED BY:	EVALUATION PERFORMED BY:	CUSTOMER WITNESS:
Aaron A. Diggins	Aaron A. Diggins	
UST-TC-1A LEVEL II	UST-TC-1A LEVEL II	DATE

UST-PT-3-1

UNITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

DATE 4/29/78

E2

LIQUID PENETRANT EXAMINATION REPORT

1.	CUSTOMER NRC	7.	PT PROCEDURE AND PT METHOD UST PT3 NRC ATT 1
2.	LOCATION Watts Bar	8.	PENETRANT - BRAND NAME & DESIGNATION Spot Check
3.	PART IDENTIFICATION (HEAT NO. SERIAL NO., ETC.) 1-074B-0055-014	9.	PENETRANT REMOVAL - BRAND NAME & DESIGNATION Spot Check
4.	MATERIAL SPECIFICATION SS	10.	EMULSIFIER - BRAND NAME & DESIGNATION N/A
5.	PT SPECIFICATION ASME	11.	DEVELOPER - BRAND NAME & DESIGNATION Spot Check
6.	ACCEPTANCE CRITERIA UST PT3 NRC ATT 1		

PRECLEANING BY AAS

METHOD OF PENETRANT APPLICATION & PENETRATION TIME Spray Can 10 min

METHOD OF REMOVING PENETRANT Rags + Solvent

METHOD OF APPLYING DEVELOPER & DEVELOPING TIME Spray Can 5 min

AREA OF EXAMINATION	DESCRIPTION OF INDICATION	ACCEPT	REJECT	REMARKS
Weld		✓		

SKETCH (IF NECESSARY)

EXAMINATION PERFORMED BY:	EVALUATION PERFORMED BY:	CUSTOMER WITNESS:
Aaron A. Siggins	Aaron A. Siggins	
UST-TC-1A LEVEL II	UST-TC-1A LEVEL II	DATE

UST-PT-3-1

NITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

DATE 4/29/78

E3

LIQUID PENETRANT EXAMINATION REPORT

1.	CUSTOMER NRC	7.	PT PROCEDURE AND PT METHOD UST PT3 NRC ATT 1
2.	LOCATION Watts Bar	8.	PENETRANT - BRAND NAME & DESIGNATION Spot Check
3.	PART IDENTIFICATION (HEAT NO. SERIAL NO., ETC.) -06	9.	PENETRANT REMOVAL - BRAND NAME & DESIGNATION Spot Check
4.	MATERIAL SPECIFICATION SS	10.	EMULSIFIER - BRAND NAME & DESIGNATION N/A
5.	PT SPECIFICATION ASME	11.	DEVELOPER - BRAND NAME & DESIGNATION Spot Check
6.	ACCEPTANCE CRITERIA UST PT3 NRC ATT 1		

PRECLEANING BY AAS

METHOD OF PENETRANT APPLICATION & PENETRATION TIME Spray Can 10min

METHOD OF REMOVING PENETRANT Rags + Solvent

METHOD OF APPLYING DEVELOPER & DEVELOPING TIME Spray Can 5min

AREA OF EXAMINATION	DESCRIPTION OF INDICATION	ACCEPT	REJECT	REMARKS
Weld		✓		

SKETCH (IF NECESSARY)

EXAMINATION PERFORMED BY:	EVALUATION PERFORMED BY:	CUSTOMER WITNESS:
Aaron A. Diggins	Aaron A. Diggins	
UST-TC-1A LEVEL II	UST-TC-1A LEVEL II	DATE

UST-PT-3-1

NITED STATES TESTING COMPANY

NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

DATE 4/29/78

E4

LIQUID PENETRANT EXAMINATION REPORT

1.	CUSTOMER NRC	7.	PT PROCEDURE AND PT METHOD UST PT3 NRC ATT 1
2.	LOCATION Watts Bar	8.	PENETRANT - BRAND NAME & DESIGNATION Spotcheck
3.	PART IDENTIFICATION (HEAT NO. SERIAL NO., ETC.) 1-087B-0040-08	9.	PENETRANT REMOVAL - BRAND NAME & DESIGNATION Spot Check
4.	MATERIAL SPECIFICATION SS	10.	EMULSIFIER - BRAND NAME & DESIGNATION N/A
5.	PT SPECIFICATION ASME	11.	DEVELOPER - BRAND NAME & DESIGNATION Spot Check
6.	ACCEPTANCE CRITERIA UST PT3 NRC ATT 1		

PRECLEANING BY CS

METHOD OF PENETRANT APPLICATION & PENETRATION TIME Spray Can 10min

METHOD OF REMOVING PENETRANT Rags + Solvent

METHOD OF APPLYING DEVELOPER & DEVELOPING TIME Spray Can 5min

AREA OF EXAMINATION	DESCRIPTION OF INDICATION	ACCEPT	REJECT	REMARKS
Weld		✓		

SKETCH (IF NECESSARY)

EXAMINATION PERFORMED BY:	EVALUATION PERFORMED BY:	CUSTOMER WITNESS:
C Sheridan	C Sheridan	
UST-TC-1A LEVEL II	UST-TC-1A LEVEL II	DATE

UNITED STATES TESTING COMPANY
NON DESTRUCTIVE TESTING DIVISION
430 LITTLE CLINTON STREET
READING, PENNA. 19601 (215) 373-4844

WORK ORDER NUMBER 20232

DATE 4/29/78

E5

LIQUID PENETRANT EXAMINATION REPORT

1.	CUSTOMER NRC	7.	PT PROCEDURE AND PT METHOD UST PT 3 NRC ATT 1
2.	LOCATION Watts Bar	8.	PENETRANT - BRAND NAME & DESIGNATION Spot Check
3.	PART IDENTIFICATION (HEAT NO. SERIAL NO., ETC.) 1-074B-0053-01	9.	PENETRANT REMOVAL - BRAND NAME & DESIGNATION Spot Check
4.	MATERIAL SPECIFICATION SS	10.	EMULSIFIER - BRAND NAME & DESIGNATION N/A
5.	PT SPECIFICATION ASME	11.	DEVELOPER - BRAND NAME & DESIGNATION Spot Check
6.	ACCEPTANCE CRITERIA UST PT 3 NRC ATT 1		

PRECLEANING BY C.S.

METHOD OF PENETRANT APPLICATION & PENETRATION TIME Spray Can 10min

METHOD OF REMOVING PENETRANT Rags + Solvent

METHOD OF APPLYING DEVELOPER & DEVELOPING TIME Spray Can 5min

AREA OF EXAMINATION	DESCRIPTION OF INDICATION	ACCEPT	REJECT	REMARKS
Weld		✓		

SKETCH (IF NECESSARY)

EXAMINATION PERFORMED BY:	EVALUATION PERFORMED BY:	CUSTOMER WITNESS:
C Sheridan	C Sheridan	
UST-TC-1A LEVEL II	UST-TC-1A LEVEL II	DATE

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