Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37384-2000

August 10, 2001

10 CFR 50.50a(g)(5)(iii)

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentleman:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI INSERVICE INSPECTION (ISI) PROGRAM - RELIEF REQUESTS FROM CYCLE 10 REFUELING OUTAGES

The relief requests are associated with ISI activities performed during SQN's cycle 10 refueling outages for each unit. Four relief requests are common to Units 1 and 2, and two relief requests are specific to Unit 2

The relief requests are based on limitations that preclude full code examination of ASME Class 1 and 2 welds. Code examination of the welds is limited due to design configuration or material properties.

The relief requests are submitted in accordance with 10 CFR 50.55a(g)(5)(iii). TVA requests that NRC provide approval in accordance with 10 CFR 50.55a(g)(6)(i).

SQN's ISI Program is currently in the second 10-year ISI interval. We are currently planning inspection activities that will complete the second period of SQN's second 10-year interval (i.e., cycle 11 refueling outages for both units). NRC response is requested by June 2002 to support scheduling of inservice inspection activities during SQN's

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third ISI period (i.e., refueling outages for cycles 12 and 13).

Enclosure 1 provides relief requests common to both units. Enclosure 2 provides the Unit 2 specific relief requests. Enclosure 3 provides examination data reports for each relief request. Enclosure 4 provides ISI drawings. Enclosure 5 provides TVA's procedure for calculation of the ASME code coverage for Section XI nondestructive examinations.

In accordance with NRC RIS 2001-05, only one paper copy of this document is being sent to the NRC Document Control Desk. If you have any questions regarding this response, please contact me at extension (423) 843-7071 or J. D. Smith at extension (423) 843-6672.

Sincerely,

Pedro Salas
Licensing and Industry Affairs Manager

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ENCLOSURE 1

SEQUOYAH NUCLEAR PLANT

ASME REQUESTS FOR RELIEF

FOR UNITS 1 AND 2

1/2-ISI-17
1/2-ISI-18
1/2-ISI-19
1/2-ISI-20

Executive Summary:

This request for relief addresses the Safety Injection Centrifugal Charging Pump (CCP) Tank nozzle-to-head full penetration welds. The design configuration of the CCP Tank nozzle-to-head welds preclude 100% ultrasonic examination of the required volume for the following (nozzle-to-head welds: BIT-5 (6 inch inlet) and BIT-2 (6 inch outlet). These examination limitations occur when the 1989 Code examination requirements are applied in areas of components constructed and fabricated to early plant physical designs. Based on the issue date of Sequoyah's (SQN) construction permit (May 27, 1970), SQN is exempt from the code requirements for providing original design and examination access provisions as allowed in 10 CFR 50.55a(g)(4).

A liquid penetrant surface examination was performed on 100% of weld BIT-5. An ultrasonic examination was performed on accessible areas to the maximum extent practical, given the physical limitations for weld BIT-5. The design configuration limits the best effort ultrasonic examination to approximately 67% of the weld volume for BIT-5. Weld BIT-2 is currently scheduled for examination in the third period of the second interval. The design configuration for BIT-2 is the same as BIT-5 and therefore the projected examination coverage will essentially be the same as that obtained for BIT-5. Performance of an ultrasonic examination of essentially 100% of full penetration welds in the CCP Tank nozzle-to-head welds, BIT-2 and BIT-5, is impractical. The maximum extent practical ultrasonic examination of the subject welds provides reasonable assurance of an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the welds.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for the second inspection interval.

Units :	1 and 2
System:	Safety Injection - System 63
Components:	Two Nozzles For the CCP Tank, Full Penetration Welds
ASME Code Class:	ASME Code Class 2 (Equivalent)
Section XI Edition:	1989 Edition
Code Table:	IWC-2500-1
Examination Category:	C-B, Pressure Retaining Nozzle Welds in Vessels
Examination Item Number:	C2.21, Nozzle-to-Shell (or Head) Welds
Code Requirement:	ASME Section XI, Table IWC-2500-1, Examination Category C-B, Item Number C2.21, Requires Surface and Volumetric Examination
Code Requirement From Which Relief Is Requested:	Volumetric Examination Coverage of Essentially 100% of the Nozzle-to-Head Weld
List Of Items Associated With The Relief Request:	6 Inch Inlet and Outlet, CCP Tank Nozzles: BIT-2 and BIT-5 Nozzle-to-Head Welds (Unit 1) BIT-2 and BIT-5 Nozzle-to-Head Welds (Unit 2)

1/2-ISI-17

Basis For Relief:

The design configuration of the CCP Tank precludes an ultrasonic examination of the required volume for the following nozzle-to-head welds: BIT-2 and BIT-5. The design configuration limits ultrasonic examination of weld BIT-5 to approximately 67% of required examination volume, as calculated in accordance with TVA procedure N-GP-28. Weld BIT-2 is currently scheduled for examination in the third period of the second inspection interval.

Alternative Examination:

In lieu of the code required 100% ultrasonic examination, a best effort ultrasonic examination will be performed on the accessible areas to the maximum extent practical, given the physical limitations of the nozzle-to-head weld. The code required surface examination (liquid penetrant) of 100% of the nozzle-to-head weld will be performed on the nozzle-to-head weld. Refer to Enclosure 3 for examination data reports.

Justification For The Granting Of Relief:

The design configuration of the subject nozzle-to-head welds precludes ultrasonic examination of essentially 100% of the required examination volume. In order to examine the welds in accordance with the code requirements, the CCP tank would require extensive design modifications. The physical arrangement of subject nozzle welds in conjunction with the close curvature of the outside wall surfaces of the nozzle precludes ultrasonic examination from the nozzle side.

Scans normal to the weld from the head side were not obstructed allowing complete coverage of the weld from one side. Examination coverage from the one side provides reasonable assurance that no flaws parallel to the weld are present. In addition, approximately 100% of the required ultrasonic examination volume for flaws transverse to the weld was performed from the vessel head side. Total combined examination coverage of weld

1/2-ISI-17

Justification For The Granting Of Relief (continued):

BIT-5 is approximately 67% of the code required volume. BIT-2 weld would achieve approximately the same coverage.

Radiographic examination as an alternate volumetric examination method, was determined to be impractical due the thickness of the component (nozzle 2.53 inches and head 2 inches minimum). Gaining access to the inside surface of the CCP Tank to place radiographic film would require extensive personnel protection due to high radiation and contamination levels. The CCP Tank manway would have to be removed, decontamination performed, and specialized scaffolding erected to gain access. The additional code coverage gained by radiography and/or ultrasonics from the inner surface are impractical when weighed against the radiological concerns.

The estimated radiological conditions for the inside the CCP tank were determined to be the following:

3-4 rad/hour beta
1-2 rem/hour gamma
5-10 rad/hour per 100 square-cm

Maximum stay time to maintain exposure to < 1 rem is approximately 30 minutes. One rem is TVA's annual administrative dose limit for an individual. Special clothing would be required for protection from the extremely high contamination levels and from the high beta dose rate. Estimates are based on actual experience inside primary components. Respiratory protection would be required. Industrial safety would also be a major concern with regards to heat stress and confined space hazards.

Performance of an ultrasonic volumetric examination of essentially 100% of full penetration welds in the CCP Tank nozzle-to-vessel head welds, BIT-2 and BIT-5, would be impractical. In addition, it would be impractical to perform other volumetric examinations

1/2-ISI-17

Justification For The Granting Of Relief (continued):

which may increase examination coverage. The surface examination of a 100% of the weld areas and adjacent base metal, and a maximum extent practical ultrasonic examination of the subject welds provides reasonable assurance of an acceptable level of quality and safety. Significant degradation, if present, would be detected during an ultrasonic examination performed to the maximum extent possible, of the subject welds. As a result, reasonable assurance of structural integrity is provided by the alternative examinations performed.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for SQN's second 10-year inspection interval.

Implementation Schedule:

This request for relief is applicable to the second 10-year inspection interval for SQN Units 1 and 2. Weld BIT-5 was examined in the second period and BIT-2 is scheduled for examination in the third period.

Background Information:

A request for relief for volumetric examination coverage limitations was submitted for BIT-2 and BIT-5 as 1-ISI-23 for Unit 1 and 2-ISI-23 for Unit 2 in SQN's first inspection interval and was approved by the reference letter below with no additional augmented requirements.

References:

Letter from F.J. Hebdon, NRC, to O.D. Kingsley, TVA, dated February 7, 1996.

Enclosure 3 - Examination Data Reports:
R-7403 and R-7453 (Unit 1)
R-6172 and R-6188 (Unit 2)

Enclosure 4 - ISI Program Drawing:
ISI-0069-C-01 (Unit 1)
ISI-0074-C-01 (unit 2)

References: (continued)

Enclosure 5 - Nondestructive Examination Procedure N-GP-28 "Calculation of ASME Code Coverage for Section XI NDE Examinations"

1/2-ISI-18

Executive Summary:

This request for relief addresses the Residual Heat Removal (RHR) heat exchanger (1A and 2A) nozzle-to-shell weld RHRW-15-A. The design configuration of the RHR heat exchanger nozzle-to-shell weld precludes a 100% ultrasonic examination of the required volume for the nozzle-to-shell weld. These physical examination limitations occur when the 1989 Code examination requirements are applied in areas of components constructed and fabricated to early plant physical designs. Based on the issue date of Sequoyah's (SQN) construction permit (May 27, 1970), SQN is exempt from the code requirements for providing original design and examination access provisions as allowed in 10 CFR 50.55a(g)(4).

A liquid penetrant surface examination was performed on 91% of the subject weld. An ultrasonic examination was performed on accessible areas to the maximum extent practical, given the physical limitations of the subject weld. The design configuration limits the best effort ultrasonic examination to approximately 39% of weld volume of RHRW-15-A. Performance of an ultrasonic examination of essentially 100% of full penetration nozzle-to-shell weld, RHRW-15-A is impractical. A surface examination and the maximum extent practical ultrasonic examination of the subject weld provides reasonable assurance of an acceptable level of quality and safety because the information and data obtained from the weld surface and the weld volume examined provides sufficient information to judge the overall integrity of the weld.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for SQN's second 10-year inspection interval.

1/2-ISI-18

Units :	1 and 2
System:	Residual Heat Removal - System 74
Components:	RHR Heat Exchanger (1A and 2A) Nozzle-to-Shell Weld, Full Penetration Weld
ASME Code Class:	ASME Code Class 2 (Equivalent)
Section XI Edition:	1989 Edition
Code Table:	IWC-2500-1
Examination Category:	C-B, Pressure Retaining Nozzle Welds in Vessels
Examination Item Number:	C2.21, Nozzle-to-Shell (or Head) Weld
Code Requirement:	ASME Section XI, Table IWC-2500-1, Examination Category C-B, Item Number C2.21, Requires Surface and Volumetric Examinations
Code Requirement From Which Relief Is Requested:	Volumetric Examination Coverage of Essentially 100% of Nozzle-to-Shell Weld
List Of Items Associated With The Relief Request:	RHR Heat Exchanger Nozzle-to-Shell Weld: RHRW-15-A (Unit 1) RHRW-15-A (Unit 2)

1/2-ISI-18

Basis For Relief:

The design configuration of the RHR heat exchanger nozzle, shell and component support precludes an ultrasonic examination of the required volume for the nozzle-to-shell weld RHRW-15-A. The design configuration limits ultrasonic examination to approximately 39% of the required examination volume as calculated in accordance with TVA procedure N-GP-28.

Alternative Examination:

In lieu of the code required 100% ultrasonic examination, an ultrasonic examination was performed on accessible areas to the maximum extent practical, given the physical limitations of the nozzle-to-shell weld. The code required surface examination (liquid penetrant) of 91% of the nozzle-to-shell weld was also performed. Refer to Enclosure 3 for examination data reports.

Justification For The Granting Of Relief:

The design configuration of the subject nozzle-to-head weld precludes ultrasonic examination of essentially 100% of the required examination volume. In order to examine the weld in accordance with the code requirement, the RHR heat exchanger would require extensive design modifications. The physical arrangement of weld RHRW-15-A in conjunction with the small radius of curvature of the outside wall surfaces of the nozzle precludes ultrasonic examination from the nozzle side. For scans normal to the weld on the vessel shell side, examinations are limited circumferentially due to large support pads attached by fillet welds at two locations (90 and 270 degree nozzle azimuths) and the close proximately of heat exchanger weld RHRW-16-A (tube sheet-to-head weld at 0 degree nozzle azimuth) and heat exchanger weld RHRW-17-A (bottom head-to-shell weld at 180 degree nozzle azimuth). The axial scan area is limited due to the close proximity of the support pad fillet weld. A total of four areas (24% of total circumference) are unrestricted for one side examination coverage. Total ultrasonic examination coverage for weld RHRW-15-A on each RHR heat exchanger was approximately 39% of the required code coverage for the weld.

1/2-ISI-18

Justification For The Granting Of Relief (continued):

Radiographic examination from the outside surface as an alternate volumetric examination method was determined to be impractical due to the component thickness (nozzle 2.5 inches and shell 1 inch) and a divider plate inside the component head affecting radiographic quality. Performing radiographic examination from the inside surface of the heat exchanger would require placing a radiographic source near the center of the head. This would require extensive modifications in order to gain access to the inside for source placement. The RHR heat exchanger would require disassembly at the tube-sheet and the component moved in an upward direction for approximately two feet. This additional code coverage gained by radiography and/or ultrasonics examinations from the inner surface to gain additional coverage are also impractical.

The estimated radiological conditions for the inside the RHR heat exchanger were determined to be the following:

20-25 rad/hour beta
10-12 rem/hour gamma
30-35 rad/hour per 100 square-cm

Maximum stay time to maintain exposure to < 1 rem is approximately 5 minutes. One rem is TVA's annual administrative dose limit for an individual. Special clothing would be required for protection from the extremely high contamination levels and from the high beta dose rate. Estimates are based on actual experience inside primary components. Respiratory protection would also be required.

Performance of an ultrasonic volumetric examination of essentially 100% of the required volume of the RHR heat exchanger full penetration nozzle-to-shell weld RHRW-15-A would be impractical. In addition, it is impractical to perform other volumetric examinations which may increase examination coverage. The surface examination of 91% of the weld areas and adjacent metal and a maximum extent practical ultrasonic examination of the subject weld provides reasonable assurance of an acceptable level of quality and safety. Significant

1/2-ISI-18

Justification For The Granting Of Relief (continued):

degradation, if present, would have been detected during the surface and ultrasonic examination that were performed on the subject weld. As a result, reasonable assurance of structural integrity for this weld is provided by the examinations that were performed.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for SQN's second 10-year inspection interval.

Implementation Schedule:

This request for relief is applicable to the second 10-year inspection interval for SQN Units 1 and 2. Weld RHRW-15-A was examined during the second period for each unit.

Background Information;

In addition, it should be noted that requests for relief for volumetric examination coverage limitations for the opposite nozzle on the RHR heat exchanger was submitted as 1-ISI-11 for Unit 1 and 2-ISI-11 for Unit 2 in the first period of the second 10-year interval and were approved by the reference letter below with no additional augmented requirements.

Reference:

Letter from Richard P. Correia, NRC, to J. A. Scalice, TVA, dated September 12, 2000.

Enclosure 3 - Examination Data Reports:
R-7390 and R-7455 (Unit 1)
R-6176 and R-6196 (Unit 2)

Enclosure 4 - ISI Program Drawings:
ISI-0290-C-02 (Unit 1)
ISI-0289-C-01 (Unit 2)

Enclosure 5 - Nondestructive Examination Procedure N-GP-28 "Calculation of ASME Code Coverage for Section XI NDE Examinations"

1/2-ISI-19

Executive Summary:

This request for relief addresses the pressurizer nozzle full penetration welds. The design configuration of the pressurizer nozzle-to-head welds precludes a 100% ultrasonic examination of the required volume for the following nozzle-to-head welds (6 inch relief nozzles: RCW-16, RCW-17, RCW-18, and RCW-19). These physical examination limitations occur when the 1989 Code examination requirements are applied in areas of components constructed and fabricated to early plant physical designs. Based on the issue date of Sequoyah's (SQN) construction permit (May 27, 1970), SQN is exempt from the code requirements for providing original design and examination access provisions as allowed in 10 CFR 50.55a(g)(4).

An ultrasonic examination was performed on accessible areas to the maximum extent practical, given the physical limitations for RCW-16 and RCW-17. The design configuration limits the best effort ultrasonic examination to approximately 66.7% for unit 1 and 68.8% for unit 2 for welds RCW-16 and RCW-17. Welds RCW-18 and RCW-19 are scheduled for examination in the third period of SQN's second 10-year inspection interval. The design configuration for welds RCW-18 and RCW-19 are the same as RCW-16 and RCW-17, and therefore, the projected examination coverage will essentially be the same as that obtained for RCW-16 and RCW-17. Performance of an ultrasonic examination of essentially 100% of full penetration welds in the pressurizer nozzle-to-vessel head welds, RCW-16 RCW-17, RCW-18 and RCW-19, is impractical. The maximum extent practical ultrasonic examination of the subject welds, provides reasonable assurance of an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the welds.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted, for the second inspection interval.

1/2-ISI-19

Units :	1 and 2
System:	Reactor Coolant - System 68
Components:	Four Pressurizer Nozzles, Full Penetration Welds
ASME Code Class:	ASME Code Class 1 (Equivalent)
Section XI Edition:	1989 Edition
Code Table:	IWB-2500-1
Examination Category:	B-D, Full Penetration Welds Of Nozzles In Vessels
Examination Item Number:	B3.110, Pressurizer Nozzle-to-Vessel Welds
Code Requirement:	ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item Number B3.110, Requires Volumetric Examination
Code Requirement From Which Relief Is Requested:	Volumetric Examination Coverage of Essentially 100% of the Nozzle-to-Vessel Welds
List Of Items Associated With The Relief Request:	6 Inch Pressurizer Relief Nozzles, Nozzle-to-Head Welds: RCW-16, RCW-17, RCW-18, and RCW-19 (Unit 1) RCW-16, RCW-17, RCW-18, and RCW-19 (Unit 2)

Basis For Relief:

The design configuration of the pressurizer precludes an ultrasonic examination of the required volume for the following nozzle-to-head welds: RCW-16 , RCW-17, RCW-18 and RCW-19. The design configuration limits

1/2-ISI-19

Basis For Relief(Continued):

ultrasonic examination to approximately 66.7% for Unit 1 and 68.8% for Unit 2 of the required examination volume, as calculated in accordance with TVA procedure N-GP-28, for welds RCW-16 and RCW-17. Welds RCW-18 and RCW-19 are scheduled for examination in the third period of the second inspection interval.

Alternative Examination:

In lieu of the code required 100% ultrasonic examination, a best effort ultrasonic examination will be performed on accessible areas to the maximum extent practical, given the physical limitations of the pressurizer nozzle-to-head welds. Refer to Enclosure 3 for examination data reports.

Justification For The Granting Of Relief:

The design configuration of the subject nozzle-to-head welds precludes ultrasonic examination of essentially 100% of the required examination volume. In order to examine the welds in accordance with the code requirements, the pressurizer would require extensive design modifications. The physical arrangement of subject nozzle welds in conjunction with the close curvature of the outside wall surfaces of the nozzle precludes ultrasonic examination from the nozzle side.

Scans normal to the weld from the head side were not obstructed allowing complete coverage of the weld from one side. Examination coverage from the one side provides reasonable assurance that no flaws parallel to the weld are present. In addition, approximately 100% of the required ultrasonic examination volume for flaws transverse to the weld was performed from the vessel head side. Total combined examination coverage for each weld (RCW-16 and RCW-17) is approximately 66.7% for unit 1 and 68.8% for unit 2 of the code required volume. Weld examinations of RCW-18 and RCW-19 are projected to receive essentially the same examination coverage.

1/2-ISI-19

Justification For The Granting Of Relief (continued):

Radiographic examination as an alternate volumetric examination method was determined to be impractical due the 2.5 inches minimum wall thickness of the component.

Gaining access to the inside surface of the pressurizer to place radiographic film would require extensive personnel protection due to high radiation and contamination levels. The pressurizer manway would have to be removed, decontamination performed, and specialized scaffolding erected to gain access. The additional code coverage gained by radiography and/or ultrasonics from the inner surface are impractical when weighed against the radiological concerns.

The estimated radiological conditions for the inside of the pressurizer were determined to be the following:

20-25 rad/hour beta
10-12 rem/hour gamma
30-35 rad/hour per 100 square cm

Maximum stay time to maintain exposure to < 1 rem is approximately 5 minutes. One rem is TVA's annual administrative dose limit for an individual. Special clothing would be required for protection from the extremely high contamination levels and from the high beta dose rate. Estimates are based on actual experience inside primary components such as steam generators. Respiratory protection would be required. Industrial safety would also be a major concern with regards to heat stress, confined space, and climbing/falling hazards.

It is concluded that performing an ultrasonic volumetric examination of essentially 100% of full penetration welds in the pressurizer nozzle to vessel head welds, RCW-16, RCW-17, RCW-18 and RCW-19, would be impractical. In addition, it would be impractical to perform other volumetric examinations which may increase examination coverage. A maximum extent practical ultrasonic examination of the subject welds provides reasonable assurance of an acceptable level of quality and safety.

1/2-ISI-19

Justification For The Granting Of Relief (continued):

It is concluded that significant degradation, if present, would be detected during an ultrasonic examination performed to the maximum extent possible of the subject welds. As a result, reasonable assurance of structural integrity is provided by the examinations performed.

Therefore pursuant to 10 CFR 50.55a(g)(5)(iii), it is recommended that relief be granted for SQN's second 10-year inspection interval.

Implementation Schedule:

This request for relief is applicable to the second 10-year inspection interval for SQN Units 1 and 2. Welds RCW-16 and RCW-17 were examined during the second period and welds RCW-18 and RCW-19 are scheduled for examination in the third period.

Background Information:

In addition, it should be noted that requests for relief for volumetric examination coverage limitations for welds RCW-16, RCW-17, RCW-18 and RCW-19 were submitted as 1-ISI-21 for Unit 1 and 2-ISI-21 for Unit 2 in SQN's first 10-year inspection interval and were approved with no additional augmented requirements.

There have been similar requests for relief, 1-ISI-9 for Unit 1 and 2-ISI-9 for Unit 2, for the volumetric examination coverage limitations on the pressurizer 4-inch spray and the 14-inch surge nozzle-to-head welds in the first period of SQN's second interval, that were approved by the reference letters below with no additional augmented requirements.

References:

Letter David E. LaBarge, NRC, to Oliver Kingsley, Jr., TVA, dated February 7,1996.

Letter Richard P. Correia, NRC, to J. A. Scalice, TVA, dated February 10, 2000.

References (continued):

Enclosure 3 - Examination Data Reports:
R-7531 and R-7532 (Unit 1)
R-6315 and R-6316 (Unit 2)

Enclosure 4 - ISI Program Drawings:
ISI-0394-C-01 and ISI-0394-C-02 (Unit 1)
ISI-0396-C-01 and ISI-0396-C-02 (Unit 2)

Enclosure 5 - Nondestructive Examination Procedure N-GP-28 "Calculation of ASME Code Coverage for Section XI NDE Examinations"

1/2-ISI-20

Executive Summary:

This request for relief addresses the Seal Water Filter (SWF)head-to-shell weld SWFW-2. The design configuration of the SWF head-to-shell weld precludes a 100% surface examination of the required area. These physical examination limitations occur when the 1989 Code examination requirements are applied in areas of components constructed and fabricated to early plant physical designs. Based on the issue date of Sequoyah's (SQN) construction permit (May 27, 1970), SQN is exempt from the code requirements for providing original design and examination access provisions as allowed in 10 CFR 50.55a(g)(4).

A liquid penetrant surface examination was performed on accessible areas to the maximum extent practical, given the physical limitations of the subject weld for Unit 1. The design configuration limits the best effort liquid penetrant surface examination to approximately 65% of the subject weld for unit 1. The subject weld for unit 2 is currently scheduled for examination during cycle 11 in the second period of SQN's second 10-year inspection interval. The design configuration for the welds are the same for both units. Therefore the projected examination coverage will be the same as that obtained for Unit 1. Performance of a surface examination of essentially 100% of the full penetration weld, SWFW-2, is impractical due to welded support attachments. The maximum extent practical surface examination of the subject weld provides reasonable assurance of an acceptable level of quality and safety because the information and data obtained from the weld surface provides sufficient information to judge the overall integrity of the weld.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for SQN's second 10-year inspection interval.

1/2-ISI-20

Units :	1 and 2
System:	Chemical Volume and Control - System 62
Components:	Seal Water Filter, Head-to-Shell Weld, Full Penetration Weld
ASME Code Class:	ASME Code Class 2 (Equivalent)
Section XI Edition:	1989 Edition
Code Table:	IWC-2500-1
Examination Category:	C-A, Pressure Retaining Welds in Pressure Vessels
Examination Item Number:	C1.20, Head Circumferential Weld
Code Requirement:	ASME Section XI, Table IWC-2500-1, Examination Category C-A, Item Number C1.20, and ASME Section XI Code Case N-435-1 "Alternative Examination Requirements for Vessels with Wall Thickness 2 inches or Less, Section XI, Division 1", Requires Surface Examination
Code Requirement From Which Relief Is Requested:	Surface Examination Coverage of Essentially 100% of the Head-to-Shell Weld
List Of Items Associated With The Relief Request:	SWF Head-to-Shell Welds: SWFW-2 (Unit 1) SWFW-2 (Unit 2)

1/2-ISI-20

Basis For Relief:

The design configuration of the SWF precludes a complete surface examination of the required area for the head-to-shell weld SWFW-2. The design configuration limits the surface examination to approximately 65% of the required examination areas as calculated in accordance with TVA procedure N-GP-28, for weld SWFW-2 in Unit 1. Weld SWFW-2 for Unit 2 is currently scheduled for examination during the second ISI period (SQN Unit 2 Cycle 11 refueling outage).

Alternative Examination:

In lieu of the code required 100% surface examination, a best effort liquid penetrant examination will be performed on accessible areas to the maximum extent practical given the physical limitations of the head-to-shell weld. Refer to Enclosure 3 for examination data reports.

Justification For The Granting Of Relief:

The design configuration of the subject head-to-shell weld precludes surface examination of essentially 100% of the required examination area. In order to examine the weld in accordance with the code requirement, the SWF would require extensive design modifications. The physical arrangement of weld SWFW-2 precludes a complete surface examination due to welded support attachments which carry the weight of the component to the floor. A total of four channel beam attachments are welded along the axial direction of the component at four equally spaced locations. Each attachment is approximately 4.4 inches in width and covers the adjoining circumferential head-to-shell weld. The complete circumference of the component is 50.25 inches. The unexamined area is 17.6 inches of a possible 50.25 inches. The unit 2 weld would achieve approximately the same coverage.

The support attachments which cover the subject weld induce negligible stresses in the head-to-shell weld. The function of the support attachment is to carry to weight of component.

1/2-ISI-20

Justification For The Granting Of Relief (continued):

Radiographic examination from the outside surface as an alternate volumetric examination method was determined to be impractical due to the support attachment affecting radiographic quality. Performing radiographic examination from the inside surface of the SWF would require placing a radiographic source near the center of the head. The SWF would require disassembly and access to the inner surface would result in extreme radiological conditions (high contamination and dose to personnel). Again radiographic quality is compromised due to the support attachments. Thus, radiography from the inner surface, to gain any additional coverage, is also impractical.

Performance of an ultrasonic volumetric examination to supplement the required coverage was also deemed to be impractical. The support attachments are 4 inch channel steel. An ultrasonic search unit cannot be placed on top of the outside head-to-shell weld due to the support attachment interference.

Performing a surface examination from the inside was determined to be impractical because of the following radiological factors.

The estimated radiological conditions for the inside surface of the SWF were determined to be the following:

3-4 rad/hour beta
1-2 rem/hour gamma
1 rad/hour per 100 square-cm

Maximum stay time to maintain exposure to < 1 rem is approximately 30 minutes. One rem is TVA's annual administrative dose limit for an individual. Special clothing would be required for protection from the extremely high contamination levels and from the high beta dose rate. Estimates are based on actual experience inside primary components. Respiratory protection would be required.

1/2-ISI-20

Justification For The Granting Of Relief (continued):

Performing a surface examination of essentially 100% of the required area of the SWF head-to-shell weld would be impractical. In addition, it is impractical to perform other volumetric or surface examinations. The maximum extent practical surface examination of the weld areas and adjacent metal and the code required VT-2 examination for leakage will provide reasonable assurance of an acceptable level of quality and safety. Significant degradation, if present, would be detected during the surface and VT-2 examinations that are performed on the subject weld. As a result, reasonable assurance of structural integrity for this weld is provided by the alternative examinations that were performed.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for SQN's second 10-year inspection interval.

Implementation Schedule:

This request for relief is applicable to the second 10-year inspection interval for SQN Units 1 and 2. Weld SWFW-2 for Unit 1 was examined in the second period and SWFW-2 for Unit 2 is also scheduled for examination during the second period (during the Unit 2 cycle 11 refueling outage).

Reference:

Enclosure 3 - Examination Data Report:
R-7609 (Unit 1)
No reports for Unit 2

Enclosure 4 - ISI Program Drawings:
ISI-0458-C-01 (Unit 1)
ISI-0459-C-01 (Unit 2)

Enclosure 5 - Nondestructive Examination Procedure N-GP-28 "Calculation of ASME Code Coverage for Section XI NDE Examinations"

ENCLOSURE 2

SEQUOYAH NUCLEAR PLANT

UNIT 2

ASME REQUESTS FOR RELIEF

2-ISI-21
2-ISI-22

2-ISI-21

Executive Summary:

This request for relief addresses the Steam Generator (SG) secondary side circumferential shell weld, SGW-D1, at a gross structural discontinuity. The design configuration of the SG upper support precludes 100% ultrasonic examination of the required volume for weld SGW-D1. These physical examination limitations occur when the 1989 Code examination requirements are applied in areas of components constructed and fabricated to early plant physical designs. Based of the issue date of Sequoyah's (SQN) construction permit (May 27, 1970), SQN is exempt from the code requirements for providing original design and examination access provisions as allowed in 10 CFR 50.55a(g)(4).

An ultrasonic examination was performed on accessible areas to the maximum extent practical given the physical limitations for weld SGW-D1. The design configuration limits the best effort ultrasonic examination to approximately 25.7% for weld SGW-D1. Performance of an ultrasonic examination of essentially 100% of full penetration weld SGW-D1 is impractical. The maximum extent practical ultrasonic examination of the subject weld, provides reasonable assurance of an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the weld.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for the second inspection interval.

2-ISI-21

Unit :	2
System:	Reactor Coolant - System 68
Component:	Steam Generator Secondary Side Circumferential Shell Weld
ASME Code Class:	ASME Code Class 2 (Equivalent)
Section XI Edition:	1989 Edition
Code Table:	IWC-2500-1
Examination Category:	C-A, Pressure Retaining Welds In Pressure Vessels
Examination Item Number:	C1.10, Shell Circumferential Welds
Code Requirement:	ASME Section XI, Table IWC-2500-1, Examination Category C-A, Item Number C1.10, Requires Volumetric Examination
Code Requirement From Which Relief Is Requested:	Volumetric Examination Coverage of Essentially 100% of the Shell Circumferential Weld
List Of Items Associated With The Relief Request:	Steam Generator Circumferential Weld (SGW-D1)

Basis For Relief:

The design configuration of the permanent SG upper support precludes an ultrasonic examination of the required volume for shell circumferential weld SGW-D1. The design configuration limits ultrasonic examination to approximately 25.7% of the required examination volume as calculated in accordance with TVA procedure N-GP-28.

2-ISI-21

Alternative Examination:

In lieu of the code required 100% ultrasonic examination, an ultrasonic examination was performed on accessible areas to the maximum extent practical, given the physical restrictions (permanent SG support) preventing 100% ultrasonic examination coverage. Refer to Enclosure 3 for examination data reports.

Justification For Granting Relief:

The design configuration of upper SG support bracket precludes ultrasonic examination of essentially 100% of the required examination volume for SG shell circumferential weld. In order to examine the weld in accordance with the code requirements, the SG support bracket would require extensive design modifications.

Scans normal to the weld from the transition shell were partially obstructed allowing partial coverage of the weld from one side. Examination coverage from the one side provides reasonable assurance that no flaws parallel to the weld are present. In addition, approximately 22% of the required ultrasonic examination volume for flaws transverse to the weld was performed from the transition shell side. Total combined examination coverage is approximately 25.7% of the code required volume.

In order to remove the permanent support from the SG would require extensive modifications in order to provide access for weld SGW-D1. The SG would require extensive scaffolding, insulation removal, bolting removal, removing Paul Monroe snubbers, unshimming the support, moving the massive support structure with a special designed hoist. Working in this region of the SG is of concern due to personnel fall potential. It would be impractical to perform these modifications to gain access to 100% of the weld volume.

Radiographic examination as an alternate volumetric examination method, was determined to be impractical due access. Gaining access to the inside surface of the SG to place radiographic film would require extensive personnel protection due to high radiation levels due to the primary tubing being exposed. The

Justification For Granting Relief (continued):

secondary side water level would have to be lowered exposing the primary tubing. In addition to high radiation levels, specialized scaffolding or platforms would be required and erected to gain access from the inside. Personnel safety would be of concern due to the fall potential, radiation exposure, and heat stress considerations. Accessing the secondary side to provide rescue efforts would be hampered by limited access between the primary tubing and the secondary shell. The additional code coverage gained by radiography and/or ultrasonics from the inner surface are impractical when weighed against the radiological concerns.

The estimated radiological conditions for the inside of the secondary side of the SG were determined to be the following:

0 rad/hour beta
10-12 rem/hour gamma
0 rad/hour per 100 square cm

Maximum stay time to maintain exposure to < 1 rem is approximately 5 minutes. One rem is TVA's annual administrative dose limit for an individual Surveys taken from SG channel head opening and are a basis for the above estimates. Estimates are based on actual experience inside primary components such as steam generators. Industrial safety would also be a major concern with regards to heat stress, confined space, and climbing/falling hazards.

It is concluded that performing an ultrasonic volumetric examination of essentially 100% of the full penetration weld of the SG secondary side, SGW-D1, would be impractical. In addition, it would be impractical to perform other volumetric examinations which may increase examination coverage. A maximum extent practical ultrasonic examination of the subject welds provides reasonable assurance of an acceptable level of quality and safety. It is concluded that significant degradation, if present, would have been detected during an ultrasonic examination performed to the maximum extent possible, of the subject welds. As

2-ISI-21

Justification For Granting Relief (continued):

a result, reasonable assurance of structural integrity for this weld is provided by the examination that was performed.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is recommended that relief be granted for the second inspection interval.

Implementation Schedule:

This request for relief is applicable to the second inspection interval for SQN Unit 2.

Background Information:

In addition, it should be noted that a request for relief for volumetric examination coverage limitations for weld SGW-D1 was submitted as 2-ISI-4 for Unit 2 in the first inspection interval and was approved with no additional augmented requirements.

Reference:

Letter from Suzanne Black, NRC, to Oliver Kingsley, Jr., TVA, dated April 19, 1990.

Enclosure 3 - Examination Data Report: R-6342

Enclosure 4 - ISI Program Drawings: ISI-0401-C-01 and ISI-0401-C-02

Enclosure 5 - Nondestructive Examination Procedure N-GP-28 "Calculation of ASME Code Coverage for Section XI NDE Examinations"

2-ISI-22

Executive Summary

This request for relief addresses circumferential pressure retaining welds in the Safety Injection System. The design configuration and materials used in the fabrication of the subject piping precludes a 100% ultrasonic examination of the required volume for the following welds: SIF-198 (elbow to branch), SIF-198B, (valve to elbow), and SIF-198C (pipe to valve). These physical examination limitations occur when the 1989 Code examination requirements are applied in areas of components constructed and fabricated to early plant physical designs. Based on the issue date of Sequoyah's (SQN) construction permit (May 27, 1970), SQN is exempt from the code requirements for providing original design and examination access provisions as allowed in 10 CFR 50.55a(g)(4).

A preservice liquid penetrant surface examination was performed on 100% of the subject welds. A preservice ultrasonic examination was performed on accessible areas to the maximum extent practical given the physical limitations and materials of the subject welds. The design configuration and materials used limits the best effort ultrasonic examination to approximately 50% of welds SIF-198, SIF-198B, and SIF-198C. Performance of an ultrasonic examination of essentially 100% of the subject circumferential pressure retaining welds is impractical. A surface examination and the maximum extent practical ultrasonic examination of the subject welds provides reasonable assurance of an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the welds.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted for the second inspection interval.

2-ISI-22

Unit:	2
System:	Safety Injection - System 63
Components:	Three Piping Circumferential Pressure Retaining Welds.
ASME Code Class:	ASME Code Class 1 (Equivalent)
Section XI Edition:	1989 Edition, 1995 Edition with 1996 Addenda and 10 CFR 50.55a(b)(2)(xv)(A)
Code Table:	IWB-2500-1
Examination Category:	B-J, Pressure Retaining Welds In Piping
Examination Item Number:	B9.11, Circumferential Welds Nominal Pipe Size 4 Inches Or Larger
Code Requirement:	ASME Section XI, Paragraph IWB-2200(c) Requires Preservice Surface and Volumetric Examinations In Accordance With Table IWB-2500-1, Examination Category B-J, Item Number B9.11
Code Requirement From Which Relief Is Requested:	10 CFR 50.55a(b)(2)(xv)(A), requires the following examination coverage when applying Supplement 2 to Appendix VIII:

(1) Piping must be examined in two axial directions and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions provided access is available.

2-ISI-22

Code Requirement From Which Relief Is Requested:

(2) Where examination from both sides is not possible, full coverage credit from a single side may be claimed only after completing a successful single sided Appendix VIII demonstration using flaws on the opposite side of the weld.

10 CFR 50.55a(b)(2)(xvi)(B), requires that examinations performed from one side of a ferritic or stainless steel pipe weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII as modified by the paragraph and 10 CFR 50.55a(b)(2)(xv)(A).

List Of Items Associated With The Relief Request:

Piping Pressure Retaining Welds:
SIF-198, Elbow to Branch Circumferential Weld
SIF-198B, Valve to Elbow Circumferential Weld
SIF-198C, Pipe to Valve Circumferential Weld

2-ISI-22

Basis for Relief:

Preservice examinations were being performed on piping circumferential welds due to the replacement of a Safety Injection System valve.

The 10 CFR 50.55a requires that if accessible, the weld shall be scanned in each of the four direction (parallel and perpendicular to the weld) where required. Coverage credit may be taken for single side examination on ferritic piping. However, for austenitic piping, a procedure must be qualified with flaws on the inaccessible side of the weld. There are currently no qualified single side examination procedures for austenitic piping welds. Current technology is not capable of reliably detecting or sizing flaws on the far side of an austenitic weld for single side examinations. The Performance Demonstration Initiative (PDI) Program conforms with 10 CFR 50.55a regarding single side access for piping. PDI Performance Demonstration Qualification Summary (PDQS) certificates for austenitic piping lists the limitation that single side examinations are performed on a best effort basis. The best effort qualification is provided in place of a complete single side qualification to demonstrate that the examiner's qualification and the subsequent weld examination is based on application of the best available technology.

When the examination area is limited to one side of an austenitic weld, examination coverage does not comply with 10 CFR 50.55a(b)(2)(xvi)(B), and full coverage credit may not be claimed.

The design configuration and materials used in fabrication of the subject Safety Injection welds preclude a preservice ultrasonic examination of the required volume because there are no current qualified single side examination procedures that demonstrate equivalency to two-sided examination procedures on austenitic piping. The design configuration and material limits ultrasonic examination to the extent indicated as calculated in accordance with TVA procedure N-GP-28.

2-ISI-22

Basis for Relief (continued):

Weld	PDI Best Effort Coverage	ASME Section XI Coverage*
SIF-198	50%	95%
SIF-198B	50%	100%
SIF-198C	50%	100%

Note:*Coverage does not consider the inherent limitations associated with the PDI for one side access.

Alternative Examinations:

In lieu of the code required 100% preservice ultrasonic examination, a preservice ultrasonic examination was performed on accessible areas to the maximum extent practical given the physical limitations of the subject welds.

Alternative Examinations (continued):

The best available techniques, as qualified through the PDI for Supplement 2 for single side examination, were used from the accessible side of the weld. The code required preservice surface examination (liquid penetrant) of 100% of the weld was also performed. Refer to Enclosure 3 for examination data reports.

Justification For Granting Relief:

The design configuration and materials used in the fabrication of the subject piping welds precludes preservice ultrasonic examination of essentially 100% of the required examination volume. In order to examine the welds in accordance with the code requirements, the Safety Injection system would require extensive modification.

The design configuration and materials used limits the best effort ultrasonic examination to approximately 50% for welds SIF-198 (elbow-to-branch), SIF-198B (valve-to-elbow),and SIF-198C (pipe-to-valve).

2-ISI-22

Justification For Granting Relief (continued):

The subject welds were examined using PDI application of the best available ultrasonic technology.

Radiographic examination as an alternate volumetric examination method was determined to be impractical due the material thickness variation and the ASME Section XI Code requiring an extended coverage (weld plus ¼" of base material). The radiographic density variation does not lend for compliance with Section V requirements without extensive radiographic exposures to obtain the density for the base material on the fitting side. The additional radiography required would increase personnel radiation exposure. In addition, a radiographic examination was performed for ASME Section III Code requirements. However due to changing material thickness in the fitting side, obtaining the proper density in the extended volume required for ASME Section XI credit was not possible.

Performance of a preservice ultrasonic examination of essentially 100% of the required volume of pressure retaining circumferential welds SIF-198 (elbow to branch), SIF-198B (valve to elbow), and SIF-198C (pipe to valve) in the Safety Injection piping would be impractical. As previously discussed, TVA determined that it would be impractical to attempt other volumetric examinations in order to increase examination coverage. The surface examination of 100% of the weld area and adjacent metal and maximum extent practical ultrasonic examination of the subject welds provides reasonable assurance of an acceptable level of quality and safety. Significant degradation, if present, would have been detected during the best effort preservice ultrasonic examination and the preservice surface examination that was performed on the subject welds. As a result, reasonable assurance of structural integrity for these welds is provided by the examinations that were performed.

Therefore pursuant to 10 CFR 50.55a(g)(5)(iii), it is requested that relief be granted, for the second inspection interval.

2-ISI-22

Implementation Schedule:

This request for relief is applicable to SQN's second 10-year inspection interval for SQN Unit 2.

Reference:

Enclosure 3 - Examination Data Reports: R-6219, R-6247, R-6248, R-6256, R-6319 and R-6348

Enclosure 4 - ISI Program Drawings: ISI-0002-C-07

Enclosure 5 - Nondestructive Examination Procedure N-GP-28 "Calculation of ASME Code Coverage for Section XI NDE Examinations"

ENCLOSURE 3

Examination Data Reports

Request for Relief Number	Examination Data Reports
1-ISI-17	R-7403 R-7453
2-ISI-17	R-6172 R-6188
1-ISI-18	R-7390 R-7455
2-ISI-18	R-6176 R-6196
1-ISI-19	R-7531 R-7532
2-ISI-19	R-6315 R-6316
1-ISI-20	R-7609
2-ISI-20	To be examined
2-ISI-21	R-6342
2-ISI-22	R-6219 R-6247 R-6248 R-6256 R-6319 R-6348

TENNESSEE VALLEY AUTHORITY	RECORD OF MAGNETIC PARTICAL	REPORT NUMBER R 6172

PROJECT: SQN UNIT: 2 CYCLE: 10
SYSTEM: SIS
WELD/COMPONENT I.D.: BIT-5
CONFIG.: VHEAD TO: VNOZ
PROCEDURE: N-MT-6 REV 20 TC N/A
EXAMINATION CODE: 89E-02
CODE CLASS: 2 CATEGORY: C-B

EXAMINATION DATE: 3 OCT 00
EXAM SURFACE: ☐ ID ☒ OD
PRESERVICE ☐
INSERVICE ☒
REFERENCE DWG NO: ISI-0074-C-01

ACCEPTANCE CRITERIA
☐ APPDX. A ☐ APPDX. B
☐ OTHER C-B

METHOD OF MAGNETIZATION

EXAMINATION MEDIUM: YOKE COLOR: GRAY BATCH NO.: 944077

YOKE Y5 ☐ Y6 ☒	PRODS: AC ☐ DC ☐	COILS: AC ☐ DC ☐
OTHER: N/A	EQUIP TYPE:	EQUIP TYPE:
EQUIP S/N: 538069	EQUIP S/N: N/A	EQUIP S/N: N/A
CAL. DUE DATE N/A	CAL. DUE DATE	CAL. DUE DATE:
POLE SPACING: 6 inches	PROD SPACING: inches	COIL TURNS:
TEST WEIGHT S/N E06219	MAG. CURRENT: amps	MAG. CURRENT: amps

THERMOMETER S/N: N/A CALIBRATION DUE DATE N/A
BLACK LIGHT METER S/N: N/A CALIBRATION DUE DATE N/A

INTENSITY VERIFICATION TIME	INIT.: N/A	1)	2)	3)

EXAMINATION RESULTS: SATISFACTORY ☒ UNSATISFACTORY ☐ NOI NO.:

EXPLANATION OF EXAM RESULTS
MT OF INLET NOZZLE TO BOTTOM HEAD OF B.I.T.
NO RECORDABLE INDICATIONS

COMMENTS / LIMITATIONS
START TIME – 12:55 STOP TIME – 13:14

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: II
REVIEWER: Robert E. Hardaway LEVEL: II DATE: 10-05-00

ANII: [signature]
DATE: 04 Nov 2000
PAGE: 1 OF 1

TENNESSEE VALLEY AUTHORITY	RECORD OF LIQUID PENETRANT EXAM	REPORT NUMBER 6176

PROJECT: SQN UNIT: 2 CYCLE: 10
SYSTEM: RHRS
WELD/COMPONENT ID: RHRW-15-A
CONFIG.: V-NOZ TO V-SHCH
PROCEDURE: N-PT-9 REV.: 19 TC: N/A
EXAMINATION CODE 89E-02
CODE CLASS: 2 CATEGORY: CB

EXAMINATION DATE 10/10/00
START TIME 10:45 END TIME: 11:36
EXAM SURFACE: ID ☐ OD ☑
PRESERVICE ☐ INSERVICE ☑
REF. DRAWING NO.: ISI-0289-C-01

ACCEPTANCE CRITERIA
☐ APPDX. A ☑ APPDX. B
☐ OTHER:

METHOD OF EXAMINATION

METHOD

WATER-WASHABLE FLUORESCENT DYE: ☐
POST-EMULSIFIABLE FLUORESCENT DYE: ☐
SOLVENT-REMOVABLE FLUORESCENT DYE: ☐
WATER-WASHABLE VISIBLE DYE: ☐
POST-EMULSIFIABLE VISIBLE DYE: ☐
SOLVENT REMOVABLE VISIBLE DYE: ☑

PENETRANT MATERIALS

BRAND NAME: Sportcheck
PENETRANT: SKL-SP BATCH: 93A02K
REMOVER: SKC-S BATCH: 99A12K
DEVELOPER: SKD-S2 BATCH: 97J05K

BLACK LIGHT
METER S/N: N/A
CAL. DUE DATE: N/A

PART TEMP: 72.4°F PYROMETER S/N: 575369 CAL. DUE DATE: 8/23/01

EXAMINATION RESULTS SATISFACTORY: ☑ UNSATISFACTORY: ☐ NOI NO.: N/A

EXPLANATION OF EXAM RESULTS:
ASME Section XI Coverage Achieved.
11/7/00

COMMENTS/LIMITATIONS:
EXAM WAS Limited due to support L1-28.5° to L2 33.5°
Coverage obtained was ~~92%~~ 91.2% (5.5" Limitation) 11/7/00

EXAMINER: LAVAR MATHENA LEVEL: II
EXAMINER: Nick W. Hinton LEVEL: II
REVIEWER: [signature] LEVEL: III DATE: 11/7/00

ANII: [signature]
DATE: 11/6/00 ~~11/7/00~~ 11/8/00
PAGE: 1 OF 1

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R6188

PROJECT: SQN	UNIT: ~~1~~ 2	CYCLE: 10		COMPONENT ID: BIT-5	
EXAMINATION METHOD				SYSTEM: SIS	ISI DWG. NO. ISI-0074-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 2	CATEGORY: C-B
PROCEDURE: N-UT-19	REV:11	TC:N/A		COFIG.: V-HEAD TO NOZZLE	
EXAMINER: Mike Kleinfan	EXAMINER: LAVAR MATHENA			EXAMINER:	EXAMINER:
LEVEL: II	LEVEL: II			LEVEL:	LEVEL:

0°,45°,60° EXAMINATION WAS PERFORMED ON THE BORON INJECTION TANK WELD BIT-5 TO MEET THE REQUIRMENTS OF ASME SEC XI CATEGORY C-B

EXAMINATION VOLUME COVERAGE

SCAN #1 0DEG. EXMINATION.....33%

SCAN#2 45DEG. TRANSVERSE-SCAN FROM THE VESSEL SIDE OF WELD.....67%

SCAN#3 45DEG. TRANSVERSE-SCAN FROM THE NOZZEL SIDE OF WELD.....0%

SCAN#4 60DEG. TRANSVERSE-SCAN FROM THE VESSEL SIDE OF WELD.....100%

SCAN#5 60DEG. TRANSVERSE-SCAN FROM THE NOZZLE SIDE OF WELD.....0%

SCAN#6 45DEG. PARALLEL-SCAN CW DIRECTION.....100%

SCAN#7 45DEG. PARALLEL-SCAN CWW DIRECTION.....100%

SCAN#8 60DEG. PARALLEL-SCAN CW DIRECTION.....100%

SCAN#9 60DEG. PARALLEL-SCAN CWW DIRECTION.....100%

TOTAL.....600/9=67%

SCAN #6 THROUGH #9 CREDIT WAS TAKEN FOR SKEWING THROUGH THE WELD ON VESSEL AREA.....(1.5 X .7X 33.25 =34.91)

LIMITATION FOR SCAN #2.....(1 X .7 X 3.25= 23.27)

THIS DATA CONTAINS THE ULTRASONIC EXAMINATION RESULTS OF THE BORON INJECTION TANK HEAD TO NOZZLE WELD. THE EXAM WAS PERFORMED TO MEET THE REQUIREMENTS OF ASME SEC XI CODE CATEGORY C-B. 67% CODE COVERAGE WAS ACHIEVED.

Results - No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
LEVEL: II DATE: 10-4-00	LEVEL: III DATE: 10/13/00	DATE: 11/14/00
		PG. 1 OF ~~12~~ 12

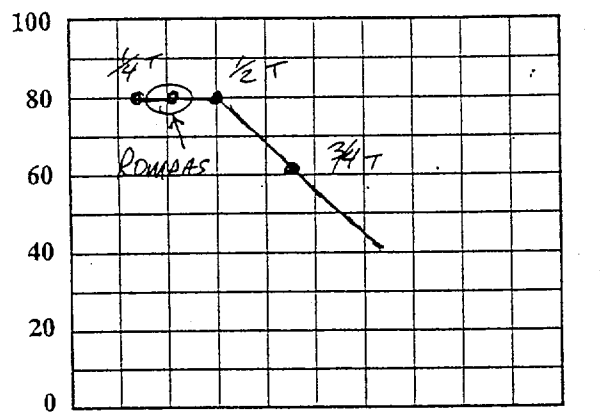
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R6188

PROJECT S'QN UNIT/CYCLE 2-10
PROCEDURE: N-UT-19 REV: 11 TC: N/A
~~INSTRUMENT~~: MODEL USN52L DUE DATE: 7-20-01
INSTRUMENT: KRAUTKRAMER S/N: ~~00F575~~ 6 OCT 00
TRANSDUCER MANUF.: KBA E30218
S/N M10111 SIZE: 1" FREQ: 2.25 MHz
CABLE TYPE RG58 A/U LENGTH: 148"

CALIBRATION DATE 2-OCT-00
CALIBRATION BLOCK NO. BNP-79 TEMP: 80°
SIMULATOR BLOCK NO. ROMPAS 94-7996
THERMOMETER S/N: 575369 DUE DATE: 8-23-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☐ LONG ☒ RL ☐

ANGLE VERIFICATION
BLOCK TYPE: N/A S/N: N/A
NOMINAL ANGLE: 0° ACTUAL ANGLE N/A

DAC



DISPLAY WIDTH 5"

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	dB	1
CIRC	~~☐~~	~~☐~~	N/A ~~dB~~	

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 0° deg DAMPING: 1000 ohms
DELAY: 0 msec PULSER: SINGLE *
ZERO: .975 msec FILTER: FIXED *
VELOCITY 2312 msec REP RATE: HIGH
RANGE: 5" inches TOF: (PEAK) FLANK
RECTIFIER: FULL POWER: DC
DUAL: ON (OFF) TCG: ON (OFF)

REF. REFLECTOR: ROMPAS SDH GAIN: 19 dB
AMPLITUDE: 80 % ~~AMPLITUDE~~ METAL PATH 1"

CALIBRATION TIMES ~~1410~~ 5 OCT.
INITIAL TIME 1115 FINAL TIME: 1410

VERIFICATION TIMES ~~1)~~ ~~2)~~ ~~3)~~ ~~4)~~ ~~5)~~ N/A ~~6)~~ ~~7)~~ ~~8)~~ ~~9)~~

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1		100	90	80	70	60	50	40	30	20
	SIGNAL 2		50	45	40	35	30	25	20	15	10
ATTENUATOR	GAIN	SET	-6 dB		-12dB		SET		+12	SET	+6
	AMP	80%	32 TO 48		16 TO 24		20%		64 TO 96	40%	64 TO 96
			40		20				80		80

COMMENTS	WELD/ITEMS EXAMINED
N/A	BIT-5

EXAMINER: Mike C. Kempson LVL.: IV
EXAMINER: [illegible] LVL.: II
EXAMINER: Mark Welch LVL.: II DATE: 10/6/00

ANII: [illegible]
DATE: 11/14/00
PAGE 2 OF 12

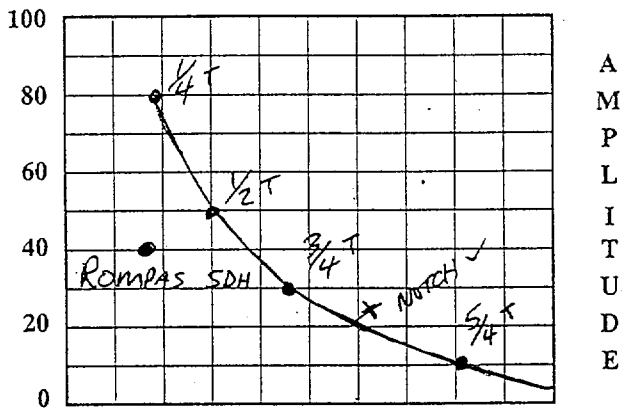
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R6188

PROJECT SQN UNIT/CYCLE 2-10
PROCEDURE: N-UT-19 REV: 11 TC: N/A
~~INSTRUMENT~~: MODEL USN52L DUE DATE: 6-20-01
INSTRUMENT: KRAUTKRAMER S/N: ~~B0F575~~ 6 OCT 00
TRANSDUCER MANUF.: KBA E30218
S/N J15206 SIZE: 5"x1.0" FREQ: 2.25 MHz
CABLE TYPE RG 58A/U LENGTH: 148"

CALIBRATION DATE 2-OCT-00
CALIBRATION BLOCK NO. BNp-79 TEMP: 80°
SIMULATOR BLOCK NO. Rompas 94-7796
THERMOMETER S/N: 575369 DUE DATE: 8-23-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☒ LONG ☐ RL ☐

ANGLE VERIFICATION
BLOCK TYPE: IIW S/N: 789191
NOMINAL ANGLE: 60° ACTUAL ANGLE 60°

DAC



DISPLAY WIDTH 10"

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	40.5 dB	3
CIRC	~~☐~~	~~☐~~	~~N/A dB~~	

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 60° deg DAMPING: 1000 ohms
DELAY: .633 msec PULSER: SINGLE *
ZERO: 14.647 msec FILTER: FIXED *
VELOCITY .1237 msec REP RATE: HIGH
RANGE: 10 inches TOF: (PEAK) FLANK
RECTIFIER: FULL POWER: DC
DUAL: ON (OFF) TCG: ON (OFF)

REF. REFLECTOR: Rompas GAIN: 40.5 dB
AMPLITUDE: 40 % ~~AMPLITUDE~~ METAL PATH 1.6"

CALIBRATION TIMES
INITIAL TIME 11:15 FINAL TIME: 1410

VERIFICATION TIMES ~~1)~~ ~~2)~~ ~~3)~~ ~~4)~~ ~~5)~~ N/A ~~6)~~ ~~7)~~ ~~8)~~ ~~9)~~

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	99	80	70	60	50	40	30	20
	SIGNAL 2	50	45	40	35	30	25	20	15	10

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD / ITEMS EXAMINED
9 DB DIFFERENT BETWEEN 3/4 T AND 5/4 T	BIT-5

EXAMINER: [signature] LVL.: II
EXAMINER: [signature] LVL.: II
EXAMINER: [signature] LVL.: II DATE: 10/6/00

ANII: [signature]
DATE: 11/14/00

PAGE 3 OF 12
11/17/00

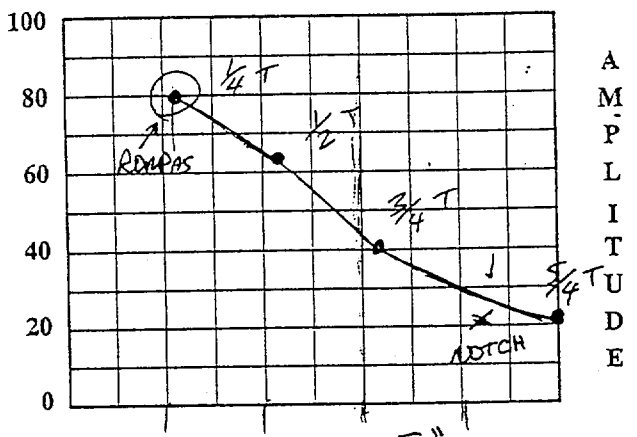
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R6188

PROJECT SQN UNIT/CYCLE 2-10
PROCEDURE: N-UT-19 REV: 11 TC: N/A
~~INSTRUMENT~~: MODEL USN52L DUE DATE: 6-20-01
INSTRUMENT: KRAUTKRAMER S/N: ~~00F575~~ A 6 OCT 00
TRANSDUCER MANUF.: KBA E30218
S/N J15205 SIZE: .5"x1.0" FREQ: 2.25 MHz
CABLE TYPE RG58 A/U LENGTH: 148"

CALIBRATION DATE 2-OCT-00
CALIBRATION BLOCK NO. RNP-79 TEMP: 80°
SIMULATOR BLOCK NO. ROMPAS 94-7996
THERMOMETER S/N: 575369 DUE DATE: 8-23-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☒ LONG ☐ RL ☐

ANGLE VERIFICATION
BLOCK TYPE: 11W S/N: 789191
NOMINAL ANGLE: 45° ACTUAL ANGLE 45°

DAC



DISPLAY WIDTH 5"

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	34.5 dB	2
CIRC	~~☐~~	~~☐~~	N/A ~~dB~~	

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 45° deg DAMPING: 1000 ohms
DELAY: .008 msec PULSER: SINGLE *
ZERO: 12.480 msec FILTER: FIXED *
VELOCITY .1266 msec REP RATE: HIGH
RANGE: 5 inches TOF: (PEAK) FLANK
RECTIFIER: FULL POWER:
DUAL: ON OFF TCG: ON OFF

REF. REFLECTOR: ROMPAS SDH GAIN: 39.5 dB
AMPLITUDE: 80 % ~~AMPLITUDE~~ METAL PATH 1"

CALIBRATION TIMES ~~1410~~ 5 OCT. 0
INITIAL TIME 1115 FINAL TIME: 1410

VERIFICATION TIMES	1)	2)	3)	4)	5) N/A	6)	7)	8)	9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1		100	90	80	70	60	50	40	30	20
	SIGNAL 2		50	45	40	35	30	25	20	15	10
ATTENUATOR	GAIN	SET	-6 dB		-12dB		SET		+12	SET	+6
	AMP	80%	32 TO 48		16 TO 24		20%		64 TO 96	40%	64 TO 96
			40		20				80		80

COMMENTS	WELD ITEMS EXAMINED
8 DB DIFFERENT BETWEEN 3/4 T AND 5/4 T	BIT-5

EXAMINER: [signature] LVL.: II
EXAMINER: [signature] LVL.: II
EXAMINER: [signature] LVL.: II DATE: 10/6/00

ANII: [signature]
DATE: 11/14/00
PAGE 34 OF 12
10/17/00

TENNESSEE VALLEY AUTHORITY	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R- 6188

PROJECT: SQN UNIT: 2

BEAM SPREAD DATE: 10-03-00

PROCEDURE: N-UT- 19 REV. 11 TC N/A

CALIBRATION SHEET NO. C- N/A

SEARCH UNIT

MANUFACTURER KBA

SIZE: 5" x 1.0" FREQ.: 2.25 MhZ

S/N: J15206 NOM. ANGLE 60°

MEASURED ANGLE: 60° DEG.

BEAM SPREAD: 60° DEG.

UT INSTRUMENT

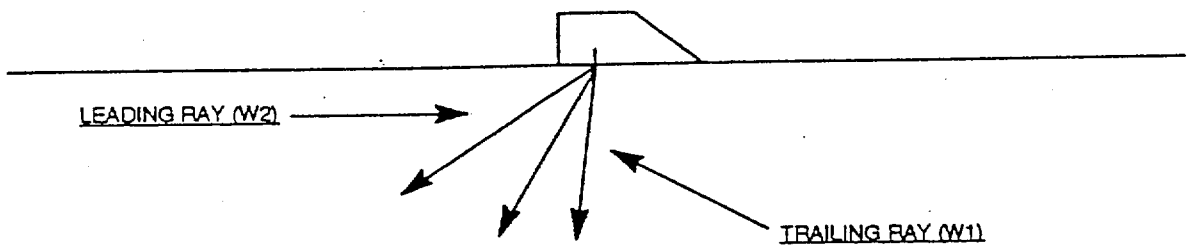
MANUFACTURER: KRAUTKRAMER

MODEL NUMBER: USN52L 6 OCT 00

SERIAL NUMBER: ~~289190~~ ~~00F575~~ E30218

HOLE POSITION	TRAILING RAY (W1)				W MAX		LEADING RAY (W2)			
	20% DAC		50% DAC		100% DAC		50% DAC		20% DAC	
	W	MP	W	MP	W	MP	W	MP	W	MP
1/4 T	1"	1.248	1 1/16"	1.300	1 7/16"	1.577	1 11/16"	1.851	1 3/4"	1.999 ~~1.843~~
1/2 T	2 3/16"	2.565	2 1/4"	2.664	2 13/16"	3.131	3 5/16"	3.583	3 3/4"	3.857
3/4 T	3 3/16"	3.810	3 1/2"	4.075	4"	4.475	5"	5.422	5 1/16"	5.529

5 OCT



R.G. 1.150 RESOLUTION VERIFICATION

NEAR SURFACE REFLECTOR: 1/4 T hole DEPTH: 11/16 IN. SIZE: 3/16

FAR SURFACE REFLECTOR: Notch DEPTH: 3 IN. SIZE: 1/4

SCANNING (REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED: ☒ YES ☐ NO

REMARKS: N/A

EXAMINER: [signature] LEVEL: II

EXAMINER: [signature] LEVEL: II

REVIEWED BY: [signature] LEVEL: II DATE: 10/6/00

ANII [signature]

DATE: 11/14/00

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TVA 19670A (NP 7/92)

TENNESSEE VALLEY AUTHORITY	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R- 6188

PROJECT: SQN UNIT: 2

BEAM SPREAD DATE: 3 OCT 00

PROCEDURE: N-UT- 19 REV. 11 TC N/A

CALIBRATION SHEET NO. C- N/A

SEARCH UNIT

MANUFACTURER KBA

SIZE: .5 x 1.0" FREQ.: 2.25 MHZ

S/N: J152065 NOM. ANGLE 45°

MEASURED ANGLE: 5 OCT 00 45° DEG.

BEAM SPREAD: 45° DEG.

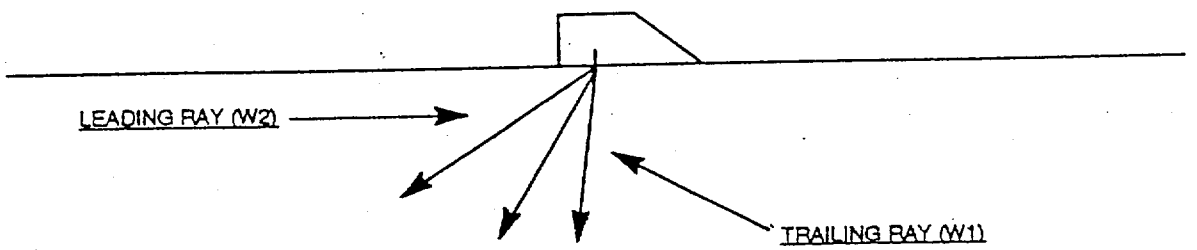
UT INSTRUMENT

MANUFACTURER: KRAUTKRAMER

MODEL NUMBER: USN52L

SERIAL NUMBER: ~~00F575~~ 6 OCT 00 E 30218

HOLE POSITION	TRAILING RAY (W1)				W MAX		LEADING RAY (W2)			
	20% DAC		50% DAC		100% DAC		50% DAC		20% DAC	
	W	MP	W	MP	W	MP	W	MP	W	MP
1/4 T	9/16"	.853	3/4"	.943	5 OCT 00 13 15/16"	1.073	1"	1.169	1 1/8"	1.224
1/2 T	1 3/8"	1.930	1 7/16"	2.000	1 5/8"	2.151	1 3/8"	2.296	1 7/8"	2.398
3/4 T	2"	2.963	2 1/8"	3.034	2 3/8"	3.233	2 1/2"	3.370	2 7/8"	3.537



R.G. 1.150 RESOLUTION VERIFICATION

NEAR SURFACE REFLECTOR: 1/4 T hole DEPTH: 11/16 IN. SIZE: 3/16

FAR SURFACE REFLECTOR: Notch DEPTH: 3 IN. SIZE: 1/4

SCANNING (REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED: ☑ YES ☐ NO

REMARKS: N/A

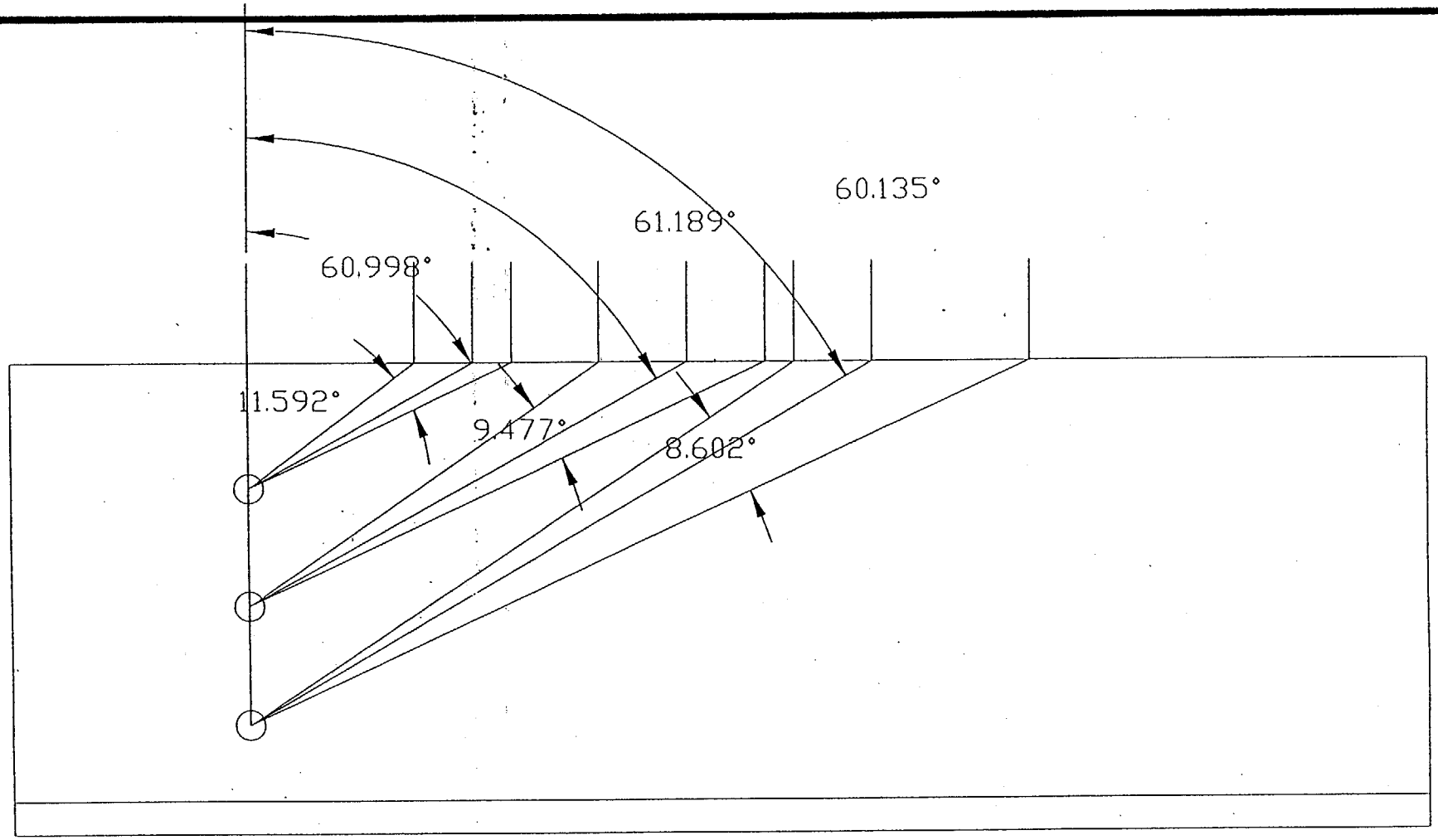
EXAMINER: [signature] LEVEL: III

EXAMINER: [signature] LEVEL: II

REVIEWED BY: [signature] LEVEL: II DATE: 10/6/00

ANII [signature]

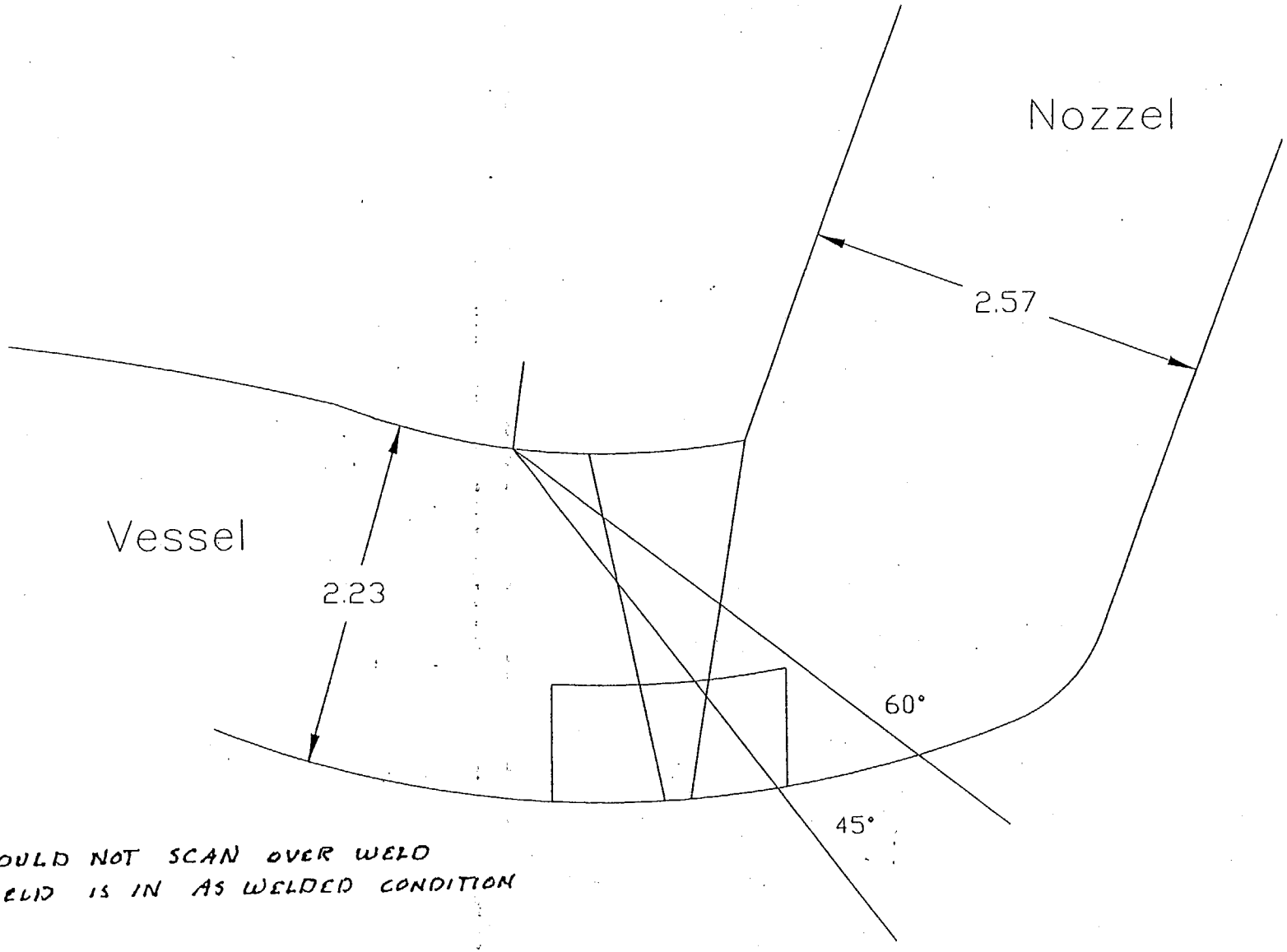
DATE: 11/14/00



R6188

as Total

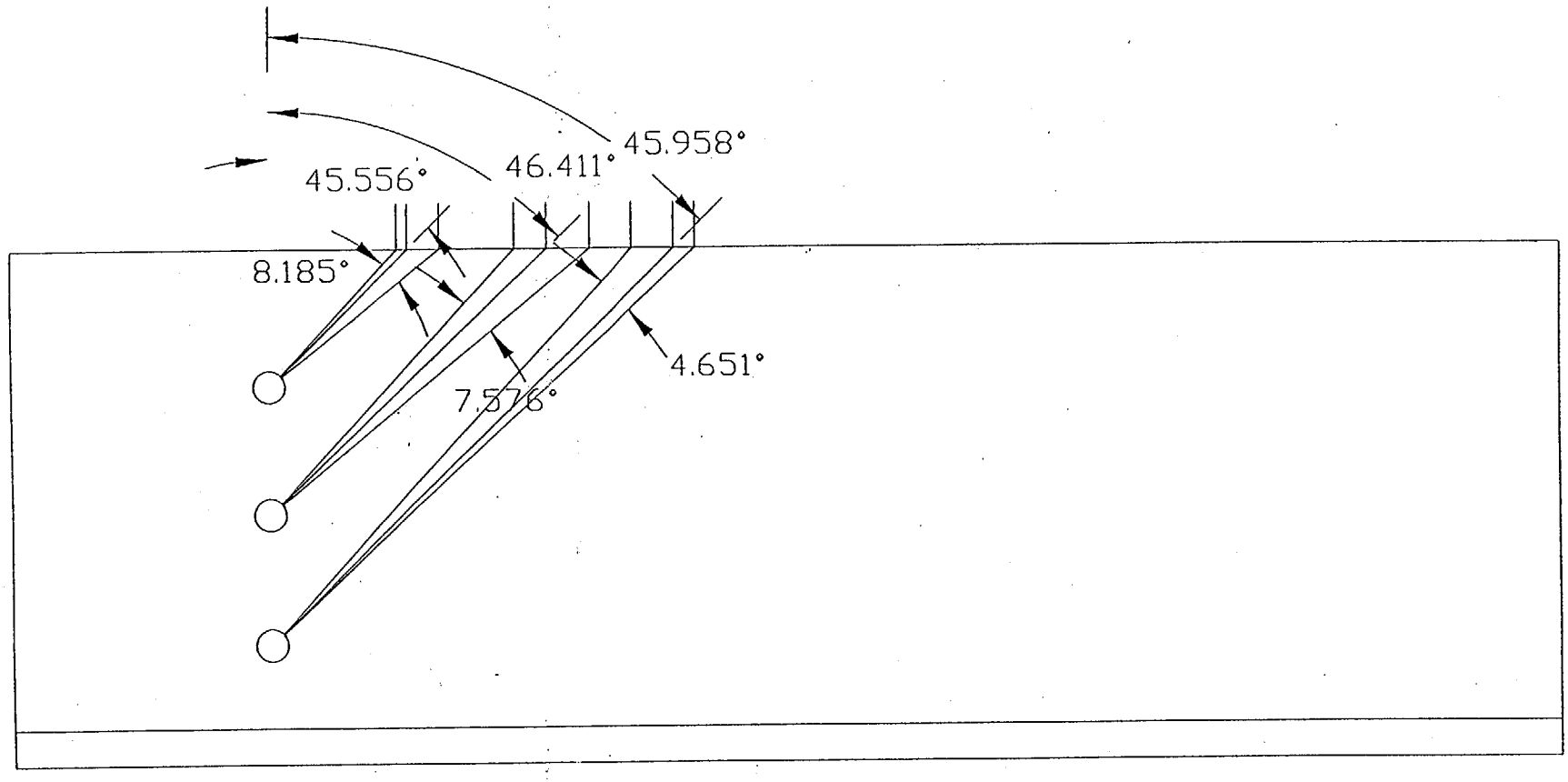
Project Site: Tennessee Valley Authority Sequoyoh unit 2	Calibration Block BNP-79	Drawn by: Mike Kleinjan ASNT Level II	Date: 03 OCT. 00



COULD NOT SCAN OVER WELD
WELD IS IN AS WELDED CONDITION

R6188

Project: Tennessee Valley Authority Site: Sequoyoh unit 2	SYS. SIS Weld ID B1	Drawn by: Mike Kleinjan ASNT Level II	Date: 03 T. 00



Project: Tennessee Valley Authority Site: Sequoyoh unit 2	Calibration Block BNP-7	Drawn by: Mike Kleinjan ASNT Level II	Date: 03 . 00

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R6188

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R- 6188

PROJECT: SQN UNIT: 2
SYSTEM: SIS
WELD I.D.: BIT-5
CONFIG: NOZZLE TO: VESSEL
PROCEDURE: N-UT- 19 REV. 11 TC: N/A

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: ℄ OF MANWAY ABOVE
SURFACE TEMP: F 82.5
PYRO. SERIAL NO. 575369

EXAMINATION DATE: 3 OCT 00
START TIME: 1337 END TIME: 1343

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	45	40.5 dB
		dB
		dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N/A							N/A	NO	NO	NO	N/A							N/A

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX) Mp1	W1	L1	50% Mp1	W1	L1	20% Mp1	W1	L1	MAX Mp	W	L	20% Mp2	W2	L2	50% Mp2	W2	L2	100% (1/2 MAX) Mp2	W2	L2

N/A

REMARKS/LIMITATIONS: SEE EXAM SUMMARY FOR COVERAGE

EXAMINER: Mike W Kaye LEVEL: II
EXAMINER: [illegible] LEVEL: II

REVIEWED BY: Matt Welch
LEVEL: II DATE: 10/6/00

ANII [illegible]

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TVA 1[illegible] (NP 7/92)

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- 6188

PROJECT: SQN UNIT: 2
SYSTEM: SIS
WELD I.D.: BIT-5
CONFIG: NOZZLE TO: VESSEL
PROCEDURE: N-UT-19 REV. 11 TC: N/A

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: ℄ OF MANWAY ABOVE
SURFACE TEMP: F 82.5°
PYRO. SERIAL NO. 575368

EXAMINATION DATE: 3 OCT 00
START TIME: 1345 END TIME: 1352

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	60	46.5 dB
		dB
		dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N/A							N/A	NO	NO	NO	N/A							N/A

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX) Mp1	W1	L1	50% Mp1	W1	L1	20% Mp1	W1	L1	MAX Mp	W	L	20% Mp2	W2	L2	50% Mp2	W2	L2	100% (1/2 MAX) Mp2	W2	L2
												N A												

REMARKS/LIMITATIONS: SEE EXAM SUMMARY FOR COVERAGE

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: II

REVIEWED BY: [signature] LEVEL: II DATE: 10/6/00

ANII [signature] 11/4/00

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TVA 19 (P 7/92)

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R- 6188

PROJECT: SQN UNIT: 2
SYSTEM: SIS
WELD I.D.: BIT-5
CONFIG: NOZZLE TO: VESSEL
PROCEDURE: N-UT- 19 REV. 11 TC: N/A

Wo REFERENCE: ℄ of WELD
Lo REFERENCE: ℄ of MANWAY ABOVE
SURFACE TEMP: F 82.5
PYRO. SERIAL NO. 575369

EXAMINATION DATE: 3 OCT 00
START TIME: 1325 END TIME: 1335

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	0	34 dB
		dB
		dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N/A							N/A	NO	N/A									N/A

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX) Mp1	W1	L1	50% Mp1	W1	L1	20% Mp1	W1	L1	MAX Mp	W	L	20% Mp2	W2	L2	50% Mp2	W2	L2	100% (1/2 MAX) Mp2	W2	L2
	N/A												N/A											

REMARKS/LIMITATIONS: SEE EXAM SUMMARY FOR COVERAGE

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: II

REVIEWED BY: [signature] LEVEL: II DATE: 10/6/00

ANII [signature] 11/6/00

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TVA 11 (NP 7/92)

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-6196

PROJECT: SQN	UNIT: 2	CYCLE: 10		COMPONENT ID: RHRW-15-A	
EXAMINATION METHOD				SYSTEM: ~~ISI~~ RHRS	ISI DWG. NO. 0289-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 2	CATEGORY: ~~C-A~~ C-B
PROCEDURE: N-UT-18	REV:23	TC:n/a		COFIG.	Flange TO Shell
EXAMINER: Mike Kleinjan	EXAMINER:			EXAMINER:	EXAMINER:
LEVEL: II	LEVEL:			LEVEL:	LEVEL:

THIS REPORT CONTAINS THE DATA ASSOCIATED WITH THE MANUAL ULTRASONIC EXAMINATION OF THE WELD RHRW-15-A. THE EXAMINATION OF THIS WELD IS IN ACCORDANCE WITH ASME SECTION XI CODE REQUIREMENTS CATEGORY ~~C-B~~ ~~C-A~~ C-B

THE WELD RHRW-15-A WAS EXAMINED UTILIZING A 1 ½ V-PATH 45° SHEAR WAVE AS THE PRIMARY EXAMINATION TECHQUE FROM THE SHELL SIDE ONLY. A SUPPLEMENTAL 60° REFRACTED LONGITUDINAL WAVE TECHNIQUE WAS PERFORMED FROM THE SHELL FOR INTERIGATION OF THE FAR SIDE OF THE WELD.

NO RECORDABLE INDICATIONS WERE OBSERVED.

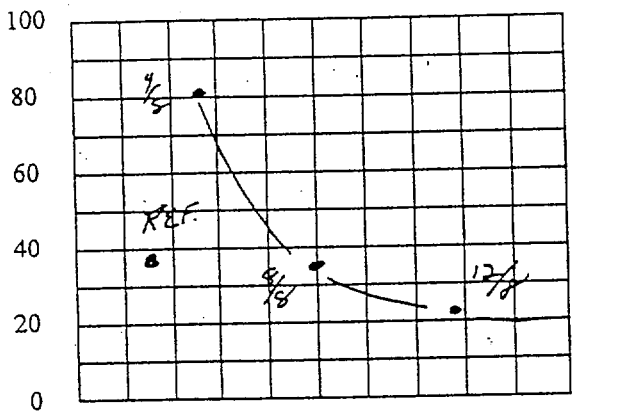
~~46%~~ 39 OF THE REQUIRED EXAMINATION COVERAGE WAS ACHIEVED PER. N-GP-28.

RESOLUTION BY: Mike W Kleinjan	REVIEWED BY:	ANII:
LEVEL: II DATE: 10-14-00	LEVEL: III DATE: 10/25/00	DATE: 11/14/00
		PG. 1 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-6196

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 12 OCT 00
PROC.: N-UT- 18 REV:23 TC:N/A	CALIBRATION BLOCK NO.: SQ-15 TEMP: 71.5'F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6-20-01	SIMULATOR BLOCK NO: 94-7995
MODEL/TYPE: USN 52L M & TE NO.: E30218	THERMOMTER S/N: 575369 DUE DATE: 8-23-01
TRANSDUCER MFG: KBA	COUPLANT ULTRAGEL II BATCH: 95325
S/N 041712 SIZE: ..5 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG-174 LENGTH: 72" inches	ANGLE VERIFICATION 12/00
	BLOCK TYPE: IIW S/N: ~~789191~~ 791538
	NOMINAL ANGLE: 45° ACTUAL ANGLE: 45°

DAC



DISPLAY WIDTH: 5.6 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	25.2 dB	5
CIRC	☐	☐	N/A dB	N/A

FREQ: ~~14-10 2-8~~ 12-00/00 MHz	REJECT: 0 %
ANGLE: 45° deg	DAMPING: 1000 ohms
DELAY: 0.0 msec	PULSER: single *
ZERO: 6.903 msec	FILTER: FIXED *
VELOCITY: .1243 msec	REP RATE: HIGH
RANGE: 5.60 inches	TOF: ☒PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: ROMPUS GAIN: 19 dB	CALIBRATION TIMES
AMPLITUDE: 35 % METAL PATH: 2"	INITIAL TIME: 11:15 FINAL TIME: 15:15

VERIFICATION TIMES	1) 11000	2) 1530	3)	4);	5)	6)	7)	8)	9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**

VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
	RHRW-15-A
	RHRW-16-A
	RHRW-17-A

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: II	LEVEL: N/A	LEVEL: III DATE: 11/25/00	DATE: 11/14/00
			PG.: 2 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-6196

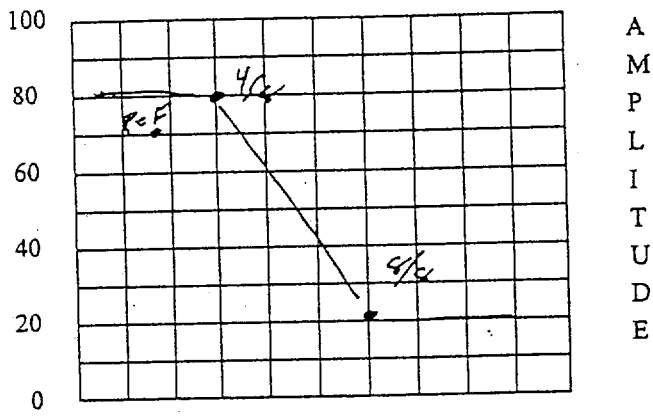
PROJECT: SQN UNIT: 2 CYCLE: 10
PROC.: N-UT- 18 REV:23 TC:N/A
INSTR. MFG: KRAUTKRAMER DUE DATE: 6-20-01
MODEL/TYPE: USN 52L M & TE NO.: E30218
TRANSDUCER MFG: KBA
S/N 44549 SIZE: .500 FREQ: 2.25 MHz
CABLE TYPE: RG-174 LENGTH: 72" inches

CALIBRATION DATE: 12 OCT 00
CALIBRATION BLOCK NO.: SQ-15 TEMP: 71.5°F
SIMULATOR BLOCK NO: 94-7995
THERMOMTER S/N: 575369 DUE DATE: 8-23-01
COUPLANT ULTRAGEL II BATCH: 95325
EXAM TYPE: SHEAR ☒ LONG ☐ RL ☐

ANGLE VERIFICATION 12/oct/00

BLOCK TYPE: IIW S/N: ~~789181~~ 791338
NOMINAL ANGLE: 60° ACTUAL ANGLE: 60°

DAC



DISPLAY WIDTH: 6.135 inches

REF. REFLECTOR: ROMPUS GAIN: 38.2 dB
AMPLITUDE: 70 % METAL PATH: 2"
VERIFICATION TIMES 1) 1400 2) 1530 3)

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	43.7 dB	6
CIRC	☐	☐	N/A dB	N/A

FREQ: 1.4-10 ~~2.8-mz~~ 12/oct/00 MHz	REJECT: 0 %
ANGLE: 60° deg	DAMPING: 1000 ohms
DELAY: 4.266 msec	PULSER: single *
ZERO: 6.903 msec	FILTER: FIXED *
VELOCITY: .1232 msec	REP RATE: HIGH
RANGE: 6.13 inches	TOF: ☒ PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

CALIBRATION TIMES

INITIAL TIME: 11:15 FINAL TIME: 15:15
4); 5) 6) 7) 8) 9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**

VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1		100	90	80	70	60	50	40	30	20	
	SIGNAL 2		50	45	40	35	30	25	20	15	10	
ATTENUATOR	GAIN	SET	-6 dB		-12 dB		SET		+12	SET		+6
	AMP	80%	32 TO 48		16 TO 24		20 %		64 TO 96	40%		64 TO 96
			40		20				80			80

COMMENTS:

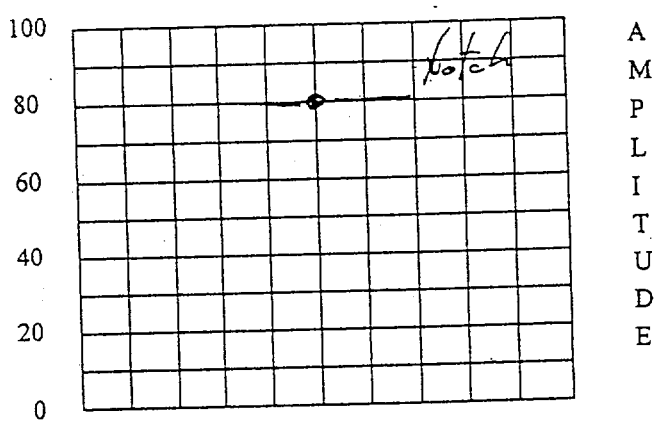
WELDS/ITEMS EXAMINED:
RHRW-15-A ok
RHRW-16-A ok
RHRW-17-A ok

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: II	N/A LEVEL:	LEVEL: III DATE: 10/25/00	DATE: 11/14/00
			PG.: 3 OF 9/10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-6196

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 12 OCT 00
PROC.: N-UT- 18 REV:23 TC:N/A	CALIBRATION BLOCK NO.: SQ-15 TEMP: 71.5'F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6-20-01	SIMULATOR BLOCK NO: 94-7995
MODEL/TYPE: USN 52L M & TE NO.: E30218	THERMOMTER S/N: 575369 DUE DATE: 8-23-01
TRANSDUCER MFG: KBA	COUPLANT ULTRAGEL II BATCH: 95325
S/N 041712 SIZE: .500 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG-174 LENGTH: 72" inches	ANGLE VERIFICATION 12/oct/00
	BLOCK TYPE: IIW S/N: ~~780191~~ 7916-28
	NOMINAL ANGLE: 45° ACTUAL ANGLE: 45°

DAC



DISPLAY WIDTH: N/A inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	26.2 dB	37
CIRC	☐	☐	N/A dB	N/A

FREQ: ~~.4-10~~ ~~2-8~~ 12/oct/00 MHz	REJECT: 0 %
ANGLE: 45° deg	DAMPING: 1000 ohms
DELAY: 0.0 msec	PULSER: single *
ZERO: 6.903 msec	FILTER: FIXED *
VELOCITY: .1243 msec	REP RATE: HIGH
RANGE: 2.82 inches	TOF: ☒PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	**CALIBRATION TIMES**
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 11:15 FINAL TIME: 15:15

VERIFICATION TIMES	1) 1100	2) 1530	3)	4);	5)	6)	7)	8)	9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**

VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL											
	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

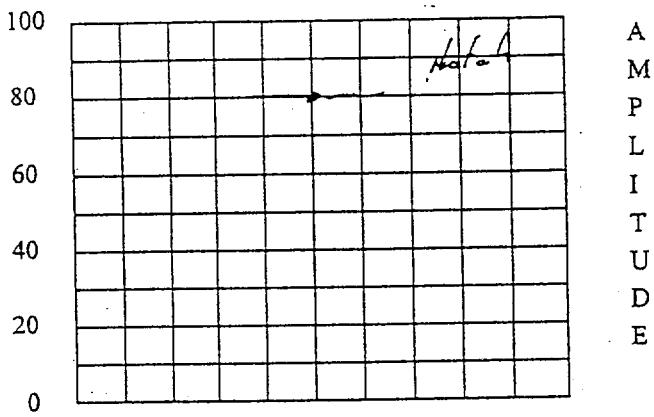
ATTENUATOR									
	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
PARALLEL EXAM	RHRW-15-A
	RHRW-16-A
	RHRW-17-A

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: II	LEVEL: N/A	LEVEL: III DATE: 10/25/00	DATE: 11/14/00 10 Jan
			PG.: 4 OF 9

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-6196

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 12 OCT 00
PROC.: N-UT- 18 REV:23 TC:N/A	CALIBRATION BLOCK NO.: SQ-15 TEMP: 71.5'F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6-20-01	SIMULATOR BLOCK NO: 94-7995
MODEL/TYPE: USN 52L M & TE NO.: E30218	THERMOMTER S/N: 575369 DUE DATE: 8-23-01
TRANSDUCER MFG: KBA	COUPLANT ULTRAGEL II BATCH: 95325
S/N 44549 SIZE: .500 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG-174 LENGTH: 72" inches	ANGLE VERIFICATION 12/oct/00
	BLOCK TYPE: IIW S/N: ~~[illegible]~~ 291538
DAC	NOMINAL ANGLE: 60° ACTUAL ANGLE: 60°



DISPLAY WIDTH: N/A inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	43.2 dB	38
CIRC	☐	☐	N/A dB	N/A

FREQ: ~~2.4~~ 2.10 ~~2.8~~ MHz 12/oct/00	REJECT: 0 %
ANGLE: 60° deg	DAMPING: 1000 ohms
DELAY: 0.0 msec	PULSER: single *
ZERO: 6.903 msec	FILTER: FIXED *
VELOCITY: .1232 msec	REP RATE: HIGH
RANGE: 4.0 inches	TOF: ☒PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 11:15 FINAL TIME: 15:15

VERIFICATION TIMES	1) 1100	2) 1530	3)	4);	5)	6)	7)	8)	9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**

VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

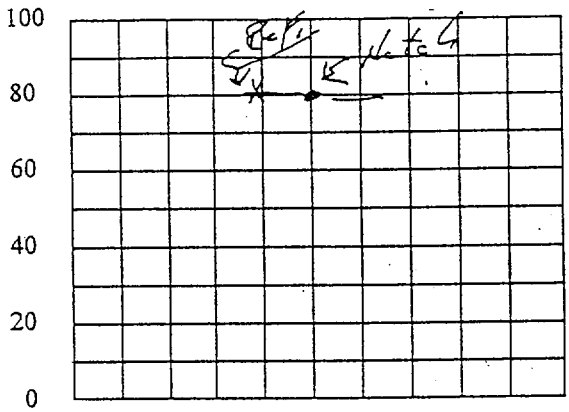
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
PARALLEL EXAM	RHRW-15-A
	RHRW-16-A
	RHRW-17-A

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: II	N/A LEVEL:	LEVEL: III DATE: 10/19/00	DATE: 11/14/00 Sum 12/4/00
			PG.: 5 OF 910

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-6196

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 12 OCT 00
PROC.: N-UT- 18 REV:23 TC:N/A	CALIBRATION BLOCK NO.: SQ-15 TEMP: 71.5'F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6-20-01	SIMULATOR BLOCK NO: 94-7995
MODEL/TYPE: USN 52L M & TE NO.: E30218	THERMOMTER S/N: 575369 DUE DATE: 8-23-01
TRANSDUCER MFG: KBA	COUPLANT ULTRAGEL II BATCH: 95325
S/N 95-852 SIZE: 7X10 FREQ: 2 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: DUAL LENGTH: 72" inches	ANGLE VERIFICATION 12/oct/00
	BLOCK TYPE: IIW S/N: ~~789191~~ 791558
DAC	NOMINAL ANGLE: 60° ACTUAL ANGLE: 60°



DISPLAY WIDTH: N/A inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE		MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY		NUMBER
AXIAL	☐	☒	44.6	dB	9
CIRC	☐	☐	N/A	dB	N/A

FREQ: .4-10 ~~2-8~~ MHz 12/oct/00	REJECT: 0 %
ANGLE: 60° deg	DAMPING: 1000 ohms
DELAY: .172 msec	PULSER: DUAL *
ZERO: 10.186 msec	FILTER: FIXED *
VELOCITY: .2286 msec	REP RATE: HIGH
RANGE: 4.0 inches	TOF: ☒PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: ROMPUS GAIN: 37.5 dB	**CALIBRATION TIMES**
AMPLITUDE: 80 % METAL PATH: 1.586"	INITIAL TIME: 11:15 FINAL TIME: 15:15

VERIFICATION TIMES	1) 1100	2) 1630	3)	4);	5)	6)	7)	8)	9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	RHRW-15-A
	RHRW-16-A
	RHRW-17-A

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: II	N/A LEVEL:	LEVEL: III DATE: 10/25/00	DATE: 11/14/00
			PG.: 6 OF 8/10

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R-6196

PROJECT: SQN UNIT: 2 CYCLE: 10

PROCEDURE: N-UT-18 REV:23 TC:N/A

SYSTEM: RHRS ISI DWG. NO: 0289-C-01

COMPONENT ID: RHRW-15-A

CONFIGURATION

SHELL TO NOZZLE

FLOW →

Wo REFERENCE: CTN. OF WELD

Lo REFERENCE: CTN.OF INLET NOZZEL

EXAMINATION DATE: 12 OCT-00

START TIME: 14:20 END TIME: 14:40

EXAM SURFACE ☐ ID ☒ OD

MATL. TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS

SURFACE TEMP.: 70. 'F PYRO. NO.: 575369

CAL DUE DATE: 8-23-01

EXAM ANGLE	45 DEG	60 DEG
CIRC. SCAN SENSITIVITY	31.2 dB	49.7 dB
AXIAL SCAN SENSITIVITY	31.2 dB	49.7 dB

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
							%	3	45	X	
							%	5	45	X	
							%	6	45	X	
							%	5	60	X	
							%	6	60	X	
							%	3	60	X	60RL EXAM
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS:

60° RL SCANNING SENSITIVITY 50.6 mk

49.7 dB 60° shear circ s/c scan ok

EXAMINER: Mike W Kluger	LEVEL: II	ANII: [signature]
EXAMINER: N/A	LEVEL: N/A	DATE: 11/14/00
REVIEWER: [signature]	LEVEL: [signature] DATE: 10/25/00	PAGE 7 OF 10

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R-6196

PROJECT: SQNP

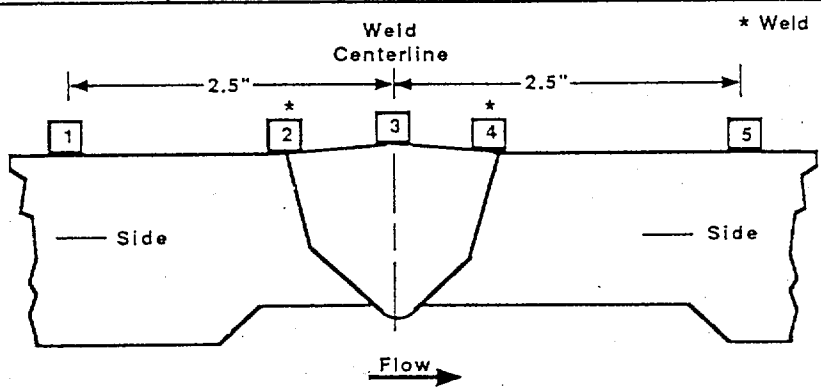
UNIT: 2

WELD NO: RHRW-15-A

SYSTEM: RHRS

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1				
2				
3				
4				
5				

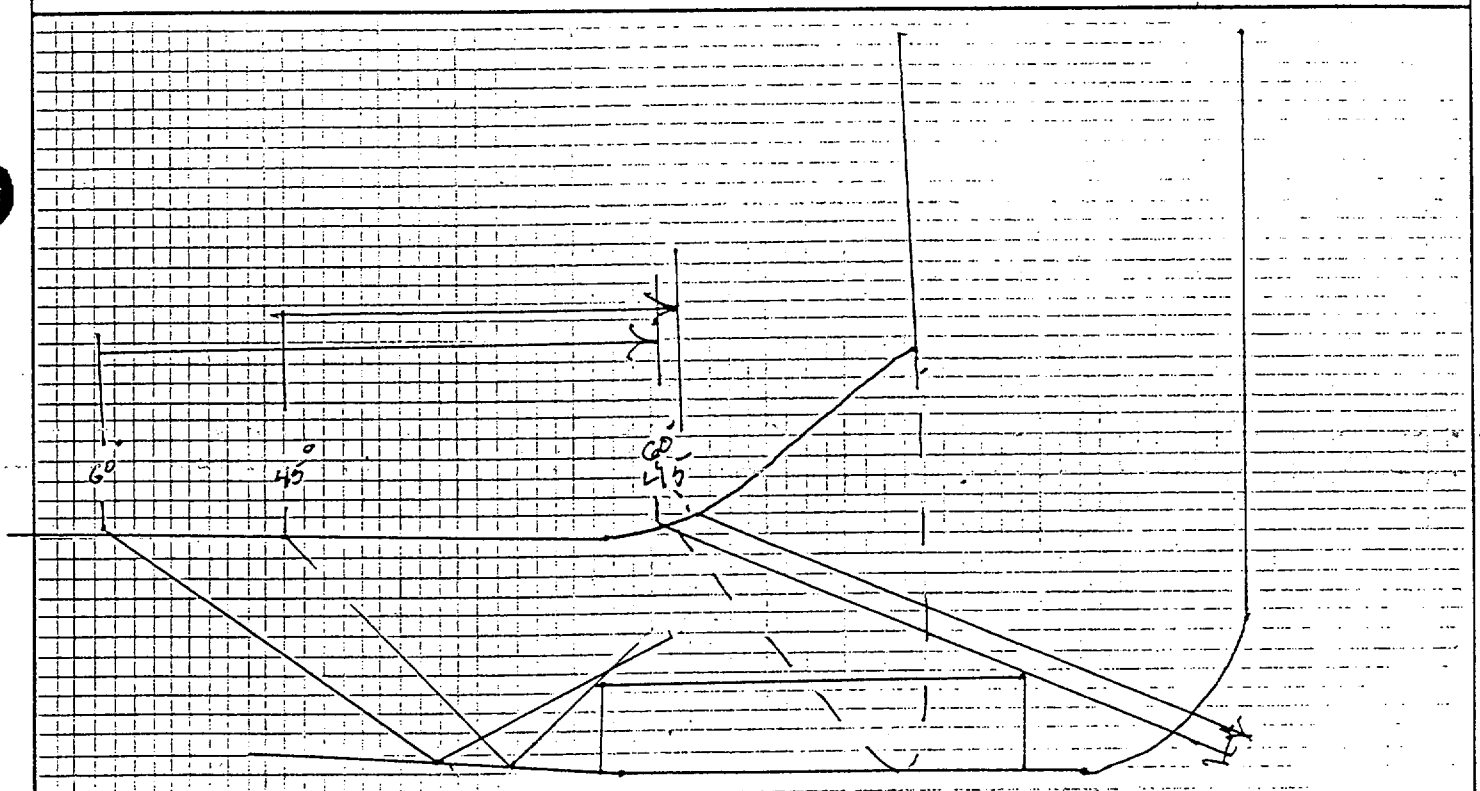


CROWN HEIGHT: FLUSH

DIAMETER: 37"

CROWN WIDTH: 1.5

WELD LENGTH: 62 1/2



Limited Coverage obtained Due to support see Outlet Nozzle

% Coverage obtained

EXAMINER: Mike Klenger	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II	LEVEL: III DATE: 10-26-00	DATE: 11/14/00
DATE: 10-17-00		PAGE 8 OF 10

TVA Office of Nuclear Power	PROJECT: SQN SYSTEM: RHR Unit: 2 WELD NO.: RHRW-15-A	REPORT NO.:

Verification of Exam Coverage

Circumferential Length = 58.0" (Adjusted to Nozzle Boss dimension (Reference Previous Reports R-5760)

T_1 Length = Total Length of Non-Limited Area =

T_1 Length = E+F+G+H

T_1 Length = 8+7+7+8 = 30"

Area in T_1 = 45° Into Nozzle = 100%

45° Away from Nozzle = 100%

45° SCAN 5 = 50%

45° SCAN 6 = 50%

T_1 Area Coverage = .25(100) + .25(100) + .25(50) + .25(50)

= 25 + 25 + 12.5 + 12.5

= 75%

T_2 Length = Total Length of Limited Region

= A+B+C+D

= 8.5 + 6 + 8 + 6

T_2 length = 28.5

Area in T_2

45° into Nozzle = 0%

45° Away from Nozzle = 0%

45° SCAN 5 = 0%

45° SCAN 6 = 0%

T_2 Coverage Area = 0%

Total Exam Coverage (TEC)

TEC = 30/58 (75%) + 28.5/58 (0)

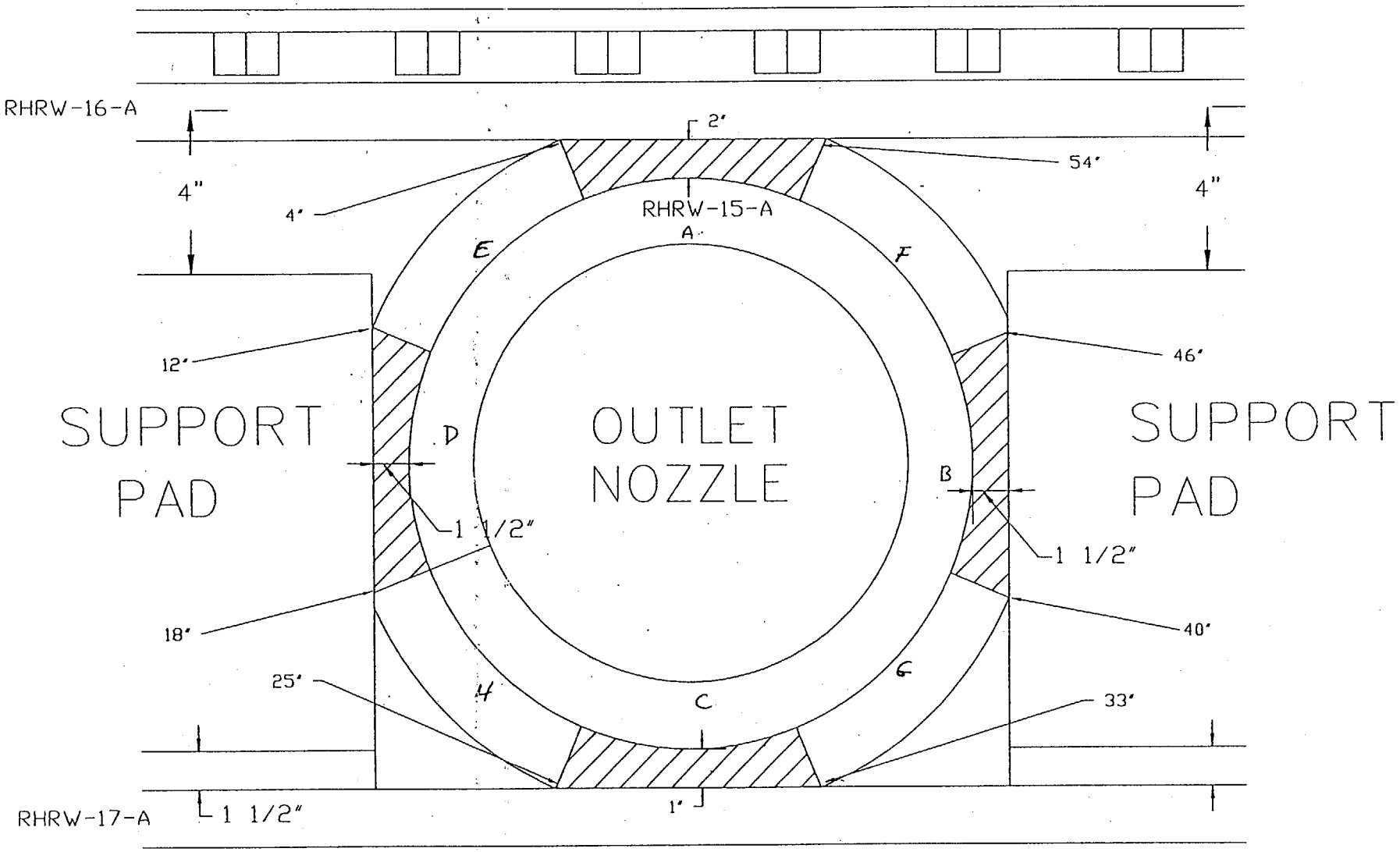
TEC = 38.8% = 39%

R-6196

BY: [signature] LEVEL: III DATE: 10/26/00 PAGE 9 OF 10 (incl. 1 of 2 sheets)

TVA 19669 (ONP-6-88)

SEQUOYAH NUCLEAR PLANT UNIT 2



AREAS OF SCANNING LIMITATION

R-6196

10 of 10

Project Tennessee Valley Authority Site: Sequoyoh unit 2	SYS. RHRW Weld ID RHRW-15-A	Drawn by: Mike Kleinjan ASNT Level II	Date: 11 OCT. 00

TENNESSEE VALLEY AUTHORITY	RECORD OF LIQUID PENETRANT EXAM	REPORT NO. R- 6219

PROJECT: SQN UNIT: 2 CYCLE: 10
SYSTEM : 63
WELD / COMPONANT I.D.: ISI#SIF-198-C
CONFIG.: PIPE TO VALVE
PROCEDURE: N-PT- 9 REV 19 TC N/A
EXAMINATION CODE: ASME SECTION III / SEC XI
CODE CLASS: 1 CATEGORY: B-J

EXAMINATION DATE: 10/26/00
START TIME: 03:05 END TIME: 03:44
EXAM SURFACE: ID ☐ OD ☒
ORIGINAL EXAM ☒ RE-EXAM ☐
REF. DRAWING NO.: N/A

ACCEPTANCE CRITERIA
N-PT-9 APPDX. A ☒ APPDX. B ☒
OTHER: N/A

METHOD OF EXAMINATION

METHOD

- ☐ WATER WASHABLE FLUORESCENT DYE
- ☐ POST-EMULSIFIABLE FLUORESCENT DYE
- ☐ SOLVENT-REMOVABLE FLUORSECENT DYE
- ☐ WATER-WASHABLE VISIBLE DYE
- ☐ POST-EMULSIFIABLE VISABLE DYE
- ☒ SOLVENT REMOVABLE VISIBLE DYE

PENETRANT MATERIALS

BRAND NAME: MAGNAFLUX
PENETRANT SKL-SP BATCH 93A02K
REMOVER SKC-S BATCH 99A12K
DEVELOPER SKD-S2 BATCH 97J05K

BLACK LIGHT

METER S/N: N/A
CAL. DUE DATE: N/A

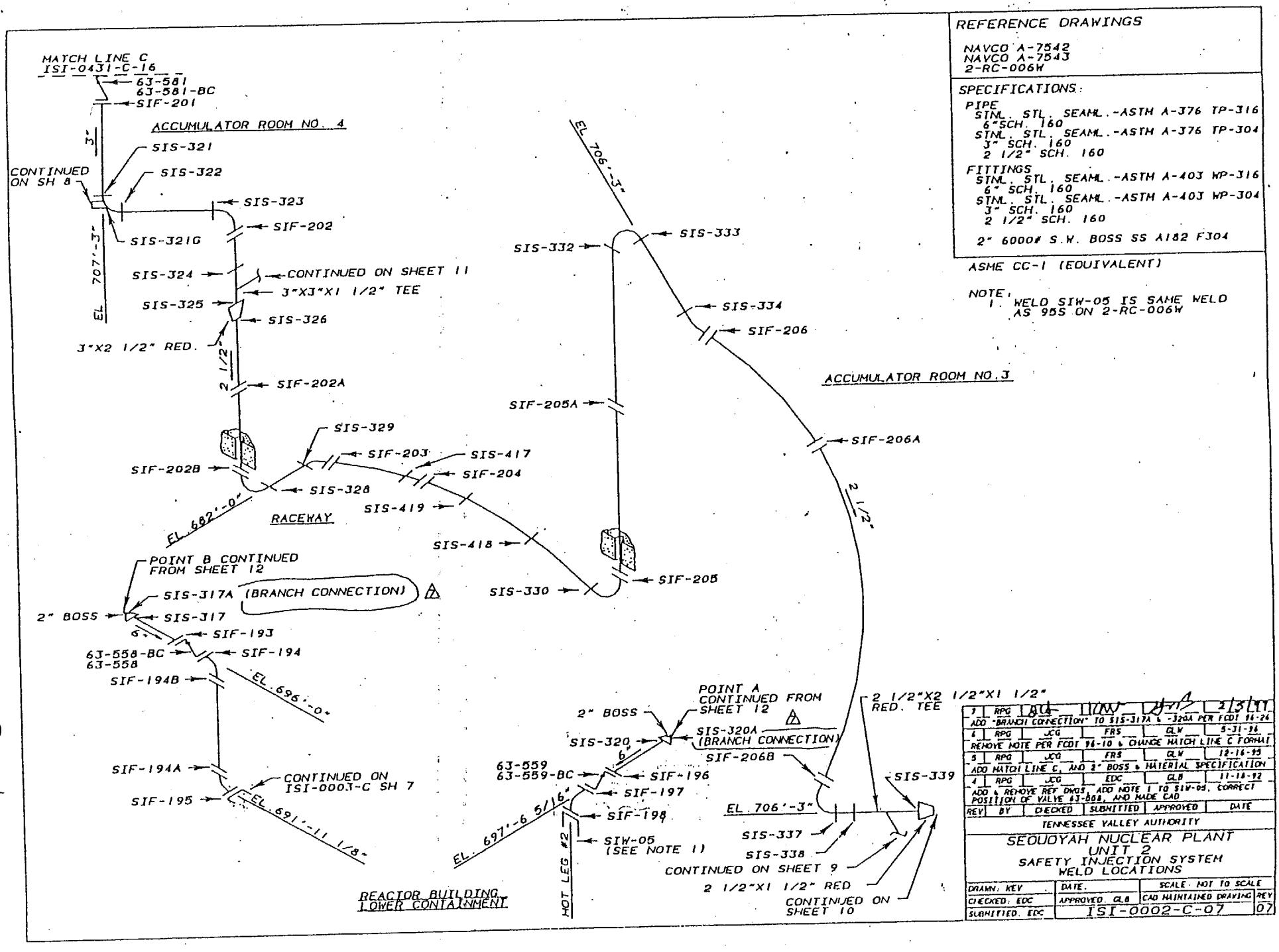
PART TEMP.: 82 °F PYROMETER S/N: E26216 CAL. DUE DATE: 7-12-01

EXAMINATION RESULTS: SATISFACTORY ☒ UNSATISFACTORY ☐ NOI NO.: N/A
EXPLANATION OF EXAM RESULTS: N/A

COMMENTS / LIMITATIONS: N/A W.O. # 00-001321-000 PSI EXAM AND B-31.7 EXAM.
ISI DRAWING # ISI-0002-C-07

EXAMINER: [signature] LEVEL II
EXAMINER: [signature] LEVEL II
REVIEWER: Robert E. Hardaway LEVEL II DATE: 10/26/00

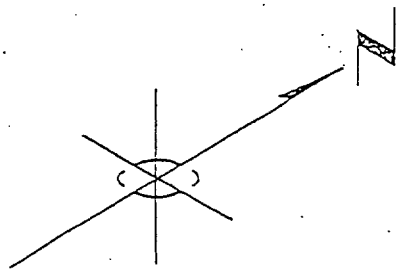
ANII: [signature]
DATE: 11/5/00
PAGE: 1 OF 3


REFERENCE DRAWINGS
NAVCO A-7542
NAVCO A-7543
2-RC-006W
SPECIFICATIONS:
PIPE
STNL. STL. SEAML.-ASTM A-376 TP-316
6" SCH. 160
STNL. STL. SEAML.-ASTM A-376 TP-304
3" SCH. 160
2 1/2" SCH. 160
FITTINGS
STNL. STL. SEAML.-ASTM A-403 WP-316
6" SCH. 160
STNL. STL. SEAML.-ASTM A-403 WP-304
3" SCH. 160
2 1/2" SCH. 160
2" 6000# S.W. BOSS SS A182 F304
ASME CC-1 (EQUIVALENT)
NOTE:
1. WELD SIW-05 IS SAME WELD AS 955 ON 2-RC-006W
MATCH LINE C
ISI-0431-C-16
6J-581
6J-581-BC
SIF-201
ACCUMULATOR ROOM NO. 4
SIS-321
SIS-322
CONTINUED ON SH 8
SIS-323
SIF-202
SIS-321G
SIS-324
CONTINUED ON SHEET 11
3"X3"X1 1/2" TEE
SIS-325
SIS-326
3"X2 1/2" RED.
SIF-202A
EL 707'-3"
SIS-329
SIF-203
SIS-417
SIF-202B
SIF-204
SIS-328
SIS-419
EL 682'-0"
RACEWAY
SIS-418
POINT B CONTINUED FROM SHEET 12
SIS-317A (BRANCH CONNECTION)
2" BOSS
SIS-317
SIF-193
6J-558-BC
6J-558
SIF-194
SIF-194B
EL 696'-0"
SIF-194A
CONTINUED ON ISI-0003-C SH 7
SIF-195
EL 691'-11 1/8"
EL 706'-3"
SIS-333
SIS-332
SIS-334
SIF-206
ACCUMULATOR ROOM NO. 3
SIF-205A
SIF-206A
2 1/2"
SIF-205
SIS-330
POINT A CONTINUED FROM SHEET 12
2" BOSS
SIS-320
SIS-320A (BRANCH CONNECTION)
SIF-206B
6J-559
6J-559-BC
SIF-196
SIF-197
SIF-198
EL 697'-6 5/16"
SIW-05 (SEE NOTE 1)
HOT LEG #2
REACTOR BUILDING LOWER CONTAINMENT
2 1/2"X2 1/2"X1 1/2" RED. TEE
SIS-339
EL 706'-3"
SIS-337
SIS-338
CONTINUED ON SHEET 9
2 1/2"X1 1/2" RED
CONTINUED ON SHEET 10
7 RPG 2/3/97
ADD "BRANCH CONNECTION" TO SIS-317A & -320A PER FCDT 96-26
6 RPG JCG FRS GLW 5-31-96
REMOVE NOTE PER FCDT 96-10 & CHANGE MATCH LINE C FORMAT
5 RPG JCG FRS GLW 12-16-95
ADD MATCH LINE C, AND 2" BOSS & MATERIAL SPECIFICATION
4 RPG JCG EDC GLB 11-18-92
ADD & REMOVE REF DWGS, ADD NOTE 1 TO SIW-05, CORRECT POSITION OF VALVE 6J-808, AND MADE CAD
REV BY CHECKED SUBMITTED APPROVED DATE
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
UNIT 2
SAFETY INJECTION SYSTEM
WELD LOCATIONS
DRAWN: KEV
DATE:
SCALE: NOT TO SCALE
CHECKED: EDC
APPROVED: GLB
CAD MAINTAINED DRAWING
REV
SUBMITTED: EDC
ISI-0002-C-07
07

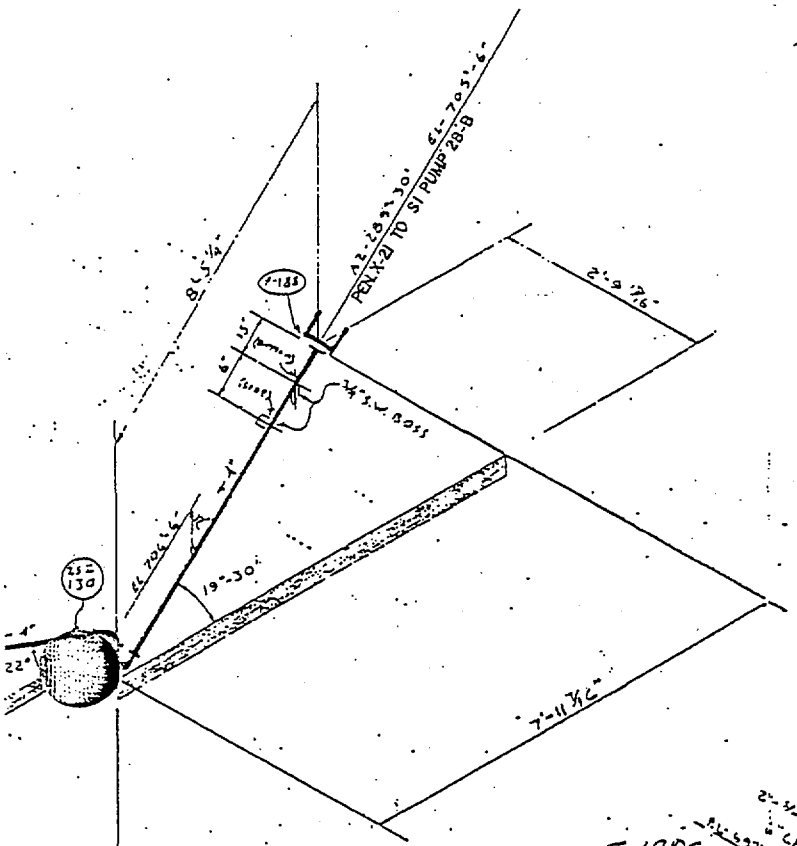
C 2/3

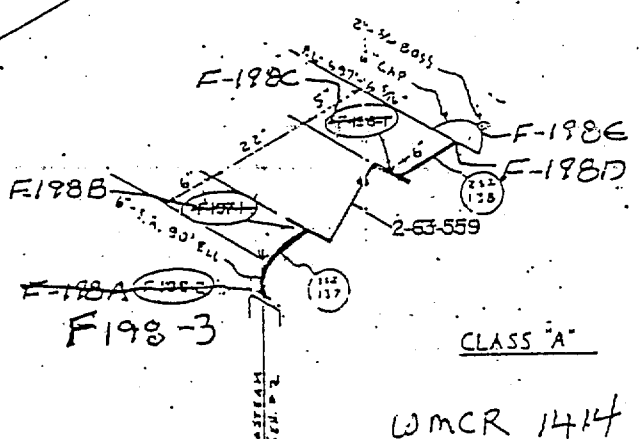
.750 2

Per Brian Turner - (Lead Eng) 10/24/00



Pipe Shop Setting on Pipe Stand





CLASS "A"

NOTES
1. TVA CODE CLASS "A" & "B"
2. WELD NOS. PREFIXED BY 2-SI-
3. WELD NOS. F-188 THRU F-198

WMCR 1414
WO 00-001321-000

Delete
~~F-198-A~~
F-197-1
F-196-1

New
~~F198A~~
F198 B
C
D
E

* WSI weld

add cut
F198-3

LEGEND

- SHOPWELD
- FIELDWELD
- PIECE MARK NUMBER
- HANGER MARK NUMBER
- HANGER LOCATION
- RT — GAMMA-RAY HOLE & PLUG
- WELD IDENTIFICATION (SHOP)
- WELD IDENTIFICATION (FIELD)
- CS — CUT SHORT

SPECIFICATIONS

DESIGN SPEC. 47B M 435
DESIGN PRESS.
DESIGN TEMP.
BACK RINGS (SHOP) (FIELD)
PREHEAT
STRESS REL.

GENERAL NOTES

ORG. XG. NAVPD 4180 OATE 71633 92615
SYSTEM CODE 20
PC. NOS. 2SI-130 THRU 2SI-138
FAB. SHTS F
LOOSE MATL. SHTS. LN
HGR. NOS. THRU
HGR. SHTS. H
REFER DWGS. 47W435-11 THRU 16
REMARKS

NATIONAL VALVE AND MANUFACTURING CO.
PITTSBURGH, PA.

SEQUOYAH NUCLEAR PLANT
UNIT #2
TVA CONTRACT - 71633 92615
SAFETY INJECTION PEN. X-21

WELD MAP

SCALE NONE
DRAWN BY JC
DATE 7/13/70
CHECKED BY BB
No. A7542

REV	SHEET	VP	DRAWN	CHKD	APPD	DATE
B	2	NA	ECP			2-21-91

REVISED PER WMCR NO. 464 FOR CAQR SQG-9000054

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-6247

PROJECT: SQN	UNIT: 2	CYCLE: 10		COMPONENT ID: F 198 B *	
EXAMINATION METHOD				SYSTEM: SIS	ISI DWG. NO. 151-0002-C-07
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: BJ
PROCEDURE: N-UT-64	REV:2	TC:00-14		COFIG.: VALVE TO ELBOW	

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
D. GRONEWOLD	J. STANFORD		
LEVEL: II	LEVEL: II	LEVEL: I	LEVEL:I

A MANUAL ULTRASONIC EXAMINATION WAS PERFORMED ON WELD F-198-B, A STAINLESS STEEL VALVE TO 6"DIA. ELBOW.

TWO 45deg. SHEARWAVES WITH A 1 1/2 V CALIBRATIONS WERE USED ALONG WITH TWO 60deg. RL'S. THIS WAS DONE BECAUSE A SMALLER FOOT PRINT TRANSDUCER IS NEEDED TO MAINTAIN CONTACT AT THE ELBOW INTRADOS.

COUNTERBORE WAS OBSEVED AND RECORDED. NO OTHER INDICATIONS WERE DETECTED.

THERE WAS NO SCANS PERFORMED ON THE VALVE SIDE DUE TO THE CONFIGUREATION.

100% ASME SECTION XI CODE COVERAGE WAS ACHIEVED BY SCANNING OVER THE WELD.

50% COVERAGE WAS ACHIEVED PER ASME SECTION XI, APPENDIX VIII REQUIREMENTS AS APPROVED BY 10CFR50.55a

WWBentley 10/29/00

*- ISI Component ID: SIF-198B

PSI EXAM
WWB 10/29/00

RESOLUTION BY:	REVIEWED BY:	ANII:
Douglas Gronewold	WWBentley	Bachwood
LEVEL: II DATE: 10/27/00	LEVEL: II DATE: 10-28-00	DATE: 11/21/00
		PG. 1 OF 9

Bjw 11/21/00

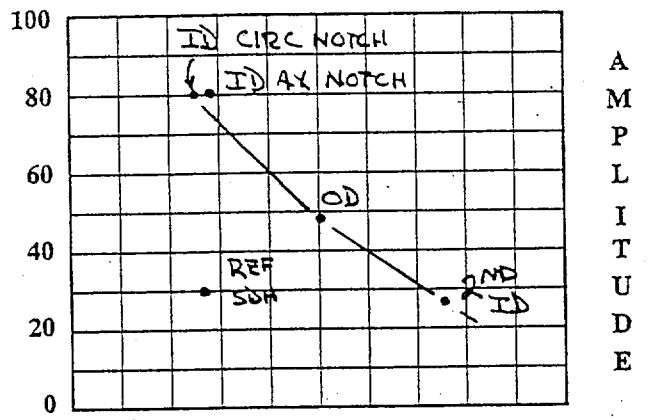
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-6247

JECT SQNP UNIT/CYCLE 2 / C10
PROCEDURE: N-UT-64 REV: 2 TC: 00-14
MODEL: USN 52L DUE DATE: 9-11-01
INSTRUMENT: KRAUTKRAMER S/N: E30217
TRANSDUCER MANUF.: KBA
S/N 00DPPK SIZE: .25 FREQ: 2.25 MHz
CABLE TYPE RG-174 LENGTH: 72"

CALIBRATION DATE 10-27-00
CALIBRATION BLOCK NO. SQ 1 TEMP: 72
SIMULATOR BLOCK NO.: 790390
THERMOMETER S/N: 552190 DUE DATE: 8-17-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☑ LONG ☐ RL ☐

ANGLE VERIFICATION
BLOCK TYPE: ROMPAS S/N: 790390
NOMINAL ANGLE: 45 ACTUAL ANGLE: 45

DAC



DISPLAY WIDTH 3.734

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☑	☐	27 dB	6
CIRCI	☑	☐	38 dB	6

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 45 deg DAMPING: 1000 ohms
DELAY: -0.234 msec PULSER: SINGLE *
ZERO: 4.252 msec FILTER: FIXED *
VELOCITY .1229 msec REP RATE: HIGH
RANGE: 3.734 inches TOF: PEAK FLANK
RECTIFIER: FULL POWER: DC
DUAL: ON OFF TCG: ON OFF

REF. REFLECTOR: ROMPAS SDH GAIN: 27 dB
AMPLITUDE: 30 % METAL PATH: 1.01

CALIBRATION TIMES
INITIAL TIME 1215 FINAL TIME: 1613

VERIFICATION TIMES	1) 1346	2) 1400	3)	4)	5)	6)	7)	8)	9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20
	SIGNAL 2	50	45	40	35	30	25	20	15	10

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD/ITEMS EXAMINED
SCAN FROM 7.0" TO 10.0"	F-198-B

EXAMINER: Douglas Honeycutt LVL.: II
EXAMINER: Julian Stanford LVL.: II
REVIEWER: W M Bentley LVL.: III DATE: 10-28-00

ANII: M Richardson
DATE: 11/21/00
PAGE 2 OF 9

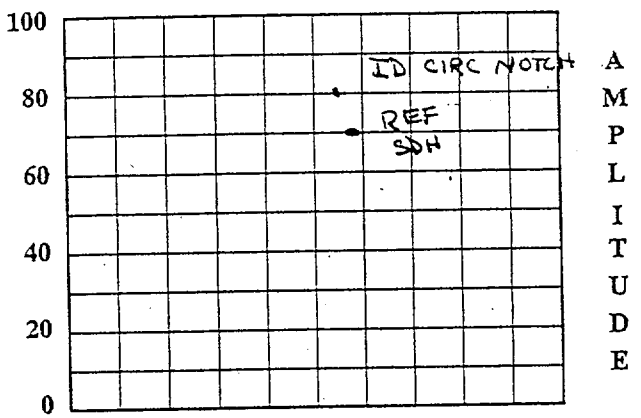
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-6247

JECT SQNP UNIT/CYCLE 2 / C10
PROCEDURE: N-UT-G4 REV: 2 TC: 00-14
MODEL: USN 52L DUE DATE: 9-11-01
INSTRUMENT: KRAUTKRAMER S/N: E30217
TRANSDUCER MANUF.: MEGASONICS
S/N H0804 ✓ SIZE: 2(.14x.3) ✓ FREQ: 4. ✓ MHz
CABLE TYPE RG-174 LENGTH: 72"

CALIBRATION DATE 10-27-00
CALIBRATION BLOCK NO. SQ 1 TEMP: 72
SIMULATOR BLOCK NO.: 790390
THERMOMETER S/N: 552190 DUE DATE: 8-17-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☐ LONG ☐ RL ☑

ANGLE VERIFICATION
BLOCK TYPE: ROMPAS S/N: 790390
NOMINAL ANGLE: 60 ACTUAL ANGLE: 60

DAC



DISPLAY WIDTH 2.5"

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☑	☐	57 dB	10
CIRC	☐	☐	N/A dB	N/A

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 60 deg DAMPING: 1000 ohms
DELAY: -0.016 msec PULSER: DUAL *
ZERO: 4.319 msec FILTER: FIXED *
VELOCITY .2224 msec REP RATE: HIGH
RANGE: 2.5 inches TOF: PEAK FLANK
RECTIFIER: FULL POWER: DC
DUAL: ON OFF TCG: ON OFF

REF. REFLECTOR: ROMPAS SDH GAIN: 51.0 dB
AMPLITUDE: 70 % METAL PATH: 1.47

CALIBRATION TIMES
INITIAL TIME 1225 FINAL TIME: 1618

VERIFICATION TIMES	1) 1421	2) 1432	3)	4)	5)	6)	7)	8)	9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	
ATTENUATOR	GAIN	SET	-6 dB	-12dB		SET	+12		SET	+6	
	AMP	80%	32 TO 48	16 TO 24		20%	64 TO 96		40%	64 TO 96	
			40	20			80			80	

COMMENTS	WELD/ITEMS EXAMINED
	F-198-B
SCAN FROM 1.0" TO 10.0"	

EXAMINER: Doyle Honeycutt LVL.: II
EXAMINER: Julie [illegible] LVL.: II
REVIEWER: [illegible] LVL.: III DATE: 10-28-00

ANII: [illegible]
DATE: 11/21/00
PAGE 3 OF 9

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER R-6247

PROJECT SQN4 UNIT/CYCLE 2 / C10
SYSTEM: SAFETY INJ.
WELD I.D.: F198 B
CONFIG.: VALVE TO ELBOW
FLOW →

PROCEDURE: N-UT- REV: TC:
Wo REFERENCE: WELD ℄
Lo REFERENCE: TDC

EXAMINATION DATE 10-27-00
START TIME: 1347 END TIME: 1432
EXAM SURFACE ☐ ID ☑ OD
MATERIAL TYPE: ☐ CS ☑ SS ☐ CSCL ☐ CCSS
SURFACE TEMP.: 69° PYRO NO. 552190

EXAMINATION ANGLE	45 S	DEG.	60 RL	DEG.
CIRC. SCAN SENSITIVITY	N/A	dB	N/A	dB
AXIAL SCAN SENSITIVITY	39	dB	57	dB

IND NO.	L (in) FROM REF.			AT MAX AMP			MAX AMP % DAC	EXAM NO. 3-14	NOM. ANG.	NRI	INDICATION INFORMATION: TYPE, DAMPING, ETC.
	L1	L Max	L2	W MAX	MP MAX	D MAX					
1	7.0"	10.4"	12.5"	1.20"	1.28"	.838	90%	4	45°S		COUNTERBORE
1	7.0"	10.4"	12.5	1.20"	1.18	.590	120+	4	60°RL		COUNTERCORE

REMARKS/LIMITATIONS HAD TO USE SMALL FOOT PRINT TRANSDUCERS (.25" SHEAR AND A 2(.14 X.3) RL) IN THIS AREA DUE TO THE ELBOW INTRADOS.

THE SCANS WERE PERFORMED WITH A 10% TO 20% ID ROLL

NO SCAN #3 DUE TO THE VALVE, AND SCANS 5 + 6 WERE PERFORMED WITH THE .375" 45 SHEARWAVE TRANSDUCER — SEE OTHER DATA SHEET.

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: II
REVIEWED BY: [signature] LEVEL: III DATE: 10-28-00

ANII: [signature]
DATE: 11/21/00

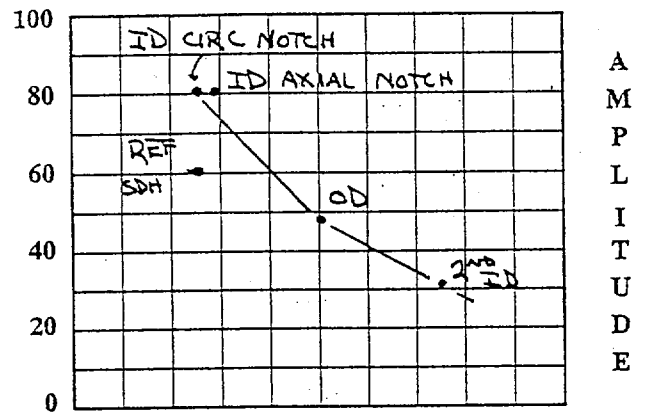
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-6247

JECT SQNP UNIT/CYCLE 2 / C10
PROCEDURE: N-UT-G4 REV: 2 TC: 00-14
MODEL: USN 52L DUE DATE: 9-11-01
INSTRUMENT: KRAUTKRAMER S/N: E30217
TRANSDUCER MANUF.: KBA
S/N 008MCC SIZE: .375 FREQ: 2.25 MHz
CABLE TYPE RG174 LENGTH: 72"

CALIBRATION DATE 10-27-00
CALIBRATION BLOCK NO. SQ1 TEMP: 72
SIMULATOR BLOCK NO.: 790390
THERMOMETER S/N: 552190 DUE DATE: 8-17-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☑ LONG ☐ RL ☐

ANGLE VERIFICATION
BLOCK TYPE: ROMPAS S/N: 790390
NOMINAL ANGLE: 45 ACTUAL ANGLE: 45

DAC



DISPLAY WIDTH

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☑	☐	24 dB	2
CIRC	☑	☐	31 dB	2

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 45 deg DAMPING: 1000 ohms
DELAY: -0.195 msec PULSER: SINGLE *
ZERO: 5.368 msec FILTER: FIXED *
VELOCITY .1229 msec REP RATE: HIGH
RANGE: 3.826 inches TOF: PEAK FLANK
RECTIFIER: FULL POWER: DC
DUAL: ON OFF TCG: ON OFF

F. REFLECTOR: ROMPAS SDH GAIN: 24 dB
AMPLITUDE: 60 % METAL PATH: 1.02"

CALIBRATION TIMES
INITIAL TIME 1210 FINAL TIME: 1610

VERIFICATION TIMES	1) 1324	2) 1345	3) 1434	4) 1450	5) 1507	6) 1530	7)	8)	9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	
ATTENUATOR	GAIN	SET	-6 dB	-12dB		SET		+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24		20%		64 TO 96	40%	64 TO 96	
			40	20				80		80	

COMMENTS	WELD/ITEMS EXAMINED
	F-198-B
	F-198-C
	F-198-D

EXAMINER: Doug Dronewski LVL.: II
EXAMINER: Julian Flanders LVL.: II
REVIEWER: M Bentley LVL.: III DATE: 10-28-00

ANII: Bodwood
DATE: 11/21/00

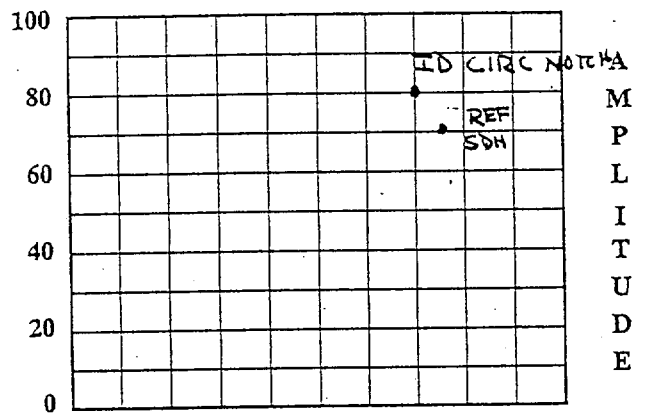
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-6247

JECT SQNP UNIT/CYCLE 2 / C10
PROCEDURE: N-UT-G4 REV: 2 TC: 00-14
MODEL: USN 52L DUE DATE: 9-11-01
INSTRUMENT: KRAUTKRAMER S/N: E30217
TRANSDUCER MANUF.: MEGASONICS
S/N K2829 SIZE: 2(.25x.5) FREQ: 2 MHz
CABLE TYPE RG-174 LENGTH: 72"

CALIBRATION DATE 10-27-00
CALIBRATION BLOCK NO. SQ 1 TEMP: 72
SIMULATOR BLOCK NO.: 790390
THERMOMETER S/N: 552190 DUE DATE: 8-17-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☐ LONG ☐ RL ☑

ANGLE VERIFICATION
BLOCK TYPE: ROMPAS S/N: 790390
NOMINAL ANGLE: 60 ACTUAL ANGLE: 60

DAC



DISPLAY WIDTH DEPTH CAL 1.00"

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☐	N/A dB	N/A
CIRC	☑	☐	61 dB	3

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 60 deg DAMPING: 1000 ohms
DELAY: 0.008 msec PULSER: DUAL *
ZERO: 7.733 msec FILTER: FIXED *
VELOCITY .1288 msec REP RATE: HIGH
RANGE: 1.00 inches TOF: (PEAK) FLANK
RECTIFIER: FULL POWER: DC
DUAL: (ON) OFF TCG: ON (OFF)

F. REFLECTOR: ROMPAS SDH GAIN: 45 dB
AMPLITUDE: 70 % METAL PATH: .750 DEPTH

CALIBRATION TIMES
INITIAL TIME 1220 FINAL TIME: 1616

VERIFICATION TIMES	1) 1404	2) 1420	3) 1451	4) 1503	5)	6)	7)	8)	9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL											
	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	
ATTENUATOR	GAIN	SET	-6 dB	-12dB		SET	+12		SET	+6	
	AMP	80%	32 TO 48	16 TO 24		20%	64 TO 96		40%	64 TO 96	
			40	20			80			80	

COMMENTS	WEED/ITEMS EXAMINED
	F-198-B
	F-198-C

EXAMINER: Doug Ironewall LVL.: II
EXAMINER: [signature] LVL.: II
REVIEWER: [signature] LVL.: III DATE: 10-28-00

ANII: [signature]
DATE: 11/21/00
PAGE 6 OF 9

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER R-6247

PROJECT SQNP UNIT/CYCLE 2 / C10
SYSTEM: SAFETY INJ.
WELD I.D.: F198B
CONFIG.: VALVE TO ELBOW
FLOW

EXAMINATION DATE 10-27-00
START TIME: 1325 END TIME: 1420
EXAM SURFACE ☐ ID ☑ OD
MATERIAL TYPE: ☐ CS ☑ SS ☐ CSCL ☐ CCSS
SURFACE TEMP.: 69° PYRO NO. 552190

PROCEDURE: N-UT-64 REV: 2 TC: 00-14
Wo REFERENCE: WELD ℄
Lo REFERENCE: TDC

EXAMINATION ANGLE	45°	DEG.	60°RL	DEG.
CIRC. SCAN SENSITIVITY	36	dB	N/A	dB
AXIAL SCAN SENSITIVITY	37	dB	61	dB

IND NO.	L (in) FROM REF.			AT MAX AMP			MAX AMP % DAC	EXAM NO. 3-14	NOM. ANG.	NRI	INDICATION INFORMATION: TYPE, DAMPING, ETC.
	L1	L Max	L2	W MAX	MP MAX	D MAX					
2	13.1	15.0"	18.5	1.22	.996	.70	63%	4	45°S		COUNTERBORE
								5	45°S	✓	
								6	45°S	✓	
								4	60°RL	✓	

REMARKS/LIMITATIONS NO SCANS WERE PERFORMED WITH THESE TRANSDUCERS FROM 7.0" TO 10.0" DUE TO THE ELBOW INTRADOSE — SEE OTHER DATA SHEET.

NO SCAN #3 DUE TO THE VALVE

ALL SCANS PERFORMED WITH 10% TO 20% ID ROLL

EXAMINER: Douglas Greenwald LEVEL: II
EXAMINER: Julian Stanford LEVEL: II
REVIEWED BY: [signature] LEVEL: III DATE: 10-28-00

ANII: [signature]
DATE: 11/21/00

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R-6247

PROJECT: SQNP

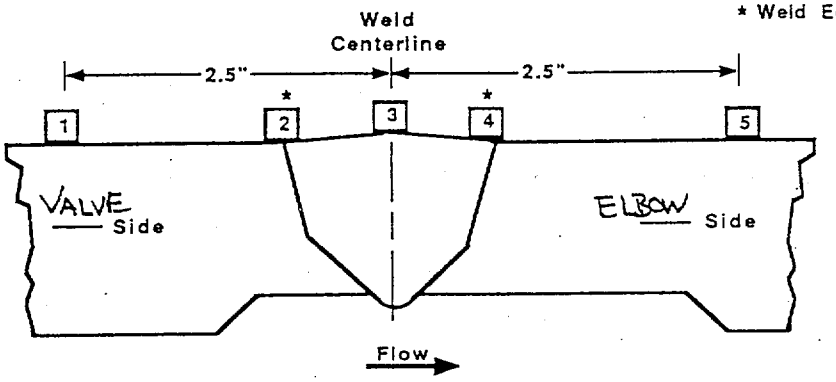
UNIT: 2

WELD NO: F198B

SYSTEM: SAFETY INJ.

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	N/A	\	N/A	\
2	N/A	\	N/A	\
3	.870	N/A	.960	N/A
4	.710	\	1.150	\
5	.900	\	1.10	\

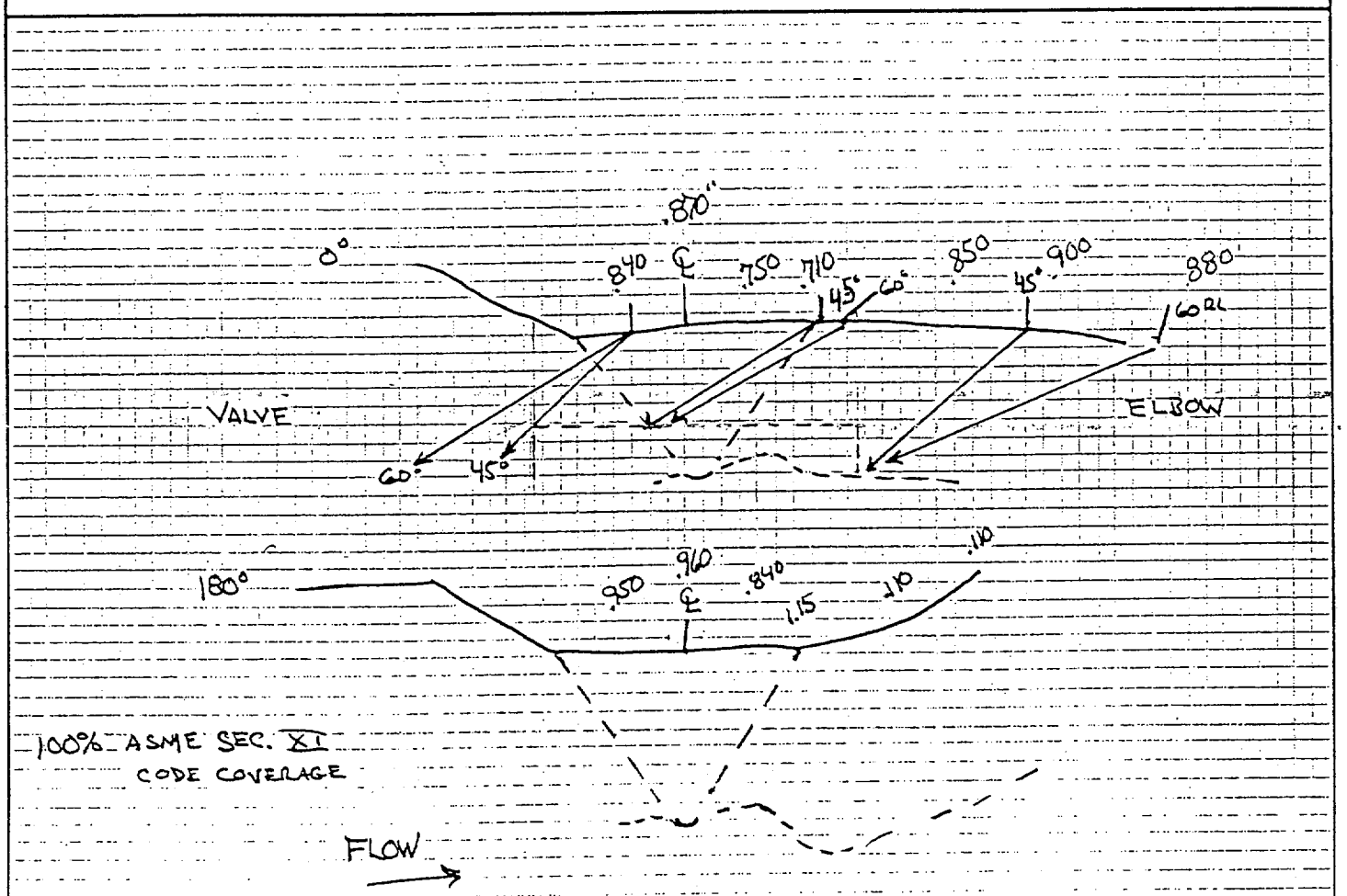


CROWN HEIGHT: FLUSH

CROWN WIDTH: 1.35"

DIAMETER: 6"

WELD LENGTH: 21.5"



EXAMINER: Douglas Aronewald

LEVEL: II

DATE: 10-27-00

REVIEWED BY: [signature]

LEVEL: III

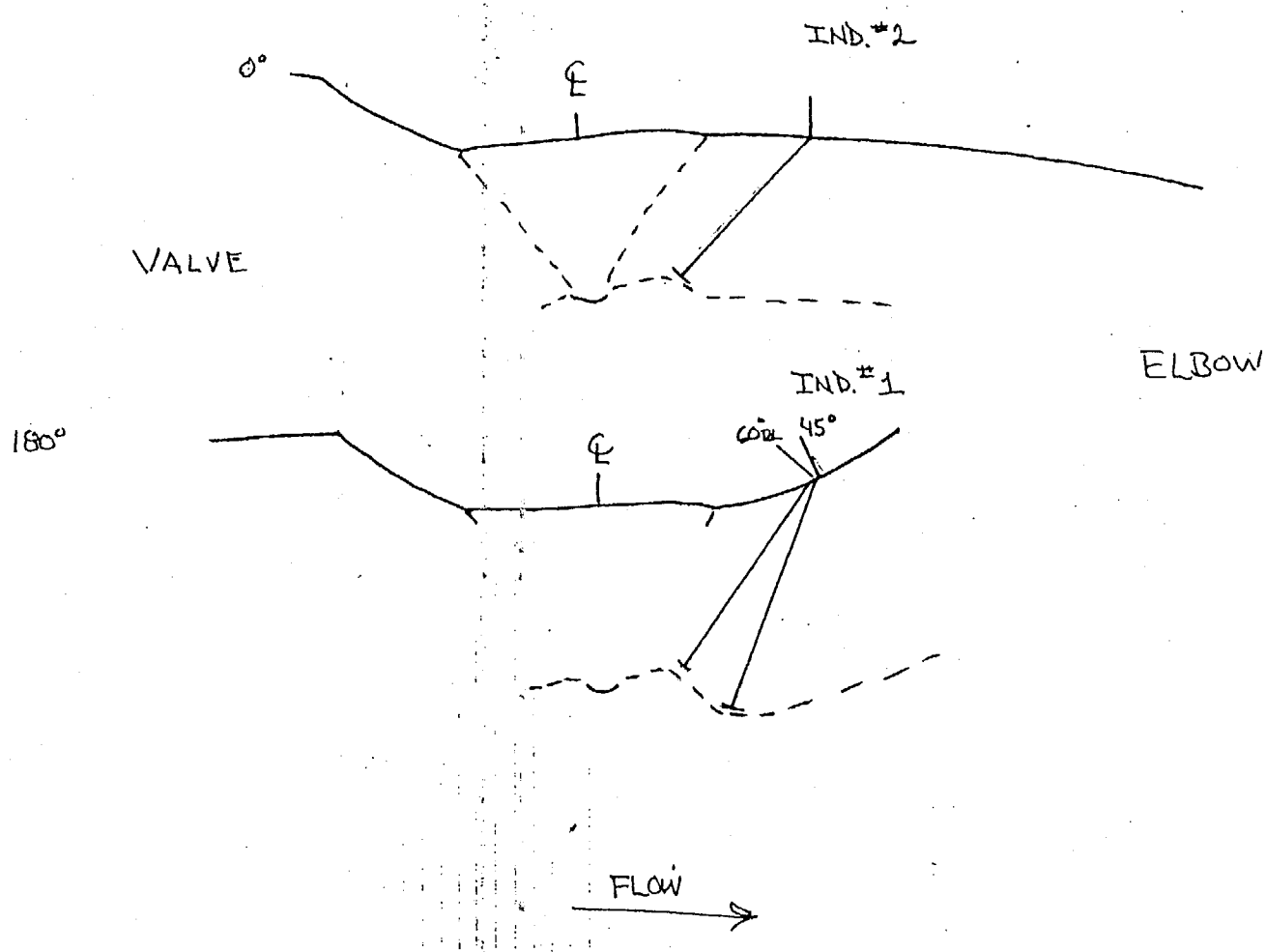
DATE: 10/28/00

ANII: [signature]

DATE: 11/21/00

PAGE 8 OF 9

TVA Office of Nuclear Power	PROJECT: SQNP SYSTEM: SAFETY INJ. Unit: 2 WELD NO.: F198-B	REPORT NO.:



BY: Douglas Kronewald LEVEL: II DATE: 10-27-00 PAGE 9 OF 9

TVA 19669 (ONP-6-88)

L-6247

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-6248

PROJECT: SQN	UNIT: 2	CYCLE: 10		COMPONENT ID: F 198 C *	
EXAMINATION METHOD				SYSTEM: SIS	ISI DWG. NO. 151-0002-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-J
PROCEDURE: N-UT-64	REV:2	TC:00-14		COFIG.: CAP TO PIPE	
EXAMINER: D. GRONEWOLD	EXAMINER: J. STANFORD			EXAMINER:	EXAMINER:
LEVEL: II	LEVEL: II			LEVEL: I	LEVEL:I

A MANUAL ULTRASONIC EXAMINATION WAS PERFORMED ON WELD F-198-C
A STAINLESS ~~STCAP TO 6"dia. PIPE...~~ pipe to valve. JW 12/7/00

A 45deg. SHEARWAVE WITH A 1 1/2 V CALIBRATION WAS USED FOR THIS EXAM ALONG WITH A 60deg. RL.

TWO SPOT INDICATIONS WERE RECORDED FOR INFORMATION ONLY. INDICATIONS ARE OUT OF THE EXAMINATION VOLUME. THESE INDICATIONS WERE OBSERVED ONLY WITH THE 45deg. SHEARWAVE. THE 60deg.RL AND A WSY70 COULD NOT DETECT THESE TWO SPOT INDICATIONS AND SHOWED NO EVEIDENCE OF AN ID CONNECTED FLAW. RADIOGRAPHS WERE REVIEWED AND NO INDICATIONS WERE OBSERVED. WMB 10/28/00

100% ASME SECTION XI CODE COVERAGE WAS ACHIEVED BY SCANNING OVER THE WELD.

THIS WAS A PRESERVICE EXAM

50% COVERAGE WAS ACHIEVED PER ASME SECTION XI, APPENDIX VIII REQUIREMENTS AS APPROVED BY 10 CFR 50.55a

WMBentley 10/29/00

*- ISI Component ID: SIF-198C

RESOLUTION BY:	REVIEWED BY:	ANII:
LEVEL: II DATE: 10/28/00	LEVEL: III DATE: 10-28-00	DATE: 11/6/00
		PG. 1 OF 6

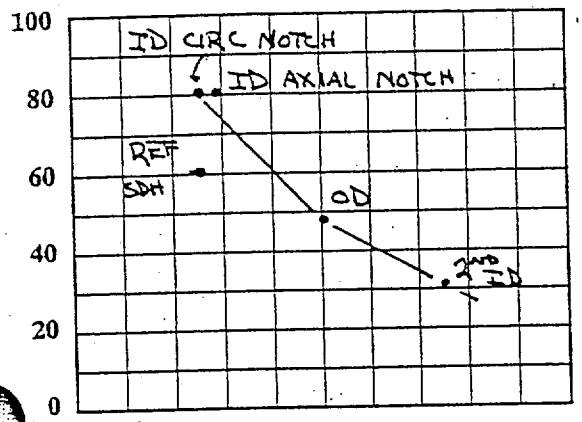
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-6248

PROJECT SQNP UNIT/CYCLE 2 / C10
PROCEDURE: N-UT-G4 REV: 2 TC: 00-14
MODEL: USN 52L DUE DATE: 9-11-01
INSTRUMENT: KRAUTKRAMER S/N: E30217
TRANSDUCER MANUF.: KBA
S/N 008MCL SIZE: .375 FREQ: 2.25 MHz
CABLE TYPE RG-174 LENGTH: 72"

CALIBRATION DATE 10-27-00
CALIBRATION BLOCK NO. SQ 1 TEMP: 72
SIMULATOR BLOCK NO.: 790390
THERMOMETER S/N: 552190 DUE DATE: 8-17-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☑ LONG ☐ RL ☐

ANGLE VERIFICATION
BLOCK TYPE: ROMPAS S/N: 790390
NOMINAL ANGLE: 45 ACTUAL ANGLE: 45

DAC



DISPLAY WIDTH

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☑	☐	24 dB	2
CIRC	☑	☐	31 dB	2

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 45 deg DAMPING: 1000 ohms
DELAY: -0.195 msec PULSER: SINGLE *
ZERO: 5.368 msec FILTER: FIXED *
VELOCITY .1229 msec REP RATE: HIGH
RANGE: 3.826 inches TOF: PEAK FLANK
RECTIFIER: FULL POWER: DC
DUAL: ON OFF TCG: ON OFF

REF. REFLECTOR: ROMPAS SDH GAIN: 24 dB
AMPLITUDE: 60 % METAL PATH: 1.02"

CALIBRATION TIMES
INITIAL TIME 1210 FINAL TIME: 1610

VERIFICATION TIMES 1) 1324 2) 1345 3) 1434 4) 1450 5) 1507 6) 1530 7) 8) 9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20
	SIGNAL 2	50	45	40	35	30	25	20	15	10

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD ITEMS EXAMINED
	F-198-B
	F-198-C
	F-198-D

EXAMINER: Doug Dronenwald LVL.: II
EXAMINER: Galen Stanford LVL.: II
REVIEWER: W. Bentley LVL.: III DATE: 10-28-00

ANII: Blackwood
DATE: 11/21/00
PAGE 2 OF 6

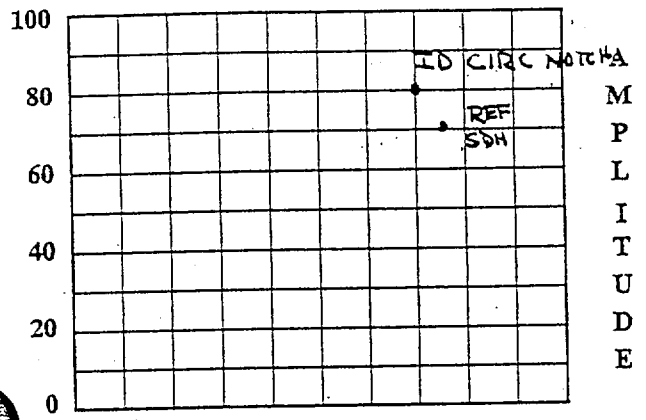
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-6248

JECT SQNP UNIT/CYCLE 2 / C10
PROCEDURE: N-UT-G4 REV: 2 TC: 00-14
MODEL: USN 52L DUE DATE: 9-11-01
INSTRUMENT: KRAUTKRAMER S/N: E30217
TRANSDUCER MANUF.: MEGASONICS
S/N K2829 ✓ SIZE: 2(.25x.5) FREQ: 2 MHz
CABLE TYPE RG174 LENGTH: 72"

CALIBRATION DATE 10-27-00
CALIBRATION BLOCK NO. SQ 1 TEMP: 72
SIMULATOR BLOCK NO.: 790390
THERMOMETER S/N: 552190 DUE DATE: 8-17-01
COUPLANT: ULTRAGEL BATCH: 95325
EXAM TYPE: SHEAR ☐ LONG ☐ RL ☑

ANGLE VERIFICATION
BLOCK TYPE: ROMPAS S/N: 790390
NOMINAL ANGLE: 60 ACTUAL ANGLE: 60

DAC



DISPLAY WIDTH DEPTH CAL 1.00"

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☐	N/A dB	N/A
CIRC	☑	☐	61 dB	3

FREQ: 2-8 MHz REJECT: 0 %
ANGLE: 60 deg DAMPING: 1000 ohms
DELAY: 0.008 msec PULSER: DUAL *
ZERO: 7.733 msec FILTER: FIXED *
VELOCITY .1288 msec REP RATE: HIGH
RANGE: 1.00 inches TOF: (PEAK) FLANK
RECTIFIER: FULL POWER: DC
DUAL: (ON) OFF TCG: ON OFF

REF. REFLECTOR: ROMPAS SDH GAIN: 45 dB
AMPLITUDE: 70 % METAL PATH: .750 DEPTH

CALIBRATION TIMES
INITIAL TIME 1220 FINAL TIME: 1616

VERIFICATION TIMES	1) 1404	2) 1420	3) 1451	4) 1503	5)	6)	7)	8)	9)

*PDI QUALIFIED INSTRUMENT SETTINGS:
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1		100	90	80	70	60	50	40	30	20	
	SIGNAL 2		50	45	40	35	30	25	20	15	10	
ATTENUATOR	GAIN	SET	-6 dB		-12dB		SET		+12		SET	+6
	AMP	80%	32 TO 48		16 TO 24		20%		64 TO 96		40%	64 TO 96
			40		20				80			80

COMMENTS	WELD/ITEMS EXAMINED
	F-198-B
	F-198-C

EXAMINER: Doug Ironwood LVL.: II
EXAMINER: John Hanford LVL.: II
REVIEWER: M Bentley LVL.: III DATE: 10-29-00

ANII: M Bedwood
DATE: 11/21/00

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER R-6248

PROJECT SQNP UNIT/CYCLE 2 / C10
SYSTEM: SAFETY INJ.
WELD ID.: F 198 C
CONFIG.: PIPE TO VALVE
FLOW →

EXAMINATION DATE 10-27-00
START TIME: 1435 END TIME: 1503
EXAM SURFACE ☐ ID ☒ OD
MATERIAL TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS
SURFACE TEMP.: 69° PYRO NO. 552190

PROCEDURE: N-UT-64 REV: 2 TC: 00-14
Wo REFERENCE: WELD ℄
Lo REFERENCE: TDC

EXAMINATION ANGLE	45° DEG.	60 RL DEG.
CIRC. SCAN SENSITIVITY	37 dB	N/A dB
AXIAL SCAN SENSITIVITY	36 dB	C1 dB

IND NO.	L (in) FROM REF. L1	L Max	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP % DAC	EXAM NO. 3-14	NOM. ANG.	NRI	INDICATION INFORMATION: TYPE, DAMPING, ETC.
1	11.6	11.65	11.7	.450'	.758	.55	56%	3	45		OUT OF EXAM VOLUME
2	5.5	5.6	5.7	.450'	.676	.52	32%	3	45		OUT OF EXAM VOLUME
								5	45	✓	
								6	45	✓	
								3	60	✓	
								3	WSY70	✓	

REMARKS/LIMITATIONS NO SCAN #4 DUE TO VALVE

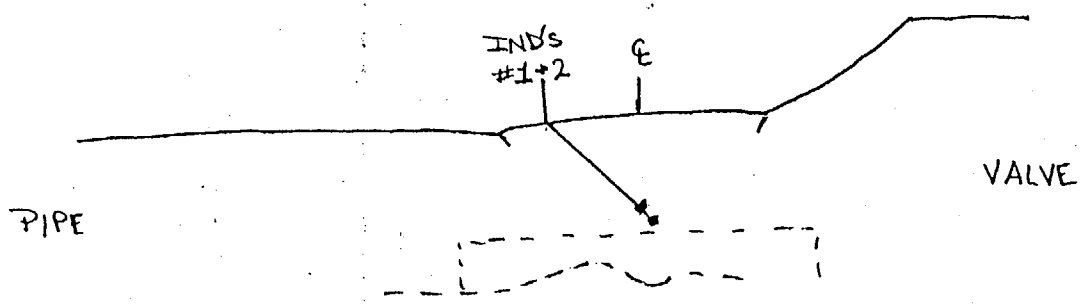
INDICATIONS #1 #2 PLOT OUT OF EXAM VOLUME AND CANNOT BE DETECTED WITH HIGHER ANGLES.

ALL SCANS PERFORMED AT 10% TO 20% ID ROLL

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: II
REVIEWED BY: [signature] LEVEL: III DATE: 10-28-00

ANII: [signature]
DATE: 11/21/00
PAGE 4 OF 6

TVA Office of Nuclear Power	PROJECT: SQNP SYSTEM: SAFETY INJ. Unit: 2 WELD NO.: F-198-C	REPORT NO.:



BY: [signature] LEVEL: II DATE: 10-27-00 PAGE 6 OF 6

TVA 1966 (P-6-88)

L-6248

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R-6248

PROJECT: SQNP

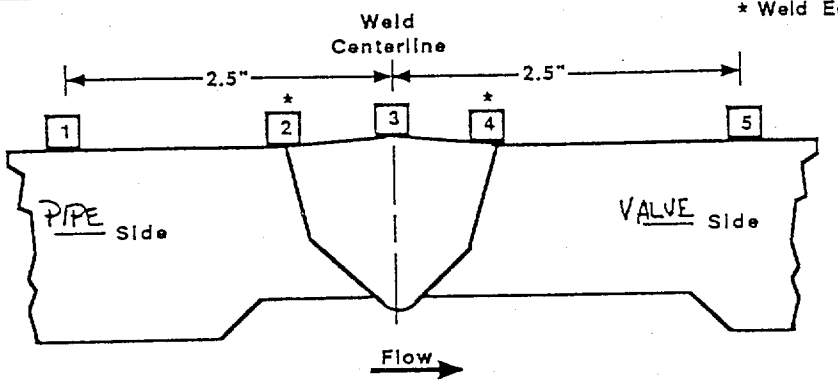
UNIT: 2

WELD NO: F198C

SYSTEM: SAFETY INJ.

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	.800			
2	.840			
3	.860		N/A	
4	N/A			
5	N/A			

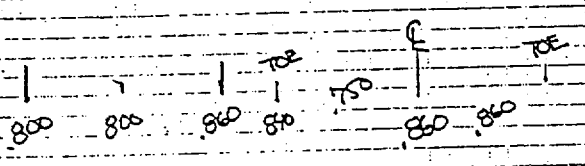


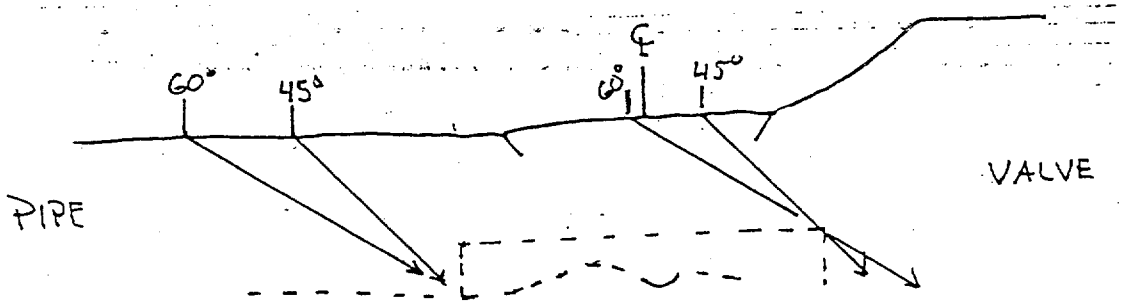
CROWN HEIGHT: FLUSH

CROWN WIDTH: 1.35"

DIAMETER: 6"

WELD LENGTH: 21.5"





100% ASME SEC. XI CODE COVERAGE

FLOW →

EXAMINER: D J Kronewald

LEVEL: II

DATE: 10-23-00

REVIEWED BY: W M Bentley

LEVEL: III

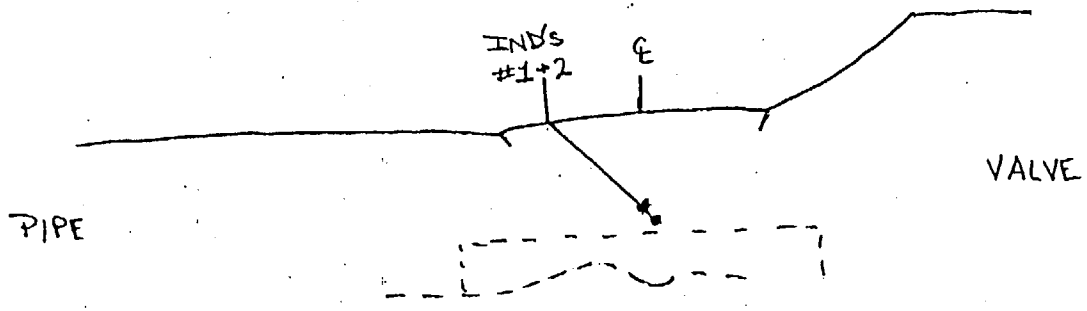
DATE: 10-29-00

ANII: [signature]

DATE: 11/21/00

PAGE 5 OF 6

TVA Office of Nuclear Power	PROJECT: SQNP SYSTEM: SAFETY INJ. Unit: 2 WELD NO.: F-198-C	REPORT NO.:



BY: [signature] LEVEL: II DATE: 10-27-00 PAGE 6 OF 6

TVA 1966 (P-6-88)

UT-0-78

TENNESSEE VALLEY AUTHORITY	RECORD OF LIQUID PENETRANT EXAM	REPORT NO. R- ~~N/A~~ BTM 10-29-00 6256

PROJECT: SQN UNIT: 2 CYCLE: 10
SYSTEM: 063 ~~RCP~~ SIS WPD 10-29-00
WELD / COMPONANT I.D.: 2-SI-F-198-B *
CONFIG.: Valve TO Elbow
PROCEDURE: N-PT-9 REV 19 TC N/A

EXAMINATION DATE: 10-26-00
START TIME: 16:00 END TIME: 16:30
EXAM SURFACE: ID ☐ OD ☑
ORIGINAL EXAM ☑ RE-EXAM ☐
REF. DRAWING NO.: A7542
ISI-0002-C-07 WMCR 1414

EXAMINATION CODE: ASME XI
CODE CLASS: 1 CATEGORY: B-J

ACCEPTANCE CRITERIA
N-PT-9 APPDX. A ☐ APPDX. B ☑
OTHER:

METHOD OF EXAMINATION

METHOD

- ☐ WATER WASHABLE FLUORESCENT DYE
- ☐ POST-EMULSIFIABLE FLUORESCENT DYE
- ☐ SOLVENT-REMOVABLE FLUORSECENT DYE
- ☐ WATER-WASHABLE VISIBLE DYE
- ☐ POST-EMULSIFIABLE VISABLE DYE
- ☑ SOLVENT REMOVABLE VISIBLE DYE

PENETRANT MATERIALS

BRAND NAME: MagnaFlux
PENETRANT SKL-SP BATCH 98M02K
REMOVER SKC-S BATCH 97H11K
DEVELOPER SKD-S2 BATCH 98L05K

BLACK LIGHT

METER S/N: N/A
CAL. DUE DATE: N/A

PART TEMP.: 77 °F PYROMETER S/N: 573202 CAL. DUE DATE: 4-28-01

EXAMINATION RESULTS: SATISFACTORY ☑ UNSATISFACTORY ☐ NOI NO.: — NA —
EXPLANATION OF EXAM RESULTS:

COMMENTS / LIMITATIONS: CWO # 00-001321-000
* - ISI Component ID: SIF-198B

EXAMINER: Wayne P. Davis LEVEL II
EXAMINER: N/A LEVEL N/A
REVIEWER: B T. Mayfield LEVEL II DATE: 10-29-00

ANII: M Mahood
DATE: 11/21/00
PAGE: OF

THIS REPORT ADDRESSES THE ~~ASME SECTION III (ANSI-B31.7)~~, ASME SECTION XI CLASS 1 CODE CLASS B-J PRESERVICE EXAMINATION. BTM 10-29-00 BTM 10-29-00 BTM 10-29-00

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-6315

PROJECT: SQN	UNIT: 2	CYCLE: 10		COMPONENT ID: RCW-16	
EXAMINATION METHOD				SYSTEM: PZR	ISI DWG. NO. ISI-0396-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: XI	CATEGORY: B-D
PROCEDURE: N-UT-19	REV:11	TC:N/A		COFIG: Vessel TO Nozzle	
EXAMINER: C. Littlefield LEVEL: II	EXAMINER: S. Drigans LEVEL: II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL:N/A

This report contains the data associated with the manual ultrasonic examination of RCW-16.

This examination was performed in accordance with ASME Section XI.

A 0° Longitudinal wave using the ¼T, ½T, and ¾T holes, and a 45° and 60° shear wave using the ¼T, ½T, ¾T, and 5/8 ~~holes with~~ Note And the ID notch were used for the calibration. WWB 11/2/00

The extent of this exam is identified in figure #4 of N-UT-19 Rev. 11

The weld was examined from the vessel side only due to nozzle configuration.

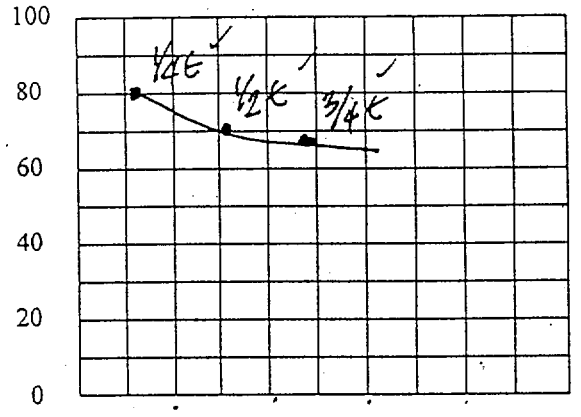
There were no recordable indications with the 0° and 45°. There was one indication recorded with the 60° that is a geometric reflector from the nozzle bore inner radius. This indication was compared with previous data.

Approximately 68.8 % coverage was obtained.

RESOLUTION BY:	REVIEWED BY:	ANII:
C. Littlefield	WWBentley	10/19/00 N/A
LEVEL: II DATE: 27 Oct 00	LEVEL: III DATE: 11-3-00	DATE: 10/19/00
		PG. 1 OF 11 A

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-6315

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 31 OCT 00
PROC.: N-UT- 19 REV:11 TC:N/A	CALIBRATION BLOCK NO.: BNP 79 TEMP: 77'F
INSTR. MFG: KRAUTKRAMER DUE DATE: 09-11-01	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN 52L M & TE NO.: E30219 ✓	THERMOMTER S/N: E26216 ✓ DUE DATE: 07-12-01
TRANSDUCER MFG: AEROTECH	COUPLANT ULTRAGEL BATCH: 95325 ✓
S/N B19004 ✓ SIZE: 1.0 FREQ: 5.0 MHz *	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG 174 LENGTH: 72 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: N/A S/N: N/A
DAC	NOMINAL ANGLE: 0° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 5.0 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☐	☒	20 dB	11
CIRC	☐	☐	N/A dB	N/A

FREQ:	.4-10	MHz	REJECT: 0		%
ANGLE:	0	deg	DAMPING: 150		ohms
DELAY:	-0.508	msec	PULSER: Single		*
ZERO:	0.525	msec	FILTER: FIXED		*
VELOCITY:	.2326	msec	REP RATE: HIGH		
RANGE:	5.0	inches	TOF: ☒PEAK ☐ FLANK		
RECTIFIER: FULL			POWER: DC		
DUAL: ☐ ON ☒ OFF			TCG: ☐ ON ☒ OFF		

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 2215	FINAL TIME: 2340

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

*** PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

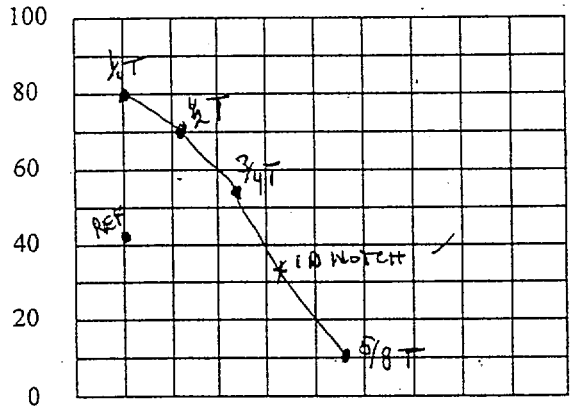
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED: PRESSURIZER
* 5.0 MHz STRAIGHT BEAM TRANSDUCER IS ACCEPTABLE. 11-3-00	RCW-16, RCW-17

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID R. KLEINJAN	LAVAR R. MATHENA		N/A 10/31/00
LEVEL: II	LEVEL: II	LEVEL: II DATE: 11/2/00	DATE: 11/2/00
			PG.: 2 OF 11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R6315

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 31 ~~NOV~~ OCT 00
PROC.: N-UT- 19 REV:11 TC:N/A	CALIBRATION BLOCK NO.: BNP 79 TEMP: 73°F
INSTR. MFG: KBA DUE DATE: 12-09-00	SIMULATOR BLOCK NO: 797620
MODEL/TYPE: USN 50 M & TE NO.: E18730	THERMOMTER S/N: E26216 DUE DATE: 7/12/01
TRANSDUCER MFG: KBA	COUPLANT Ultragel BATCH: 95325
S/N J15203 ✓ SIZE: .5X1.0 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG-58 LENGTH: 10'	**ANGLE VERIFICATION**
	BLOCK TYPE: IIW / S/N: 789191
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 45°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☒	35.0 dB	29
CIRC	☐	☐	N/A dB	N/A

FREQ: FIXED MHz	REJECT: 0 %
ANGLE: 45 deg	DAMPING: FIXED ohms
DELAY: 12.08 msec	PULSER: HIGH *
ZERO: 12.345 msec	FILTER: FIXED *
VELOCITY: .1267 msec	REP RATE: FIXED
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
RECTIFIER: FIXED	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: Rompas SDH GAIN: 35.0 dB	**CALIBRATION TIMES**
AMPLITUDE: 42 % METAL PATH: 1.05" ✓	INITIAL TIME: 2200 FINAL TIME: 0030

VERIFICATION TIMES	1)0110	2)	3)	4)	5)	6)	7)	8)	9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

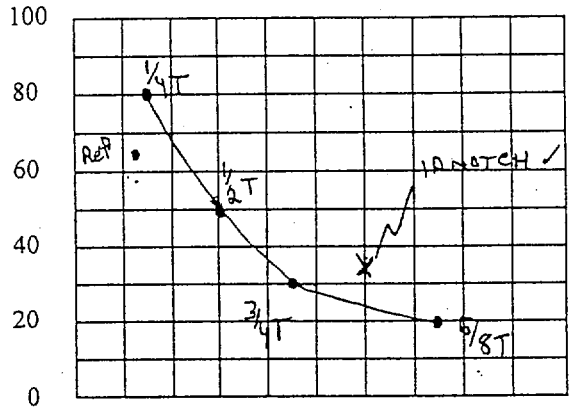
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS: Delta dB difference between the ¾T and 5/8T= 6dB	WELDS/ITEMS EXAMINED: PRESSURIZER RCW-16 AND 17

EXAMINER:	EXAMINER:	REVIEWER:	ANII: N/A 12/9/00
Charles Littlefield	Sammy Drigans		DATE: 12/9/00
LEVEL: II	LEVEL: II	LEVEL: II DATE: 11/2/00	PG.: 3 OF 11A

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R 6315

PROJECT: SQN UNIT: 2 CYCLE: 10	CALIBRATION DATE: 31 ~~NOV~~ 00 11/3/00
PROC.: N-UT- 19 REV:11 TC:N/A	CALIBRATION BLOCK NO.: BNP 79 TEMP: 73°F
INSTR. MFG: KBA DUE DATE: 12-09-00	SIMULATOR BLOCK NO: 797620
MODEL/TYPE: USN 50 M & TE NO.: E18730	THERMOMTER S/N: E26216 DUE DATE: 7/12/01
TRANSDUCER MFG: KBA	COUPLANT Ultragel BATCH: 95325
S/N J15204 ✓ SIZE: .5X1.0 FREQ: 2.25 MHz	EXAM TYPE: SHEAR ☒ LONG ☐ RL ☐
CABLE TYPE: RG-58 LENGTH: 10'	**ANGLE VERIFICATION**
	BLOCK TYPE: IIW / S/N: 789191
DAC	NOMINAL ANGLE: 60° / ACTUAL ANGLE: 60°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☒	☒	40.0 dB	30
CIRC	☐	☐	N/A dB	N/A

FREQ: FIXED MHz	REJECT: 0 %
ANGLE: 60 deg	DAMPING: FIXED ohms
DELAY: 15.75 msec	PULSER: HIGH *
ZERO: 16.010 msec	FILTER: FIXED *
VELOCITY: .1267 msec	REP RATE: FIXED
RANGE: 10 inches	TOF: ☒ PEAK ☐ FLANK
RECTIFIER: FIXED	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: Rompas SDH GAIN: 48.0 dB	**CALIBRATION TIMES**
AMPLITUDE: 65 % METAL PATH: 1.47" ✓	INITIAL TIME: 2200 FINAL TIME: 0030

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE !

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS: Delta dB difference between the ¾T and 5/8T = 8dB.	WELDS/ITEMS EXAMINED: PRESSURIZER RCW-16 AND RCW-17

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Charles Littlefield	Sammy Drigans		12/19/00 N/A 12/19/00
LEVEL: II	LEVEL: II	LEVEL: II DATE: 11/2/00	DATE:
			PG.: 4 OF 11 A

TENNESSEE VALLEY AUTHORITY	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R- 6315

PROJECT: SQNP UNIT: 2

SEARCH UNIT

MANUFACTURER KBA

SIZE: .5 × 1.0 FREQ.: 2.25 MhZ

S/N: J15203 NOM. ANGLE 45

MEASURED ANGLE: 45 DEG.

BEAM SPREAD: 10 DEG.

BEAM SPREAD DATE: 31 OCT 00

PROCEDURE: N-UT- 19 REV. 11 TC N/A

CALIBRATION SHEET NO. C- N/A

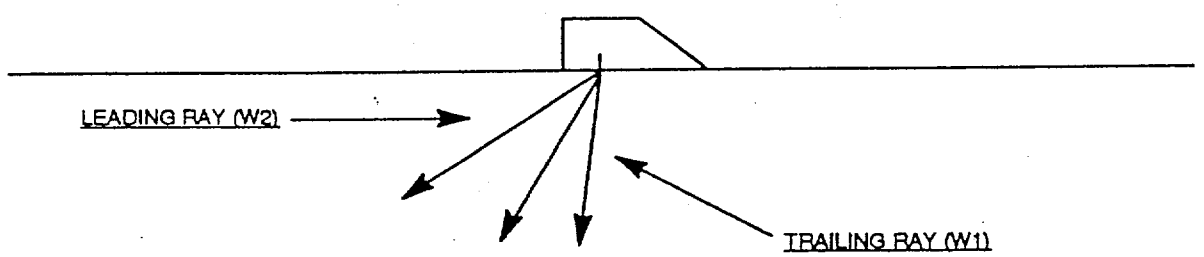
UT INSTRUMENT

MANUFACTURER: KRAUTKRAMER

MODEL NUMBER: USN 50

SERIAL NUMBER: E 18502

HOLE POSITION	TRAILING RAY (W1)				W MAX		LEADING RAY (W2)			
	20% DAC		50% DAC		100% DAC		50% DAC		20% DAC	
	W	MP	W	MP	W	MP	W	MP	W	MP
1/4 T	.55	.85	.75	.96	.85	1.06	1.00	1.15	1.05	1.19
1/2 T	1.35	1.91	1.42	1.97	1.58	2.08	1.8	2.25	1.95	2.34
3/4 T	2.0	2.91	2.1	2.99	2.3	~~2.94~~ 3.11	2.65	3.37	2.85	3.52



R.G. 1.150 RESOLUTION VERIFICATION

NEAR SURFACE REFLECTOR: 1/4 T SDH DEPTH: .75 IN. SIZE: 3/16"

FAR SURFACE REFLECTOR: 3/4 T SDH DEPTH: 2.25 IN. SIZE: 3/16"

SCANNING (REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED: ☒ YES ☐ NO BNP 79

REMARKS:

EXAMINER: C. LITLE FIELD LEVEL: II

EXAMINER: Sam Drigans LEVEL: II

REVIEWED BY: Mark Wilch LEVEL: II DATE: 11/2/00

ANII: Bochnak ~~N/A~~ 11/2/00

DATE: 12/19/00 ~~N/A~~ 11/2/00

PAGE 5 OF 11A

TVA 19670A (NP 7/92)

TENNESSEE VALLEY AUTHORITY	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R- 6315

PROJECT: SQNP UNIT: 2

BEAM SPREAD DATE: 31 OCT 00

PROCEDURE: N-UT- 19 REV. 11 TC N/A

CALIBRATION SHEET NO. C- N/A

SEARCH UNIT

MANUFACTURER KBA

SIZE: .5 x 1.0 FREQ.: 2.25 MhZ

S/N: J15204 NOM. ANGLE 60

MEASURED ANGLE: 60 DEG.

BEAM SPREAD: 13 DEG.

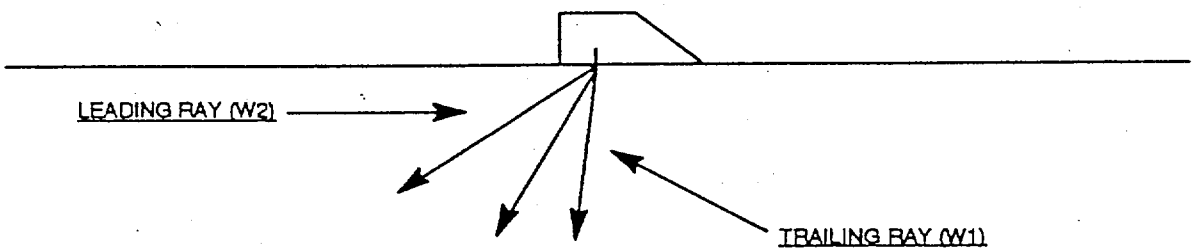
UT INSTRUMENT

MANUFACTURER: KRAUTKRAMER

MODEL NUMBER: USN 50

SERIAL NUMBER: E18502

HOLE POSITION	TRAILING RAY (W1)				W MAX		LEADING RAY (W2)			
	20% DAC		50% DAC		100% DAC		50% DAC		20% DAC	
	W	MP	W	MP	W	MP	W	MP	W	MP
1/4 T	1.1	1.24	1.2	1.39	1.4	1.56	1.7	1.74	2.05	2.1
1/2 T	2.15	2.5	2.35	2.69	2.85	3.13	3.35	3.57	3.7	3.86
3/4 T	2.55	3.12	3.55	4.08	4.65	4.5	5.05	5.36	5.55	5.84



R.G. 1.150 RESOLUTION VERIFICATION

NEAR SURFACE REFLECTOR: 1/4T SDH DEPTH: .75 IN. SIZE: 3/16"

FAR SURFACE REFLECTOR: 3/4T SDH DEPTH: 2.25 IN. SIZE: 3/16"

SCANNING (REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED: ☒ YES ☐ NO BNP 79

REMARKS:

EXAMINER: G. LITTLEFIELD LEVEL: II

EXAMINER: Sam Drigan LEVEL: II

REVIEWED BY: Mark Wilcox LEVEL: II DATE: 11/2/00

ANII Wakwood N/A

DATE: N/A 12/19/00

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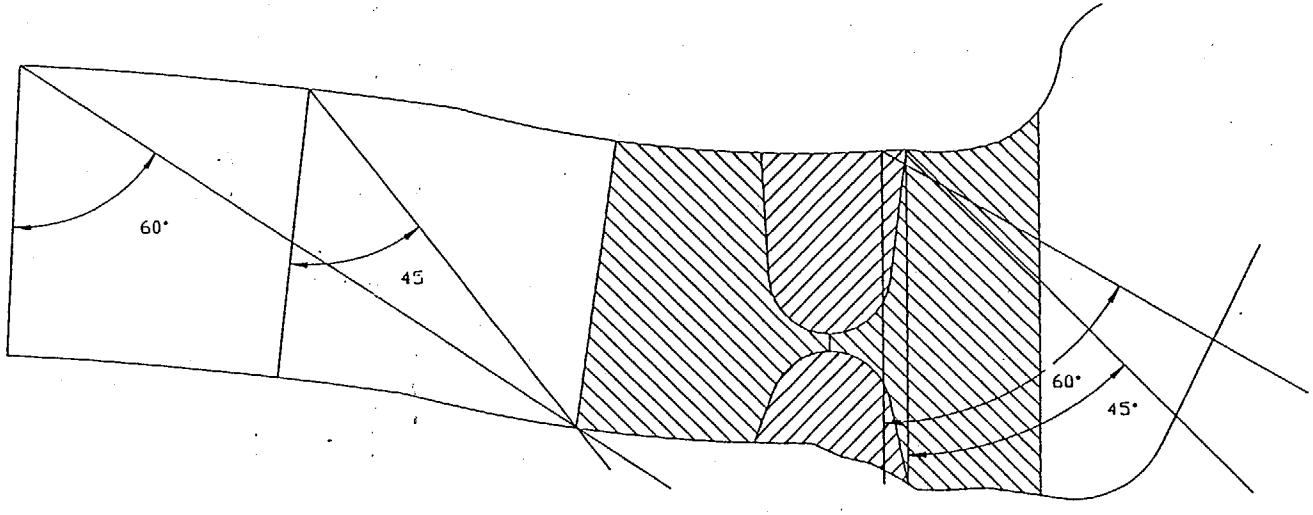

SCALE = 1 : 2

roject ON NIT 1 CLE 10	SYSTEM: PRESSURIZER	Weld I.D. RCW-16	Drawn by: David Kleinjan	ASNT Level II	Date: 01 N 00

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R- 6315

PROJECT: SQN. UNIT: 2
SYSTEM: PZR
WELD I.D.: RCW-16
CONFIG: VESSEL TO: NOZZLE
PROCEDURE: N-UT- 19 REV. 11 TC: N/A

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: TDC
SURFACE TEMP: F 77°
PYRO. SERIAL NO. E26216

EXAMINATION DATE: 31 OCT 00
START TIME: 1035 END TIME: 1105

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	0	26 dB
N/A	N/A	N/A dB
		dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)																			

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
				NO		RECORDABLE					INDICATION													

REMARKS/LIMITATIONS: N/A

EXAMINER: Sam Drigan
LEVEL: II/II
EXAMINER: Sam Watkins
LEVEL: II

REVIEWED BY: Matt Willet
LEVEL: II
DATE: 11/2/00

ANII N/A 11/9/00 Reviewed 11/9/00

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ENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R-6315

B9811A

OJECT: SQN UNIT: 2
TEM: PRESSURIZER
D I.D.: RCW-16
NFIG: VESSEL TO: Nozzle
XCEDURE: N-UT-19 REV. 11 TC: N/A

Wo REFERENCE: ℄ OF Weld
Lo REFERENCE: T. D.C.
SURFACE TEMP: 77 F
PYRO. SERIAL NO. E26716

EXAMINATION DATE: 10-31-00
START TIME: 2300 END TIME: 0005

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	0°	26 dB
	45°	41 dB
	60°	46 dB

ULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
DICATION RECORDED (Y/N)			N		A				Y	N	N			N		P			

MAX AMP	SCAN NO	ANG	100% (1/2 MAX) Mp1	W1	L1	50% Mp1	W1	L1	20% Mp1	W1	L1	MAX Mp	W	L	20% Mp2	W2	L2	50% Mp2	W2	L2	100% (1/2 MAX) Mp2	W2	L2
100	9	60		N						A		4.8"	1.25	*		N						A	

MARKS/LIMITATIONS: * INDICATION CAN BE SEEN 360°. INDICATION IS ID GEOMETRY FROM NOZZLE ORE INNER RADIUS. NO EXAMINATION FROM NOZZLE SIDE DUE TO CONFIGURATION.

AMINER: C. LITTLEFIELD LEVEL: II
AMINER: Sam Duigan LEVEL: II

REVIEWED BY: Mark Welch
LEVEL: II DATE: 11/2/00

ANII N/A 12/9/00

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R6315

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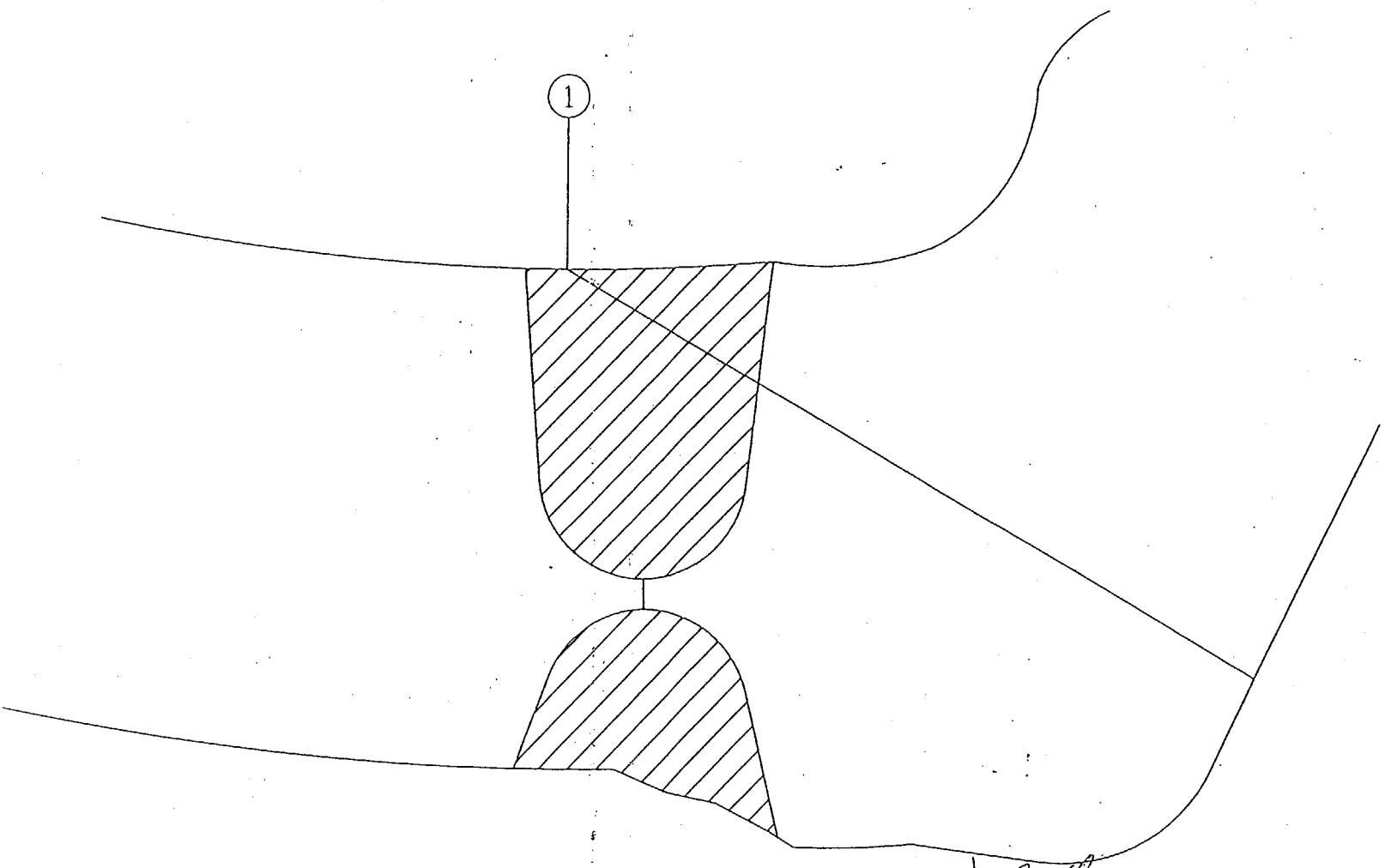
dication #1 is ID geometry from inner radius



ojec' ON NIT' CLE 10	SYSTEM: PRESSURIZER	Weld I.D. RCW-16	Drawn by: David Kleinjan ASNT Level II	Date 01 00