Duke Power
A Duke Energy Company

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May 7, 2003

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

Subject: Duke Energy Corporation
Catawba Nuclear Station, Unit 1
Docket Number 50-413
Request for Relief Number 02-002,
Revision 1
Limited Weld Examinations for End of Cycle 13
Refueling Outage

Reference: Letter from Duke Energy Corporation to NRC, same subject, dated August 15, 2002

Pursuant to 10 CFR 50.55a(g)(5)(iii), please find attached Request for Relief 02-002, Revision 1. This request for relief is associated with limited weld examinations for the subject outage and incorporates a response to a Request for Additional Information previously discussed with members of the NRC staff. The reference letter originally transmitted Revision 0 of this Request for Relief. Revision 1 of this Request for Relief should replace Revision 0 in its entirety. Please note that the number of welds included in Revision 1 is less than that included in Revision 0. Relief is no longer being requested for some of the welds included in Revision 0 because these welds will be examined again in a subsequent refueling outage in the interval using improved examination techniques.

The attachment to this letter contains all technical information necessary in support of this request for relief. Duke Energy Corporation is requesting NRC review and approval of this request at your earliest opportunity.

There are no regulatory commitments contained in this letter or its attachment.

A047

If you have any questions concerning this material, please call L.J. Rudy at (803) 831-3084.

Very truly yours,

Gary R. Peterson

LJR/s

Attachment

xc (with attachment):

L.A. Reyes, Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

E.F. Guthrie, Senior Resident Inspector
U.S. Nuclear Regulatory Commission
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Proposed Relief in Accordance with 10 CFR 50.55a(g)(5)(iii)
Inservice Inspection Impracticality

Duke Energy Corporation
Catawba Nuclear Station – Unit 1 (EOC-13)
Second 10-Year Interval – Inservice Inspection Plan
Second Interval Start Date – June 29, 1995 Second Interval End Date – June 29, 2005
ASME Section XI Code – 1989 Edition with No Addenda

	I	II & III	IV	V	VI	VII
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage and / or 4 Scan Directions Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1PZR-W4ASE	RC System Pressurizer Safety Nozzle-to-Safe End Butt Weld	Exam Category B-F Item No. B05.040.004 - ASME Section XI, Appendix III, III-4420, 1989 Edition with No Addenda. Coverage from two beam path directions (See note below) 77.28% Volume Coverage	See Paragraph "A"	See Paragraph "F"	See Paragraphs "G and J"	See Paragraph "K"
1PZR-W4BSE	RC System Pressurizer Safety Nozzle-to-Safe End Butt Weld	Exam Category B-F Item No. B05.040.005 - ASME Section XI, Appendix III, III-4420, 1989 Edition with No Addenda. Coverage from two beam path directions (See note below) 86.00% Volume Coverage	See Paragraph "B"	See Paragraph "F"	See Paragraphs "G and J"	See Paragraph "K"
1PZR-W4CSE	RC System Pressurizer Safety Nozzle-to-Safe End Butt Weld	Exam Category B-F Item No. B05.040.006 - ASME Section XI, Appendix III, III-4420, 1989 Edition with No Addenda. Coverage from two beam path directions (See note below) 82.03% Volume Coverage	See Paragraph "C"	See Paragraph "F"	See Paragraphs "G and J"	See Paragraph "K"
1ND38-1	ND System Valve 1ND002A to Pipe Circumferential Weld	Exam Category B-J Item No. B09.011.104 IWB-2500-8(c), Volume C-D-E-F only 61.23% Volume Coverage	See Paragraph "D"	See Paragraph "F"	See Paragraph "H and J"	See Paragraph "K"
1BRHRHX-5-9	ND System RHR Heat Exchanger Shell-to-Flange Circum. Weld	Exam Category C-A Item No. C01.010.002 IWC-2500-1(a) 55.90% Volume Coverage	See Paragraph "E"	See Paragraph "F"	See Paragraph "I and J"	See Paragraph "K"

Notes: The examination shall be performed using a sufficiently long examination beam path to provide coverage of the required examination volume in two-beam path directions. The examination shall be performed from two sides of the weld, where practicable, or from one side of the weld, as a minimum.

See Attachment 1 for a drawing of the RHR Heat Exchanger welds listed above
See Attachment 2 for a drawing of the Pressurizer welds listed above

IV. Basis for Relief

Paragraph A: (The pressurizer safety valve nozzle material is SA-508 and the safe end is SA-182, Gr. F316L. The weld is 6.0 inches in diameter with a 0.96 inch wall thickness.)

Nozzle to Safe End Weld 1PZR-W4ASE cannot be examined from two beam path directions because the nozzle taper limits scanning from the nozzle side. This is a dissimilar metal weld joining a carbon steel nozzle to a stainless steel safe end. Coverage is limited to 77.28% of the required examination volume. This percentage of coverage represents the aggregate from all scans performed on the weld. Each scan is considered 25% of the total examination volume because four scans are required. One axial scan from the safe end side covered 100% of the examination volume in one direction; one axial scan from the nozzle side covered 9.12% of the examination volume; two circumferential scans covered 100% of the examination volume in two opposing directions. Thus, the required exam volume was fully scanned from three of the four required directions but the fourth scan from the nozzle side caused the limitation that resulted in less than 100% aggregate coverage from all scans. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld. (See note in Paragraph C below.)
(Examination data is shown in Attachment A.)

Paragraph B: (The pressurizer safety valve nozzle material is SA-508 and the safe end is SA-182, Gr. F316L. The weld is 6.0 inches in diameter with a 0.96 inch wall thickness.)

Nozzle to Safe End Weld 1PZR-W4BSE cannot be examined from two beam path directions because the nozzle taper limits scanning from the nozzle safe end. This is a dissimilar metal weld joining a carbon steel nozzle to a stainless steel safe end. Coverage is limited to 86.00% of the required examination volume. This percentage of coverage represents the aggregate from all scans performed on the weld. Each scan is considered 25% of the total examination volume because four scans are required. One axial scan from the safe end side covered 100% of the examination volume in one direction; one axial scan from the nozzle side covered 44.00% of the examination volume; two circumferential scans covered 100% of the examination volume in two opposing directions. Thus, the required exam volume was fully scanned from three of the four required directions but the fourth scan from the nozzle side caused the limitation that resulted in less than 100% aggregate coverage from all scans. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld. (See note in Paragraph C below.)
(Examination data is shown in Attachment B.)

Paragraph C: (The pressurizer safety valve nozzle material is SA-508 and the safe end is SA-182, Gr. F316L. The weld is 6.0 inches in diameter with a 0.96 inch wall thickness.)

Nozzle to Safe End Weld 1PZR-W4CSE cannot be examined from two beam path directions because the nozzle taper limits scanning from the nozzle safe end. This is a dissimilar metal weld joining a carbon steel nozzle to a stainless steel safe end. Coverage is limited to 82.03% of the required examination volume. This percentage of coverage represents the aggregate from all scans performed on the weld. Each scan is considered 25% of the total examination volume because four scans are required. One axial scan from the safe end side covered 100% of the examination volume in one direction; one axial scan from the nozzle side covered 28.15% of the examination volume; two circumferential scans covered 100% of the examination volume in two opposing directions. Thus, the required exam volume was fully scanned from three of the four required directions but the fourth scan from the nozzle side caused the limitation that resulted in less than 100% aggregate coverage from all scans. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld. (Examination data is shown in Attachment C.)

Note: Variations in the calculated coverage from the nozzle side of the three Pressurizer welds were the result of differences in the OD weld contours. These differences caused the distance from the weld centerline to the search unit exit point to change from weld to weld as shown on the attached UT profile / plot sheet sketches.

Paragraph D: [The residual heat removal (ND system) valve body and pipe material are both stainless steels. The weld is 12.0 inches in diameter with a 1.125 inch wall thickness.]

Valve 1ND002A to Pipe Weld 1ND38-1 cannot be examined from two beam path directions because the valve body taper limits scanning from the valve side. This is a similar metal weld joining a stainless steel valve to a stainless steel pipe. Coverage is limited to 61.23% of the required examination volume. This percentage of coverage represents the aggregate from all scans performed on the weld. One axial scan from the pipe side covered 54.88% of the examination volume in one direction; no axial scan was performed from the valve side. Two circumferential scans covered 100% of the examination volume in two opposing directions. Thus, the required exam volume was fully scanned from only the two circumferential directions. The partial scan from one axial direction and none from the other caused the limitation that resulted in less than 100% aggregate coverage from all scans. In order to achieve more coverage, the valve configuration would have to be re-designed to allow scanning from both sides of the weld. (Examination data is shown in Attachment D.)

Paragraph E: [The residual heat removal (ND system) heat exchanger shell material is SA-285-C and the flange is SA-105. The weld is 43.75 inches in diameter with a .875 inch wall thickness.]

This weld was radiographed to provide more exam volume coverage than was possible with ultrasonic examination. During the radiographic examination of Residual Heat Removal Heat Exchanger Shell to Flange Weld 1BRHRHX-5-9, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 55.90%. Limitations were caused by the heat exchanger's shell-to-flange configuration. In order to achieve more coverage, the heat exchanger would have to be disassembled at the flange connection and the upper and lower sections of the vessel separated allowing access for the placement of the radiographic film on the inside surface of the weld, which is impractical. Ultrasonic examination of this weld and adjacent base metal would also require the disassembly of the flange connection; which is impractical.
(Examination data is shown in Attachment E.)

The limited radiographic (RT) examination of the Residual Heat Exchanger shell to flange weld was due to internal vessel divider plates, the external geometric configuration and limited access to the examination external surface due to the flange bolting material. Each of these specific exam interferences limited the radiographic examination of the required volume as discussed in the following paragraphs.

Internal Vessel Divider Plates

The vessel's internal divider plates are designed in a "T" configuration as shown on Attachment 1-Sheet 2, Detail A, and the Radiographic Technique sheet, in Attachment E. The internal divider plates come in contact with the examination area in three separate locations, identified as points A, B and C, which completely obstruct examination coverage of the weld and the required 0.5 inch of base metal on each side of the weld.

At point "A", 4.5 linear inches of the circumferential examination area was obstructed (film interval 0R – 10, Attachment E) by the divider plate thickness and the angle through which the radiation from the source had to penetrate the divider plate to image the examination area on the opposite side.

At point "C", 4.875 linear inches of the circumferential examination area was obstructed (film interval 5E - 6) by the divider plate thickness and the angle through which the radiation from the source had to penetrate the divider plate to image the examination area on the opposite side.

At divider plate contact point "B", 0.750 linear inches of the circumferential examination area was obstructed (film interval 8 – 8X) by the divider plate thickness and by the divider plate weld metal.

External Shell to Flange Configuration and Flange Bolting

The flange weld is in close proximity to the flange bolting surface as shown on Attachment 1-Sheet 2, Detail B and has 52 flange studs with large heavy hex nuts. The close proximity of the studs and nuts to the outside surface of the vessel in conjunction with the nearness of the flange face restricted the placement of the RT film for complete examination coverage. During the examination, the radiographic film holders and backing leads were placed behind the bolting material, on the outside surface of the vessel and then slide onto the flange taper to the fullest extent possible. This provided for examination coverage of the required 0.5 inch base metal on the shell side of the weld and ~ 0.625 inches of 0.875 inch wide weld. The required 0.5 inch of base metal on the flange side, and an average of ~ 0.25 inch of the weld were not recorded on the film. The area of examination coverage and the obstructed area is shown on Attachment 1-Sheet 2, Detail B.

V. Alternate Examinations or Testing

Paragraph F:

The scheduled 10-year code examination was performed on the referenced area / weld and resulted in the noted limited coverage of the required ultrasonic volume. No alternate examinations or testing is planned for the area / weld during the current inspection interval.

VI. Justification for Granting Relief

Paragraph G:

Beginning in 1990 Duke Energy Corporation changed to refracted longitudinal wave search units to examine dissimilar metal (DM) welds based upon NRC Information Notice 90-30, "Ultrasonic Inspection Techniques for Dissimilar Metal Welds". The procedure used for DM weld examination complied with the requirements of ASME Section XI, Appendix III, 1989 Edition. The procedure required the use of refracted longitudinal waves to examine the weld and buttered material and shear waves to examine the wrought nozzle and safe end base materials. Duke Energy Corporation employed the best available manual techniques to examine DM welds prior to the implementation of Appendix VIII. Based on procedure development work using DM weld mock-ups containing thermal fatigue cracks, Duke Energy Corporation believes that ID initiated fatigue cracks exceeding the acceptance standards of IWB-3514 would have been detected.

The refracted longitudinal wave search units have an inherent limitation in that the useful portion of the sound beam lies in the first beam path leg between the transducer and the inside surface of the pipe. Beam paths beyond the inside surface of the pipe cannot be used to extend the examination coverage because of mode conversion that occurs at the inside surface. However, refracted longitudinal wave search units have better penetration through stainless steel weld metal than shear wave search units. When calibrating in accordance with ASME Section XI, Appendix III, there is not enough sound energy available to establish a distance-amplitude-correction curve beyond the inside surface notch located in the basic calibration block.

There were no examination findings and no flaws were detected during any of the previous inservice inspections. This weld was initially inspected by radiography and liquid penetrant examination during construction and verified to be free from unacceptable fabrication defects.

These Pressurizer nozzle-to-safe end butt welds are located inside containment and are part of the reactor coolant system pressure boundary. General Design Criterion 30, "Quality of Reactor Coolant Pressure Boundary," of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," mandates

that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage. If a leak were to develop at these weld locations, the instrumentation available to the operators for detection and monitoring of leakage would provide prompt and qualitative information necessary to permit them to take immediate corrective action. If a leak should develop in these aforementioned locations, the only corrective action would be to shutdown and depressurize the reactor coolant system, since the components are non-isolable.

Plant Technical Specifications dictate that a reactor coolant system water inventory balance be performed on a regular basis. A normal operating practice is to perform this computer based mass balance on a daily frequency and/or whenever the operators suspect any abnormal changes to other leakage detection systems. Plant Technical Specification requires that if the leak rate cannot be reduced below 1 gpm unidentified that the plant be put in hot standby within 6 hours and in cold shutdown within the following 30 hours. Leakage as a result of a failed weld discussed in this section would show up as unidentified leakage and be subject to the 1 gpm limit.

Other leakage detection systems available to the operator and dictated per plant technical specifications are:

- Containment Atmosphere Gaseous and Particulate Radioactivity Monitoring System (EMF monitors 38 & 39) which would detect airborne radiological activity;
- Containment Floor and Equipment Sump Level Monitoring Subsystem where unidentified accumulated water on the containment floor would be monitored and evaluated as sump level changes;
- Containment Ventilation Unit Condensate Drain Tank Level Monitoring Subsystem which collects and measures as unidentified leakage the moisture removed from the containment atmosphere.

Additionally, other indicators are also available to the operator that a leak exists:

- Containment Atmosphere Iodine Monitor (EMF 40)
- Charging / Letdown system mismatches;
- Containment humidity indications;
- Pre-Cycle walkdowns performed each outage while system is at operating temperature and pressure prior to criticality;
- Post-Cycle walkdowns performed at operating temperature and pressure performed during unit shutdown.

Potential Failure Mechanisms:
The pressurizer safety valve nozzle to safe-end butt weld joins two dissimilar metal components, a carbon steel vessel nozzle to a stainless steel forging safe end using inconel weld material. The weld is susceptible to two potential failure mechanisms, both of which are initiated from the inside diameter. The first is PWSCC due to wetted surface exposure to high temperature primary coolant system water. The second is thermal fatigue associated with high temperature differences experienced during unit heat-up and cool-down cycles.

The first mechanism, PWSCC, is eliminated by the existence of cladding material (SA-213, Gr. TP304) on the inside diameter of the nozzle that also covers the weld. The second mechanism, thermal fatigue, is not expected to result in cracking of the weld because it was accounted for by the number of acceptable unit heat-up and cool-down cycles within the primary coolant system design and is further minimized by the expected infrequent operation of the safety valves.

At the time of the inspection, Duke Power Corporation used the best available UT methodology to perform the weld examination such that evidence of thermal fatigue cracking would be expected to be detected in the areas covered by the sound beams.

See Paragraph J for additional justification information based on other code required testing.

Paragraph H:
Duke Energy Corporation does not take credit for the weld metal and far side examination volume when performing ultrasonic examination of similar metal austenitic piping welds where scanning is limited to one side of the weld. However, a best effort examination using a 60° refracted longitudinal wave search unit was conducted in one direction perpendicular to the weld covering 100% of the weld metal and 100% of the far side base. The near side was examined using a 60° shear wave search unit covering 100% of the base material volume. Circumferential scans using a 45° shear wave search unit were performed over 100% of the examination volume in two opposite directions.

ND system Valve 1ND002A to pipe weld 1ND38-1 is located inside containment. If a leak were to develop at this weld location discussed in this relief request, the instrumentation available to the operators for detection and monitoring of leakage would provide prompt and qualitative information necessary to permit them to take immediate corrective action. If a leak should develop in this aforementioned location, the probable corrective action would be shutdown and depressurize the steam generators, since the weld is non-isolable.

Other leakage detection systems available to the operator and dictated per plant technical specifications are:

- Containment Atmosphere Gaseous and Particulate Radioactivity Monitoring System (EMF monitors 38 & 39) which would detect airborne radiological activity;
- Containment Floor and Equipment Sump Level Monitoring Subsystem where unidentified accumulated water on the containment floor would be monitored and evaluated as sump level changes;
- Containment Ventilation Unit Condensate Drain Tank Level Monitoring Subsystem which collects and measures as unidentified leakage the moisture removed from the containment atmosphere.

Additionally, other indicators are also available to the operator that a leak exists or may be developing:

- Containment humidity indications;
- Low FWST Level annunciator;
- Pre-Cycle walkdowns performed each outage while system is at operating temperature and pressure prior to criticality;
- Post-Cycle walkdowns performed at operating temperature and pressure performed during unit shutdown.

See Paragraph J for additional justification information based on other code required testing.

Paragraph I:

Weld 1BRHRHX-5-9 on the ND Heat Exchanger is used to cool the water from the reactor coolant system (RCS) in Residual Heat Removal (RHR) mode or the Containment Sump in Containment Sump Recirculation. The ND System is normally in standby during power operations. When the RCS is less than 350° F, the ND system is aligned to RHR mode and the ND Heat Exchanger is used to remove decay heat during shutdown operations. In emergency core cooling mode, the Heat Exchanger is used to remove the heat energy from containment prior to the ND system returning the water back to containment.

The area that contains this Heat Exchanger to flange weld is surveyed twice a day by Operations staff during their routine rounds. One of the items that must be checked off is the general condition of the room containing

the Heat Exchanger. It is reasonable for the operator making these rounds to detect any external leaks from this weld.

This same area is also surveyed once a week by a periodic test that is used to specifically look for radioactive leaks outside containment. This area must be surveyed and signed off. If a leak were encountered, it would be written up in a work request and Problem Investigation Process form filled out. The Fluid Leak Management Process then examines the leak. The leak is either repaired or set up for periodic monitoring. A leak in the ND system would also have to be entered into the Emergency Core Cooling System Leakage Program.

Potential Failure Mechanisms:
The residual heat removal heat exchanger shell to flange circumferential weld joins two carbon steel components using compatible weld material. The weld is susceptible to one failure mechanism, thermal fatigue, that is initiated from the inside diameter of the weld and is associated with high temperature differences experienced during unit heat-up and cool-down cycles. This mechanism is not expected to result in cracking of the weld because it was accounted for by the number of acceptable heat-up and cool-down cycles factored into the system design.

At the time of the inspection, Duke Power Corporation used the best available RT methodology to perform the weld examination such that evidence of thermal fatigue cracking, consistent with the fatigue type cracks that are introduced into Performance Demonstration Initiative (PDI) UT samples, should have been detected in the areas covered by the RT exam.

See Paragraph J for additional justification information based on other code required testing.

Paragraph J:

Duke Energy proposes to use the code required pressure test and VT-2 visual examination to compliment the limited examination coverage. The Code requires, for Class 1 Components (reference Table IWB-2500-1, Item Numbers B15.20 and B15.50) that a system leakage test be performed after each refueling outage. Additionally, a system hydrostatic test (reference Table IWB-2500-1, Item Numbers B15.21and B15.51) is required once during each 10-year inspection interval.

The Code requires, for Class 2 Components (reference Table IWC-2500-1, Item Number C7.10) that a system pressure test be performed each inspection period. Additionally a system hydrostatic test (reference Table IWC-2500-1, Item Number C07.020 is required once during each 10-year inspection interval. These tests require a VT-2 visual examination for evidence of leakage. This testing will provide adequate assurance of pressure boundary integrity.

VII. Implementation Schedule

Paragraph K:

The scheduled second 10-year interval plan code examination was performed on the referenced welds resulting in limited volumetric coverage. No additional examinations are planned for the welds during the current inspection interval. The same welds may be examined again as part of the next (third) 10-year interval plan, depending on the applicable code year edition and addenda requirements adopted in the future.

VIII. Other Information

The following individuals contributed to the development of this RFR:

Jim McArdle (NDE Level III Inspector) provided UT related information for Sections II through V
Tim Tucker (NDE Level III Inspector) provided RT related information for Sections II through V
David Goforth (CNS Systems Engineer) provided a portion of Section VI
Mark Pyne (G.O. Engineering) provided a portion of Section VI.
Andy Hogge (Sponsor) compiled the remaining sections

Sponsored By: A. J. Hogge Jr. **Date** 5/5/2003

Approved By: R. Kevin Rhyne **Date** 5/5/03

Attachment A	Weld 1PZR-W4ASE Examination Data
Attachment B	Weld 1PZR-W4BSE Examination Data
Attachment C	Weld 1PZR-W4CSE Examination Data
Attachment D	Weld 1ND38-1 Examination Data
Attachment E	Weld 1BRHRHX-5-9 Examination Data
Attachment 1	RHR Heat Exchanger Equipment Drawing
Attachment 2	Pressurizer Safety Nozzle & Weld Detail Drawing

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0505 | Form NDE-UT-2A

Exam Finish: 0532 | Revision 4

Station: Catawba | Unit: 1 | Component/Weld ID: 1PZR-W4ASE | Date: 4/29/2002

Weld Length (in.): 20.8 | Surface Condition: AS GROUND | Lo: 9.1.1.4

Surface Temperature: 81 ° F

Examiner: David Zimmerman Level: III

Examiner: Gary J. Moss Level: II

Pyrometer S/N: MCNDE 27228

Cal Due: 7/3/2002

Procedure: NDE-610 Rev: 4

FC: *

Scans:

45 ☐ 72** dB 70 ☐ ____ dB

45T ☐ 62 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Configuration: CIRC. WELD

S2 Flow S1

NOZZLE to SAFE-END

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

Calibration Sheet No:
0201046, 0201047

IND #	∠	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
NRI	45°														

Remarks: *FC 02-10, 01-03, 98-20, 97-01. **Scanned at 72dBdue to signal/noise ratio.

Limitations: (see NDE-UT-4) ☐ 90% or greater coverage obtained: yes ☐ no ☐

Sheet 1 of 4

Reviewed By: D E Hanson Level: III Date: 5/15/02

Authorized Inspector: Robert McGill Date: 5-22-02

Item No: B05.040.004

REQUEST FOR RELIEF #02-002 ATTACHMENT A REV. 1

6/18/02

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1PZR-W4ASE | Item No: B05.040.004 | Remarks:

NOZZLE CONFIGURATION

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO 1.0 to BEYOND
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____
FROM 0 DEG to 360 DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: Daniel K. F. | Level: III | Date: 4/29/2002 | **Sketch(s) attached** ☐ yes ☐ no | Sheet 2 of 4

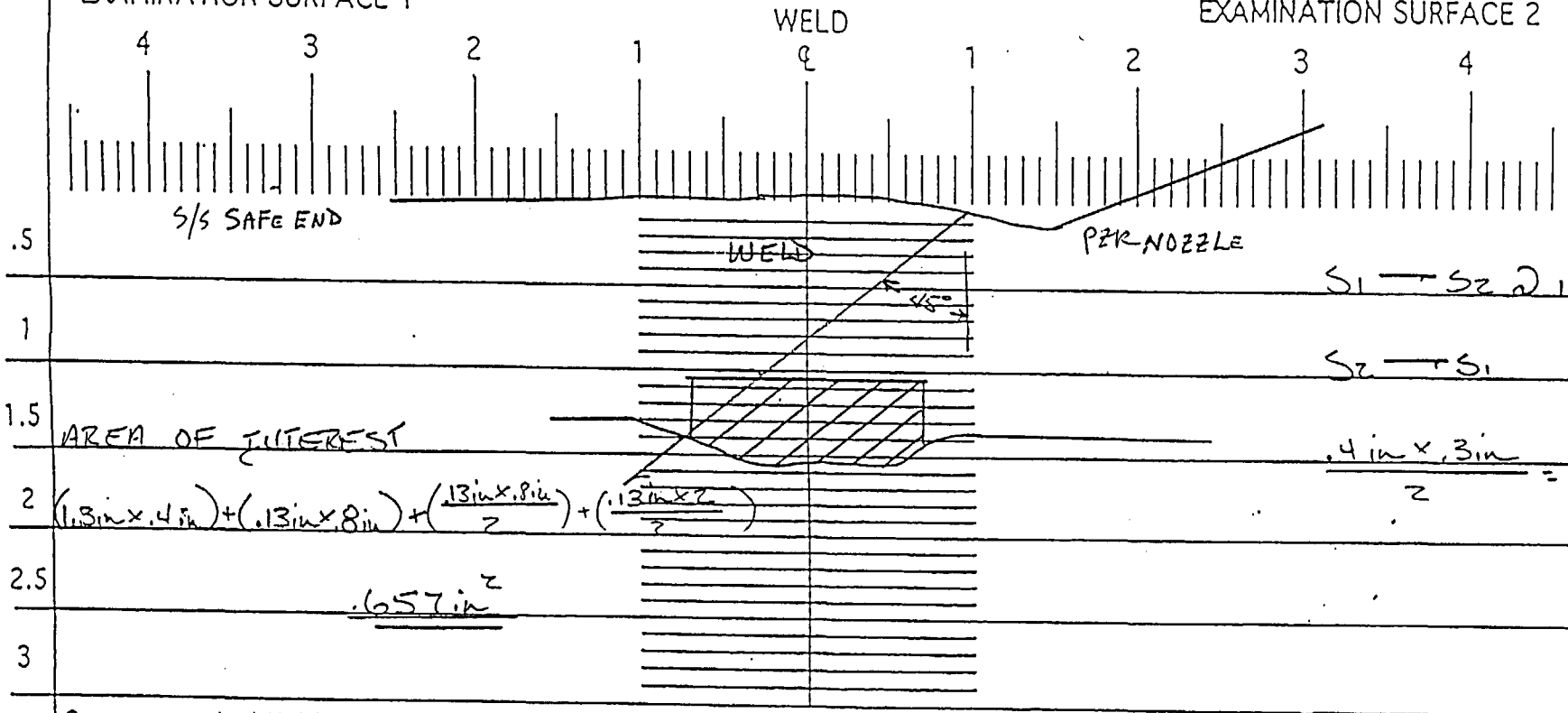
Reviewed By: M E Power | Date: 5/15/02 | Authorized Inspector: Robert McGuire | Date: 5 22 02

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

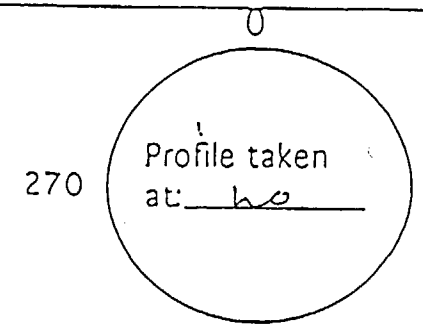
NDE-UT-5

Revision 1



Component ID/Weld No. 1PZR-WHASE

Remarks: PROFILE TAKEN FROM PREVIOUS DATA



Item No: B05.040.004

Examiner: David E. Bruce	Level: III	Date: 4/29/02
Reviewed By: DE Bowman	Level: III	Date: 5/15/02
Authorized Inspector: Robert McGill		Date: 5-22-02

Sheet 3 of 4

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☐ Base Metal ☐ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
.657 SQ. IN. SEE ATTACHED	

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.657	20.8	13.7	13.7	
2	45°	CCW	.657	20.8	13.7	13.7	
3	45°	S1	.060	20.8	1.25	13.7	
4	45°	S2	.657	20.8	13.7	13.7	
					42.35	54.8	77.28

Item No: B05.040.004

Prepared By: David K. Zi Level: III Date: 4/29/02

Reviewed By: D E Powers Level: III Date: 5/15/02

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0508 | Form NDE-UT-2A

Exam Finish: 0527 | Revision 4

Station: Catawba | Unit: 1 | Component/Weld ID: 1PZR-W4BSE | Date: 4/29/2002

Weld Length (in.): 20.8 | Surface Condition: AS GROUND | Lo: 9.1.1.4

Surface Temperature: 81 ° F

Examiner: David Zimmerman Level: III

Examiner: Gary J. Moss Level: II

Pyrometer S/N: , MCNDE 27228

Cal Due: 7/3/2002

Procedure: NDE-610 Rev: 4

FC: *

Calibration Sheet No: 0201046, 0201047

Scans:

45 ☐ 72** dB 70 ☐ ____ dB

45T ☐ 62 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Configuration: CIRC. WELD

S2 Flow S1

NOZZLE to SAFE-END

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

IND #	4	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
NRI	45°														

Remarks: *FC 02-10, 01-03, 98-20, 97-01. ** Scanned at 72dB due to signal/noise ratio.

Limitations: (see NDE-UT-4) ☐ 90% or greater coverage obtained: yes ☐ no ☐

Sheet 1 of 4

Reviewed By: D E Howser Level: III Date: 5/15/02

Authorized Inspector: Robert McGill Date: 5-22-02

Item No: B05.040.005

REQUEST FOR RELIEF #02-002 ATTACHMENT B REV. 1

6/18/02

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1PZR-W4BSE | Item No: B05.040.005 | Remarks:

NOZZLE CONFIGURATION

☐ NO SCAN
☒ LIMITED SCAN
SURFACE ☐ 1 ☐ 2
BEAM DIRECTION ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO 1.0 to BEYOND
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____
FROM 0 DEG to 360 DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE ☐ 1 ☐ 2
BEAM DIRECTION ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE ☐ 1 ☐ 2
BEAM DIRECTION ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE ☐ 1 ☐ 2
BEAM DIRECTION ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: [signature] Level: III Date: 4/29/2002 | Sketch(s) attached ☐ yes ☐ no | Sheet 2 of 4

Reviewed By: ME Hansen Date: 5/15/02 | Authorized Inspector: Robert McGill Date: 5-22-02

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☐ Base Metal ☐ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
.625 SQ. IN. SEE ATTACHED	

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.625	20.8	13	13	
2	45°	CCW	.625	20.8	13	13	
3	45°	S2	.625	20.8	13	13	
4	45°	S1	.275	20.8	13	13	
					44.72	52	86.00

Item No: B05.040.005

Prepared By: David G Z Level: III Date: 4/29/02

Reviewed By: ME Hansen Level: III Date: 5/15/02

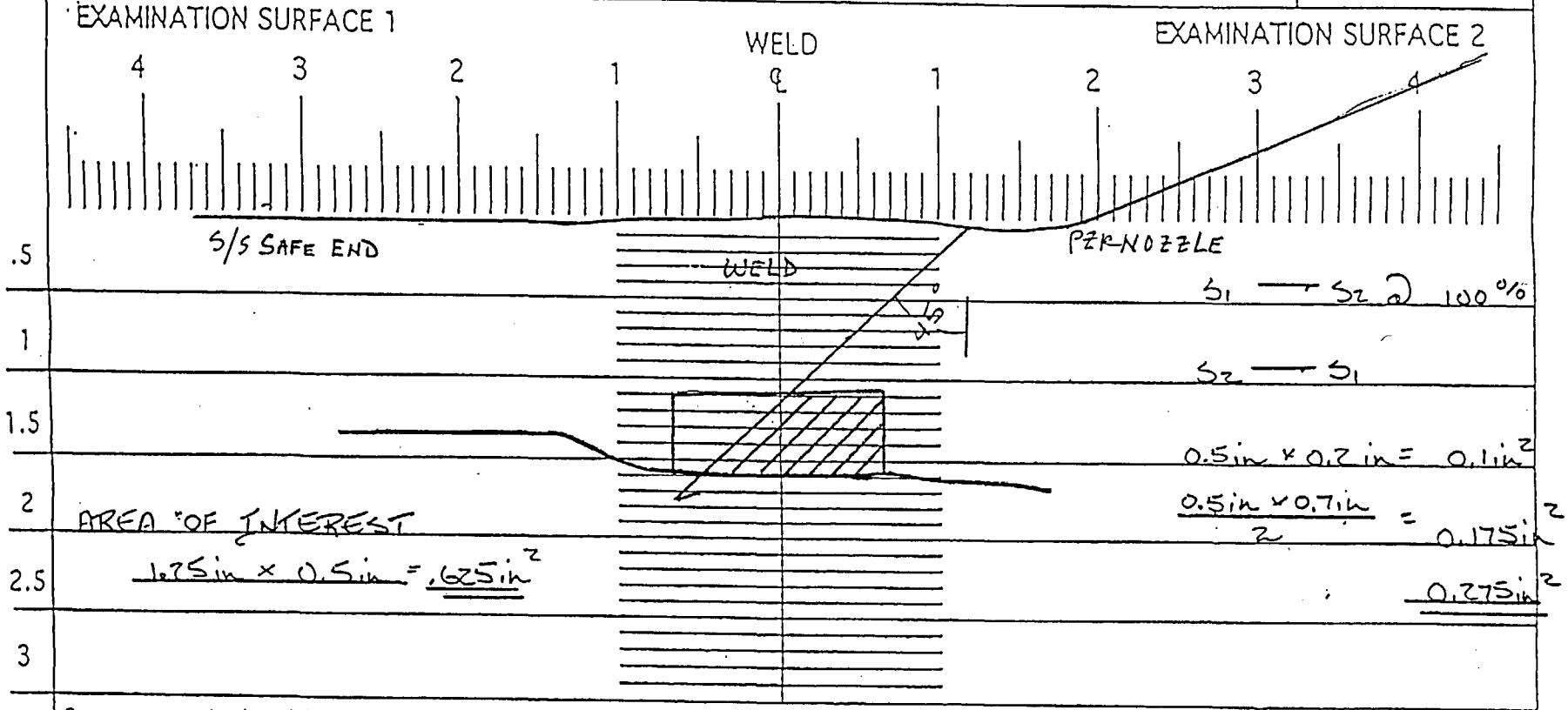
PB 3 of 4

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. 1PZR - W4BSE

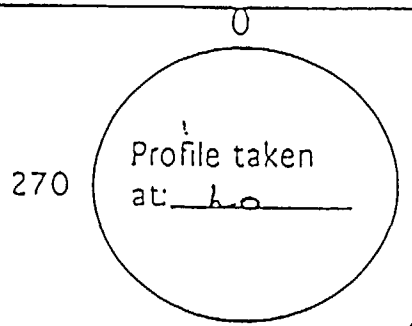
Remarks: PROFILE TAKEN FROM PREVIOUS DATA

Item No: B05.040.005

Examiner: David K. [illegible] Level: II Date: 4/29/02

Reviewed By: DE Danner Level: III Date: 5-15-02

Authorized Inspector: Robert Martell Date: 5-22-02



DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0512 | Form NDE-UT-2A

Exam Finish: 0522 | Revision 4

Station: Catawba | Unit: 1 | Component/Weld ID: 1PZR-W4CSE | Date: 4/29/2002

Weld Length (in.): 20.8 | Surface Condition: AS GROUND | Lo: 9.1.1.4

Examiner: Winfred C. Leeper Level: II

Examiner: Marion T. Weaver Level: II

Procedure: NDE-610 Rev: 4

FC: *

Calibration Sheet No: 0201046, 0201047

Scans:

45 ☒ 72** dB 70 ☐ ____ dB

45T ☒ 62 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Surface Temperature: 81 ° F

Pyrometer S/N: MCNDE 27228

Cal Due: 7/3/2002

Configuration: CIRC. WELD

S2 Flow S1

NOZZLE to SAFE-END

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

IND #	∠	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
NRI	45°														

Remarks: *FC 02-10, 01-03, 98-20, 97-01. ** Scanned at 72dB due to signal/noise ratio.

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☐

Sheet 1 of 4

Reviewed By: D E Howser Level: III Date: 5/15/02

Authorized Inspector: Robert McGill Date: 5-22-02

Item No: B05.040.006

REQUEST FOR RELIEF #02-002 ATTACHMENT C
REV. 1

RJH 6/19/02

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1PZR-W4CSE | Item No: B05.040.006 | Remarks:

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO 1.0 to BEYOND

ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____
FROM 0 DEG to 360 DEG

NOZZLE CONFIGURATION

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: David C. Z | Level: III | Date: 4/29/2002 | **Sketch(s) attached** ☐ yes ☐ no | Sheet 2 of 4

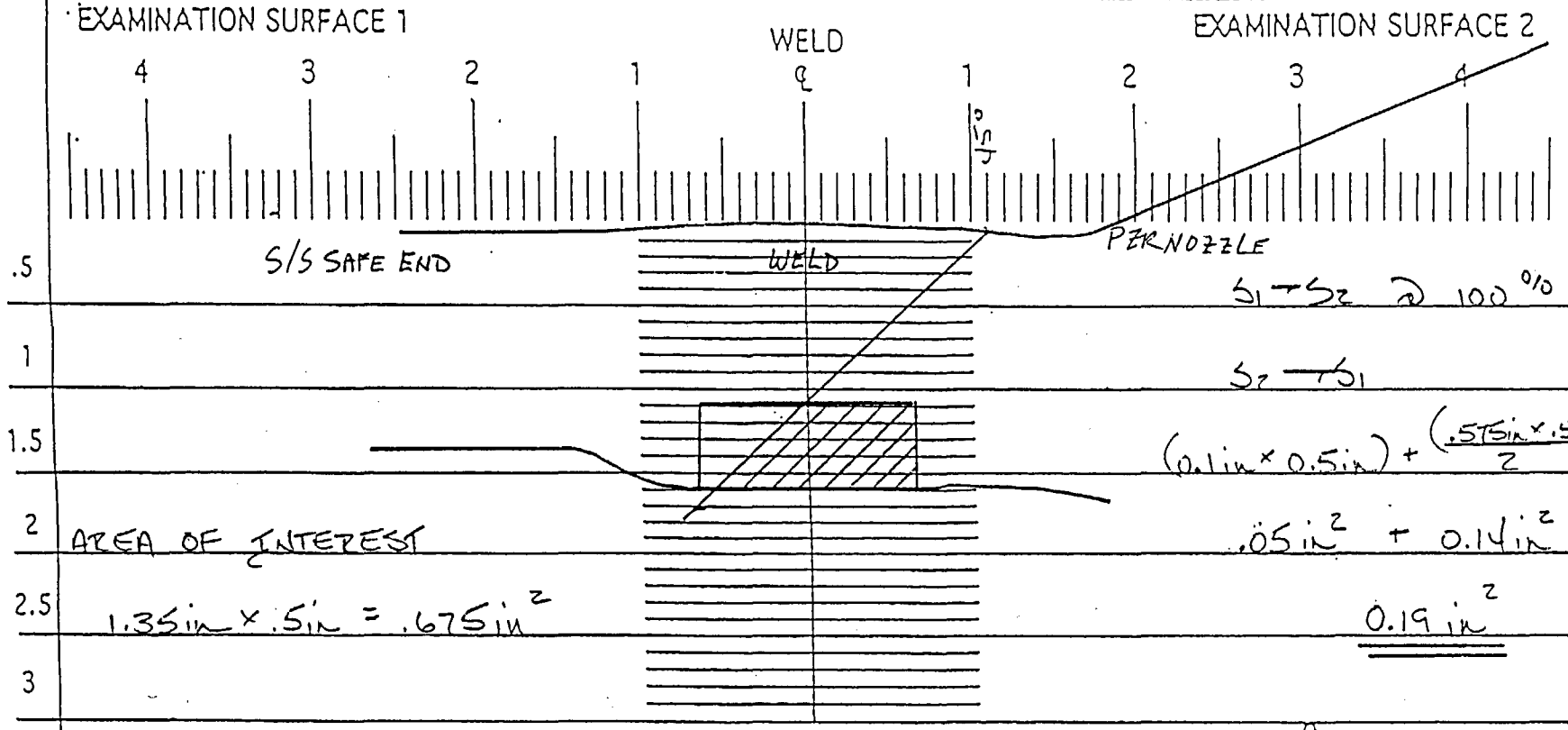
Reviewed By: DE Bowen | Date: 5/15/02 | Authorized Inspector: Robert Mutill | Date: 5-22-02

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1

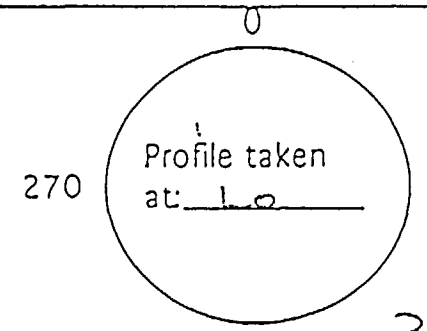


Component ID/Weld No. PZR-WELD SE

Remarks: PROFILE TAKEN FROM PREVIOUS DATA

Item No: B05.010.006

Examiner: Daniel C. [illegible]	Level: III	Date: 4/29/02
Reviewed By: D E Rogers	Level: III	Date: 5/15/02
Authorized Inspector: Robert McGee		Date: 5-22-02



Sheet 3 of 4

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☐ Base Metal ☐ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
.675 SQ. IN. SEE ATTACHED SKETCH	

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.675	20.8	14.04	14.04	
2	45°	CCW	.675	20.8	14.04	14.04	
3	45°	S2	.675	20.8	14.04	14.04	
4	45°	S1	.19	20.8	3.95	14.04	
					46.07	56.16	82.03

Item No: B05.040.006

Prepared By: David [illegible] Level: III Date: 4/29/02

Reviewed By: M E Hansen Level: III Date: 5/15/02

PS 4 of 4

Catawba Unit #1
EOC13

Item # B09.011.104

Weld # 1N038-1

No Data Recorded. Reference Calibration Sheet #'s

0201026 45°/60°

0201027 60° L

REQUEST FOR RELIEF #02-002 ATTACHMENT D
REV.1

ASH 6/19/02

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1ND38-1 | Item No: B09.011.104 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2

BEAM DIRECTION: ☐ 1 ☒ 2 ☐ cw ☐ ccw

FROM L _____. to L _____

INCHES FROM WO C/L. to Beyond

ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____

FROM 0 DEG to 360 DEG

Valve Configuration

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2

BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____. to L _____

INCHES FROM WO _____. to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____

FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2

BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____. to L _____

INCHES FROM WO _____. to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____

FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2

BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____. to L _____

INCHES FROM WO _____. to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____

FROM _____ DEG to _____

Prepared By: Jay A. Eaton | Level: III | Date: 5/2/2002 | **Sketch(s) attached** ☒ yes ☐ no | Sheet 2 of 4

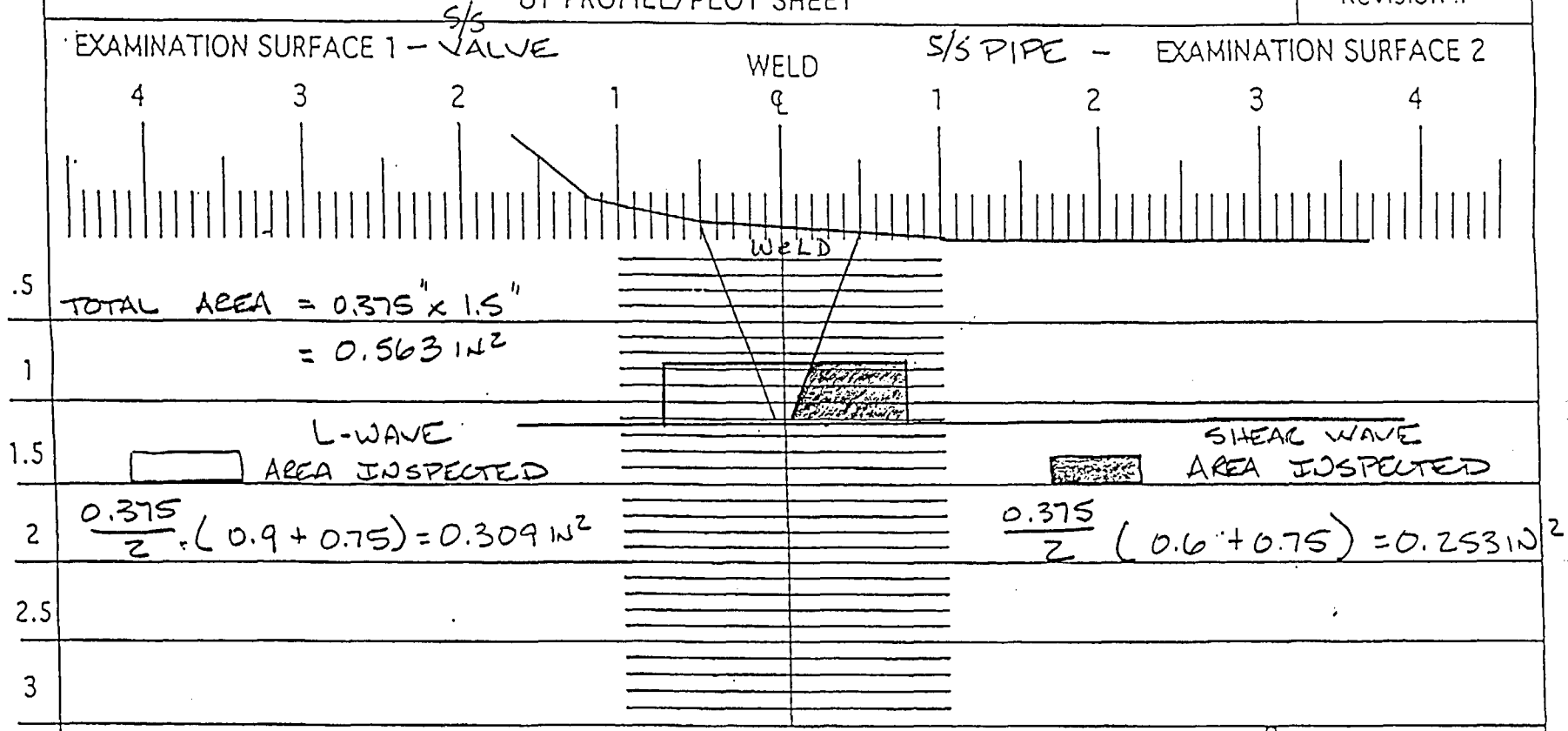
Reviewed By: Gary Moss | Date: 5-4-02 | Authorized Inspector: Robert McGill | Date: 5-8-02

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. IND38-1

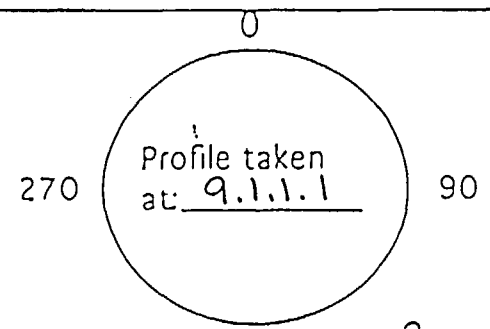
Remarks:

Item No: B09.011.104

Examiner: [signature]

Reviewed By: Gary [signature] Level: III Date: 5/1/02

Authorized Inspector: Robert [signature] Level: II Date: 5-8-02



Sheet 3 of 4

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
0.375" X 1.5" = 0.563 SQ. IN.	0.563 X 40.1" = 22.58 CU.IN.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	0.563	40.1	22.58	22.58	100.00
2	45°	CCW	0.563	40.1	22.58	22.58	100.00
3	60°	S1	0.253	40.1	10.14	22.58	44.91
4	60°	S2	0	0	0	22.58	0.00
		Total	Aggregate	Coverage	55.3	90.32	61.23
		60°L Wave	Supplement	Coverage			
3	60°L	S1	0.309	40.1	12.391	22.58	54.88

54.88% of 1 scan (25%) = 13.72% of total weld.

Item No: B09.011.104

Prepared By: Jay A. Eaton Level: III Date: 5/1/2002

Reviewed By: Gary J. Moss Level: II Date: 5-4-02

PS 4 of 4

FORM NDE-RT1 | REVISION 5

DUKE POWER COMPANY
RADIOGRAPHIC EXAMINATION REPORT / TECHNIQUE

Weld / Component ID. 1BRHRHX-5-9 Project Catawba Nuclear Station

Procedure No./Rev. NDE 12/11 Acceptance/Reporting Standards ASME XI

Radiographer		Level	Date	
R.L.Gantt	Roger L. Gantt	II	05-04-02	Code Reference ASME Sec. XI

Material: CS ☒ SS ☐ ☐ Diameter 43.75" Thickness .875"

Source: Ir-192 Size: .142" Curies: 91 Estimated Weld Build-Up .0625" SFD 21.937"

IQI: Film Side ☒ Source Side ☐ 20 Size(s) IQI Design: Standard Hole-Type

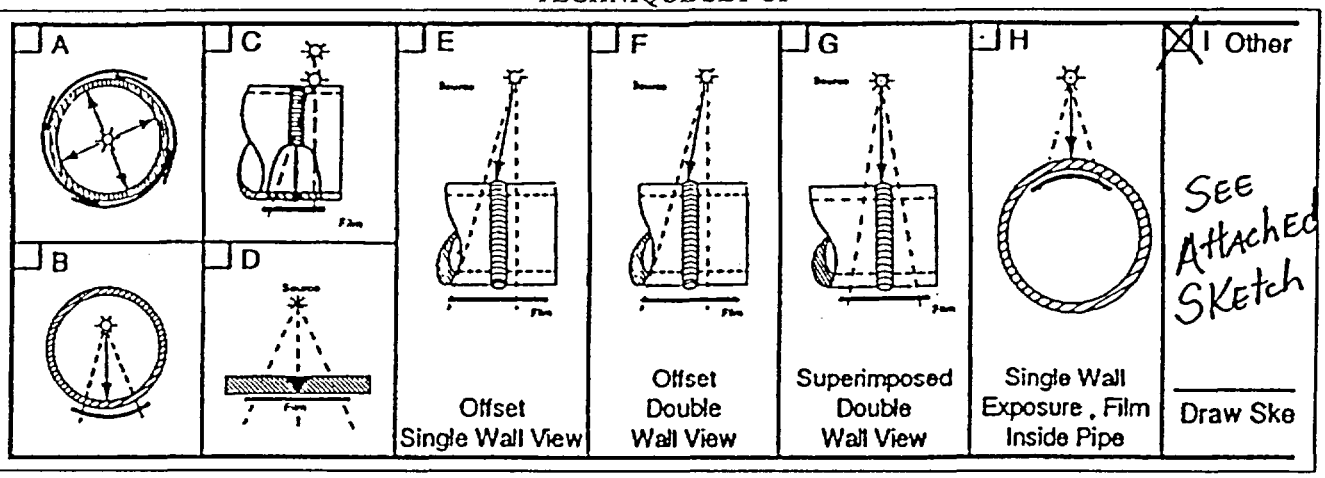
Film View: Single ☒ Composite ☐ Number of Film Per Cassette: 2 Film Stand Off NA

Film Brand/Type: Front Fuji 80 Center NA Back Fuji 80 Shim Size(s): NA

Screen Thickness: Front .010" Center NA Back .010" (Ug = Fd/D) Actual Ug: .006"

Exposure Time: Hrs. NA Min. *See Attached. Thicker member used as shim: ☒

TECHNIQUE SET UP



FILM REVIEW

Interval	Date	Indication	Length/Size	Reviewer	Level	Date	Accept	Reject	Report	Reshoot
0-1	05-04-02	8,12		JKT	III	05-04-02	✓			
1-2	05-04-02	8		JKT	III	05-04-02	✓			
2-3	05-04-02	8		JKT	III	05-04-02	✓			
3-4	05-04-02	8,12		JKT	III	05-04-02	✓			
4-5	05-04-02	8		JKT	III	05-04-02	✓			
5E-6	05-04-02			JKT	III	05-04-02	✓			
6-7	05-04-02	8		JKT	III	05-04-02	✓			
7-8	05-04-02			JKT	III	05-04-02	✓			
8X-9	05-04-02			JKT	III	05-04-02	✓			
9-10	05-04-02	12		JKT	III	05-04-02	✓			
10-0R	05-04-02			JKT	III	05-04-02	✓			

Indication and flaw types:					
	1. Incomp. Fusion	4. Unconsumed Insert	7. Undercut	10. Convexity	13. Surface
	2. Incomp. Pen.	5. Crack	8. Porosity	11. Concavity	14. Inclusion
	3. Excessive Pen.	6. Slag	9. Tungsten	12. Film Artifact	15.

Exam Limitations: ☒ Yes: 55.5% Examined ☐ No: (100% Examined)

Comments:

Second Review JK Tuskey Level III Date 05-04-02

ANI/ANII Review Robert McGill Date 5-6-02

Item No. C01.010.002

REQUEST FOR RELIEF #02-002 REV.1 ATTACHMENT E

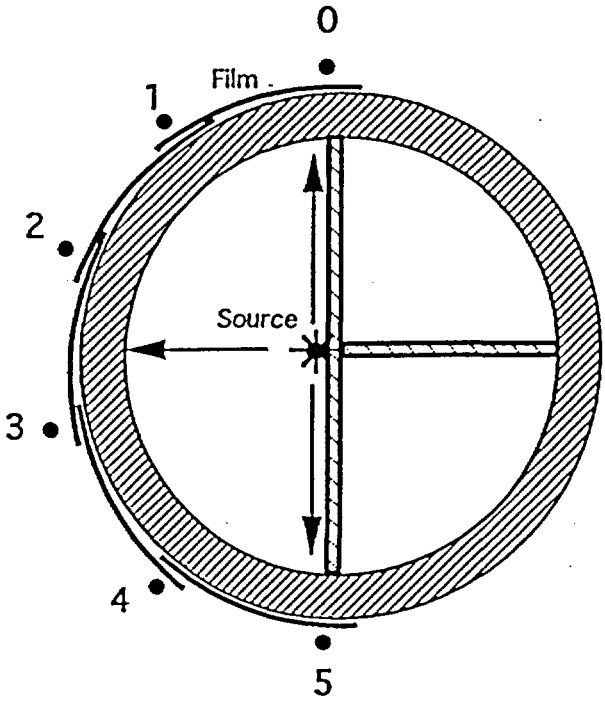
AH 6/14/02

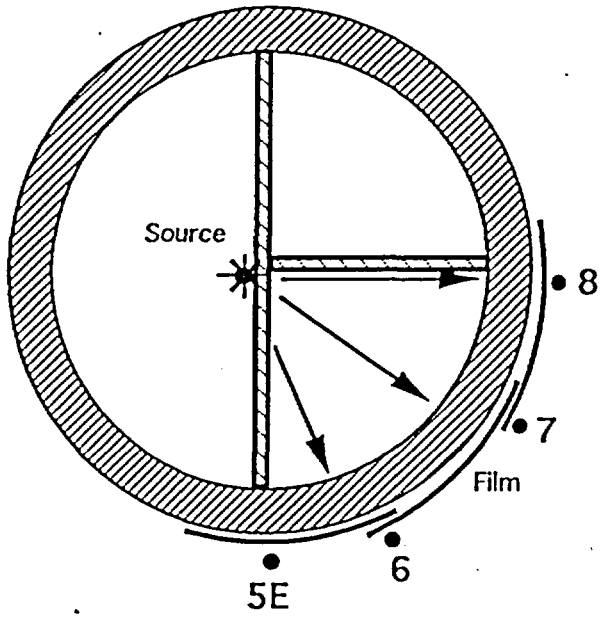
1BRHRHX-5-9
C01.010.002

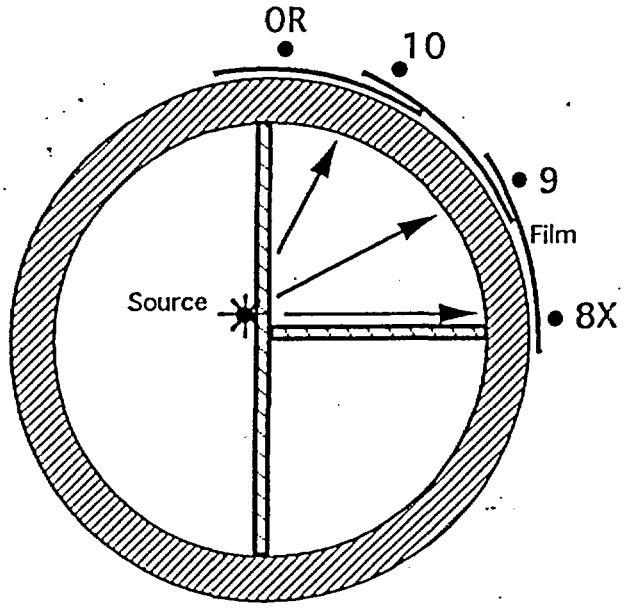
RADIOGRAPHIC TECHNIQUE I

Date: 5-4-02

Approved: TL Tucker
RT Level III







Exposure Times

0 - 1	3 MIN.
1 - 2	3 MIN.
2 - 3	3 MIN.
3 - 4	3 MIN.
4 - 5	3 MIN
5E - 6	8 MIN
6 - 7	5 MIN 50 sec.
7 - 8	5 MIN 50 sec.
8X - 9	5 MIN 50 sec.
9 - 10	5 MIN 50 sec.
10 - 0R	10 MIN 50 sec.

DUKE POWER COMPANY	NDE-91-1
Limited Examination Coverage Worksheet	Revision 0

Examination Volume/Area Defined

Base Metal ☑ Weld ☑ Near Surface ☐ Bolting ☐ Inner Radius ☐

Area Calculation	Volume Calculation
Required exam Area = 258.45 Area examined = 144.47 144.47 ÷ 258.45 x100 = 55.898% * See note below	

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage

* Notes

1. Required area calculation:
   weld length = 137.84"
   weld width = .875"
   Base metal = 1" (.5" each side)

   137.84 X 1.875 = 258.45 sq. in.

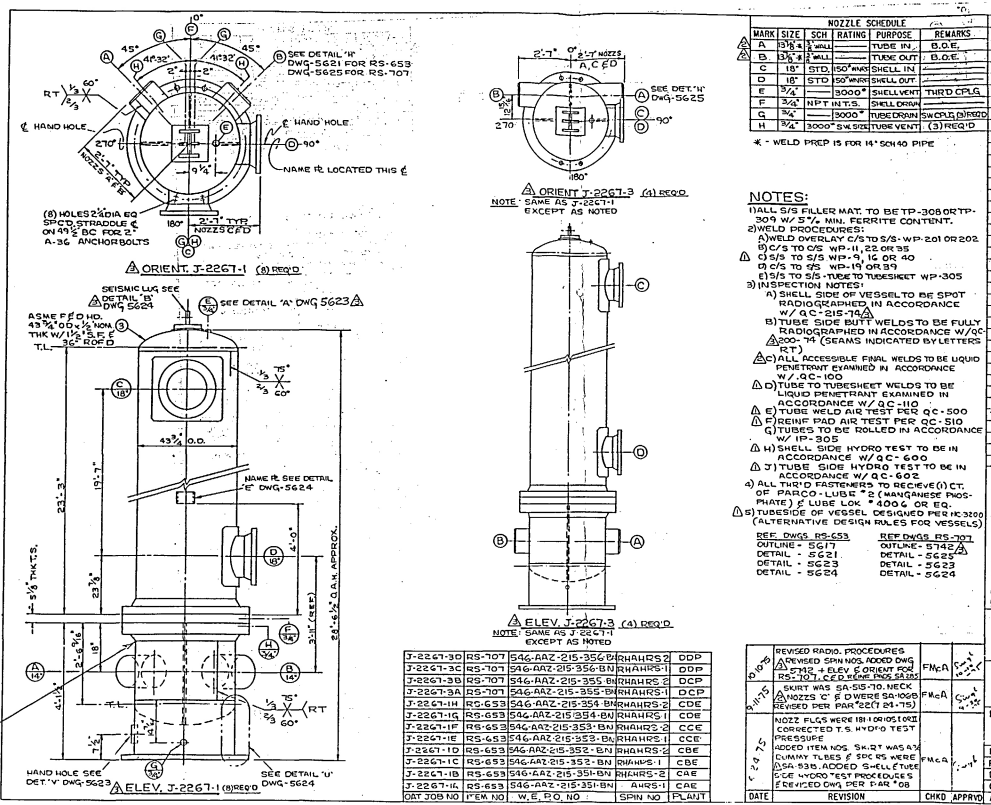
2. Area examined calculation:
   The area examined was determined from measurements taken on each radiographic interval

3. Limitation due to configuration.
   100% of base metal on the flange side and a portion of the weld was not examined.

Item No: CG1.010.002

Prepared BY: TL Tucker Level: III Date: 5-4-02

Reviewed By: James K. Tackett Level: III Date: 5-4-02



C01.010.002

NOZZLE SCHEDULE					
MARK	SIZE	SCH	RATING	PURPOSE	REMARKS
A	13⅛ x ⅜ WALL			TUBE IN	B.O.E.
B	13⅛ x ⅜ WALL			TUBE OUT	B.O.E.
C	18"	STD.	150# RWN	SHELL IN	
D	18"	STD	150# RWN	SHELL OUT	
E	¾"		3000#	SHELL VENT	THRD CPLG
F	¾"	NPT IN T.S.		SHELL DRAIN	
G	¾"		3000#	TUBE DRAIN	SW CPLG (2) REQ'D
H	¾"		3000# SW	TUBE VENT	(2) REQ'D

* - WELD PREP IS FOR 14" SCH 40 PIPE

NOTES:
1) ALL S/S FILLER MAT. TO BE TP-308 OR TP-309 W/ 5% MIN. FERRITE CONTENT.
2) WELD PROCEDURES:
A) WELD OVERLAY C/S TO S/S - WP-201 OR 202
B) C/S TO C/S WP-11, 22 OR 35
C) S/S TO S/S WP-9, 16 OR 40
D) C/S TO S/S WP-19 OR 39
E) S/S TO S/S - TUBE TO TUBESHEET WP-305
3) INSPECTION NOTES:
A) SHELL SIDE OF VESSEL TO BE SPOT RADIOGRAPHED IN ACCORDANCE W/ QC-215-74
B) TUBE SIDE BUTT WELDS TO BE FULLY RADIOGRAPHED IN ACCORDANCE W/ QC-200-74 (SEAMS INDICATED BY LETTERS RT)
C) ALL ACCESSIBLE FINAL WELDS TO BE LIQUID PENETRANT EXAMINED IN ACCORDANCE W/ QC-100
D) TUBE TO TUBESHEET WELDS TO BE LIQUID PENETRANT EXAMINED IN ACCORDANCE W/ QC-110
E) TUBE WELD AIR TEST PER QC-500
F) REINF PAD AIR TEST PER QC-510
G) TUBES TO BE ROLLED IN ACCORDANCE W/ IP-305
H) SHELL SIDE HYDRO TEST TO BE IN ACCORDANCE W/ QC-600
J) TUBE SIDE HYDRO TEST TO BE IN ACCORDANCE W/ QC-602
4) ALL THRD FASTENERS TO RECIEVE (1) CT. OF PARCO-LUBE #2 (MANGANESE PHOSPHATE) & LUBE LOK #4000 OR EQ.
5) TUBESIDE OF VESSEL DESIGNED PER HX-3200 (ALTERNATIVE DESIGN RULES FOR VESSELS)

REF. DWGS RS-653	REF. DWGS RS-707
OUTLINE - 5617	OUTLINE - 5742
DETAIL - 5621	DETAIL - 5625
DETAIL - 5623	DETAIL - 5623
DETAIL - 5624	DETAIL - 5624

DESIGN DATA	SHELL SIDE	TUBE SIDE
DESIGN AND FABRICATION	ASME SECT III CL-3 1974	ASME SECT III CL-2 1974 TEMA-R
DESIGN PRESSURE	150 PSI	600 PSI
DESIGN TEMPERATURE	200° F	400° F
CORROSION ALLOWANCE	⅛"	.005" ON TUBES
WELDING	PER CODE	PER CODE
FLANGE FACE FINISH	125 AA SHELL 63 AA GASKET	
RADIOGRAPHIC EXAMINATION	SPOT	FULL
HEAT TREATMENT		
TEST PROCEDURE	PER CODE	PER CODE
FINAL TEST PRESSURE	225 PSI	803 PSI
MATERIAL		
SHELL	SA-285-C	SA-240 304
HEADS	SA-515-70	SA-240 304
SHELL AND HEAD FLANGES	SA-105	SA-182 F304
NOZZLE NECKS	SA-53B	SA-240 304
NOZZLE FLANGES	SA-105	
MANHOLE NECK		
REINFORCING PADS	SA-515-70	SA-240 304
SUPPORTS (SKIRT)		SA-36
TUBE SHEETS	SA-515-70 W/ SS WELD OVERLAY	SA-240 304
TUBES		SA-249 304
BAFFLES	SA-36	
SPACERS	SA-53	
TIE-RODS	SA-36	
PARTITION PLATES		SA-240 304
COUPLINGS	SA-105	SA-182 F-304
GASKETS	SPIRAL WOUND	SPIRAL WOUND
BOLTS OR STUDS	SA-193-B7	SA-193-B7
NUTS	SA-194-2H	SA-194-2H
DUMMY TUBES	SA-53	
ELBOWS		SA-182 F304
DRAIN PIPES		SA-312-304
'U' TUBE SUPPT	SA-36	

WEIGHT EMPTY 27,000# BUNDLE - 14,500#
WEIGHT FULL OF WATER 45,000#
PAINTING COMMERCIAL BLAST CLEAN PER SSPC-SP6 63, PAINT-DIMETCOATE STEEL PRIMER #2 (1.5 TO 2.0 MILS DFT.) ALL EXTERNAL C.S. SURFACES
INSPECTION DAT. UNDERWRITERS & WESTINGHOUSE
STAMPING SHELL SIDE - SECT III CL-3 TUBESIDE SECT III CL-2
UNLESS OTHERWISE NOTED:
ALL BOTTOM NOZZLES SHALL BE FLUSH WITH INSIDE OF VESSEL. OTHER NOZZLES SHALL BE FLUSH
BOLT HOLES SHALL STRADDLE THE NORMAL VESSEL CENTER LINES.

J-2267-3G	RS-707	546-AAZ-215-356-BN	RHAHRS-2	DDP
J-2267-3C	RS-707	546-AAZ-215-356-BN	RHAHRS-1	DDP
J-2267-3B	RS-707	546-AAZ-215-355-BN	RHAHRS-2	DCP
J-2267-3A	RS-707	546-AAZ-215-355-BN	RHAHRS-1	DCP
J-2267-1H	RS-653	546-AAZ-215-354-BN	RHAHRS-2	CDE
J-2267-1G	RS-653	546-AAZ-215-354-BN	RHAHRS-1	CDE
J-2267-1F	RS-653	546-AAZ-215-353-BN	RHAHRS-2	CCE
J-2267-1E	RS-653	546-AAZ-215-353-BN	RHAHRS-1	CCE
J-2267-1D	RS-653	546-AAZ-215-352-BN	RHAHRS-2	CBE
J-2267-1C	RS-653	546-AAZ-215-352-BN	RHAHRS-1	CBE
J-2267-1B	RS-653	546-AAZ-215-351-BN	RHAHRS-2	CAE
J-2267-1A	RS-653	546-AAZ-215-351-BN	AHRS-1	CAE
OAT JOB NO	ITEM NO	W. E. P.O. NO	SPIN NO	PLANT

DATE	REVISION	CHKD	APPRVD
10-10-75	REVISED RADIO. PROCEDURES & REVISED SPIN NOS. ADDED DWG J-2267-3 + ELEV. & ORIENT FOR RS-707, C.F.D. REVISE PROS SA 285	FMcA	
9-11-75	SKIRT WAS SA-515-70. NECK NOZZS & F & D WERE SA-105B REVISED PER PAR "22" (1 24-75)	FMcA	
7-24-75	NOZZ FLGS WERE 181-1 OR 105-1 OR II CORRECTED T.S. HYDRO TEST PRESSURE. ADDED ITEM NOS. SK. 2 WAS A-1 DUMMY TUBES & SPCERS WERE SA-938. ADDED SHELL & TUBE SIDE HYDRO TEST PROCEDURES & REVISED DWG PER PAR "08	FMcA	

JOSEPH OAT CORPORATION
CHEMICAL ENGINEERS/DESIGNERS/FABRICATORS
EST. 1798 CAMDEN, NEW JERSEY 08104

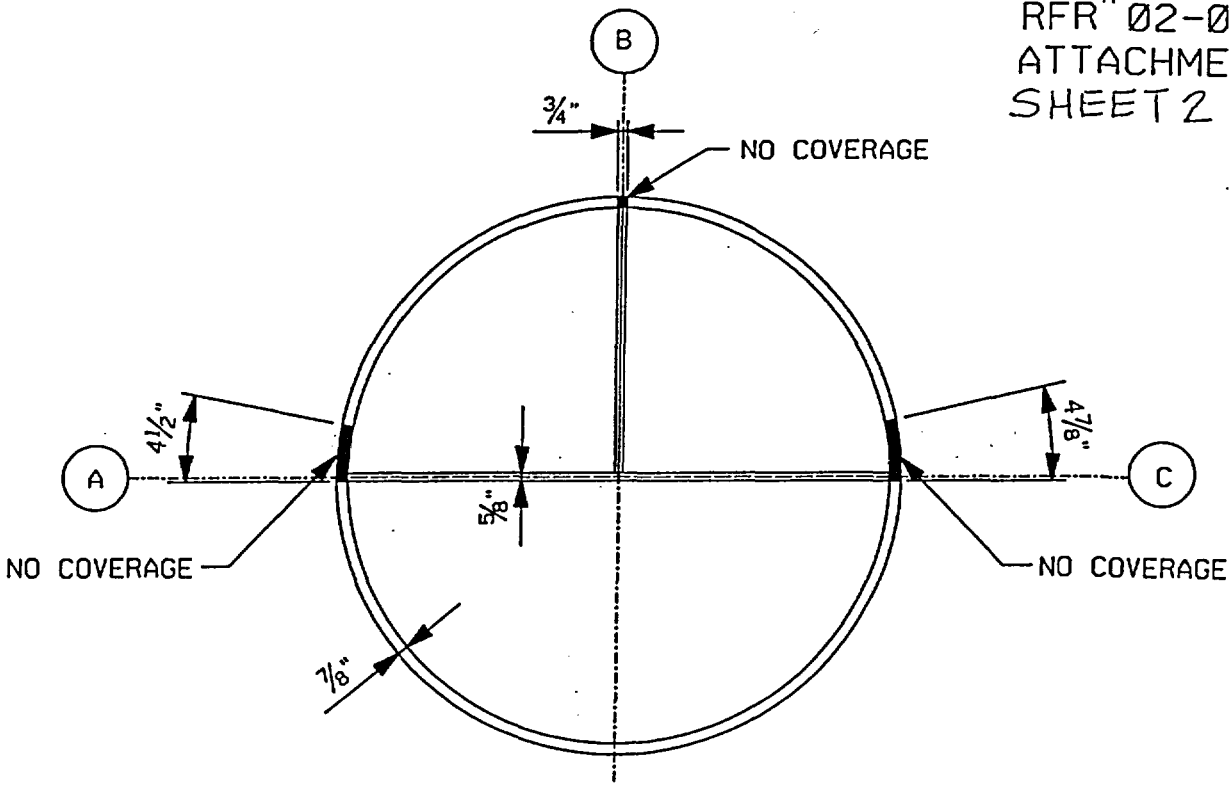
VERTICAL RESIDUAL HEAT EXCHANGER
ASSEMBLY & DETAILS

FOR: WESTINGHOUSE ELECTRIC CORP. PWR SD PITTSBURGH, PA

REF. NO.	JOB NO: J-2267-1 & 3
P.O. NO. SEE DATA BLOCK	SEE DATA BLOCK
DRAWN: F McA DATE: 8-8-74	DRAWING NO. 5619 REV. 3
CHECKED: DATE:	
APPROVED: DATE:	

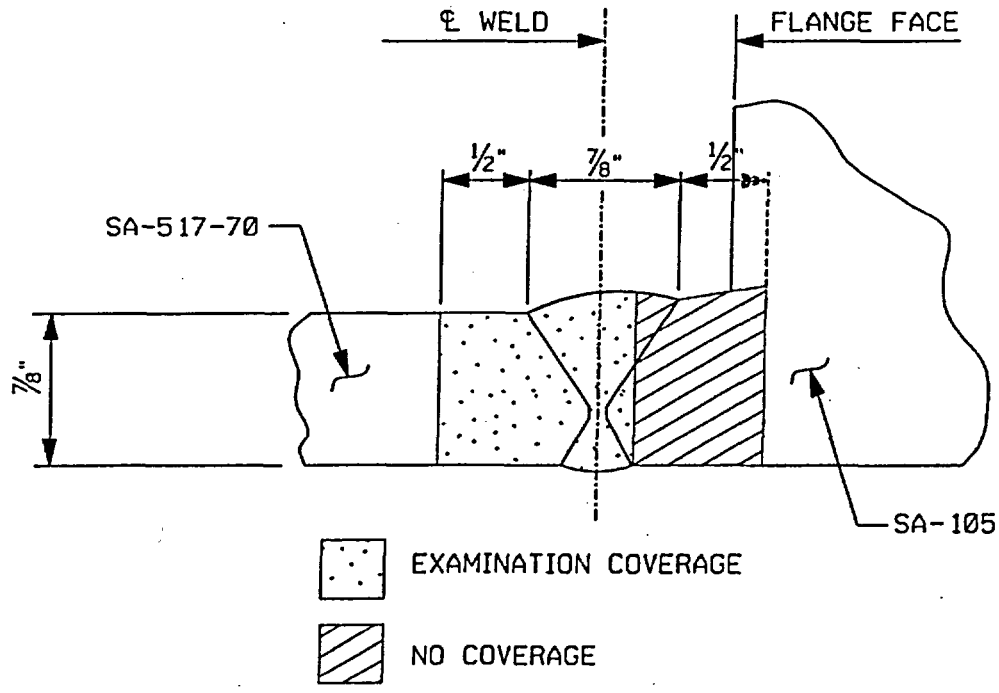
RFR 02-002 REV. 1
ATTACHMENT 1
SHEET 1

RFR # 02-002 REV.1
ATTACHMENT 1
SHEET 2



DETAIL A - DIVIDER PLATES

SCALE: NONE



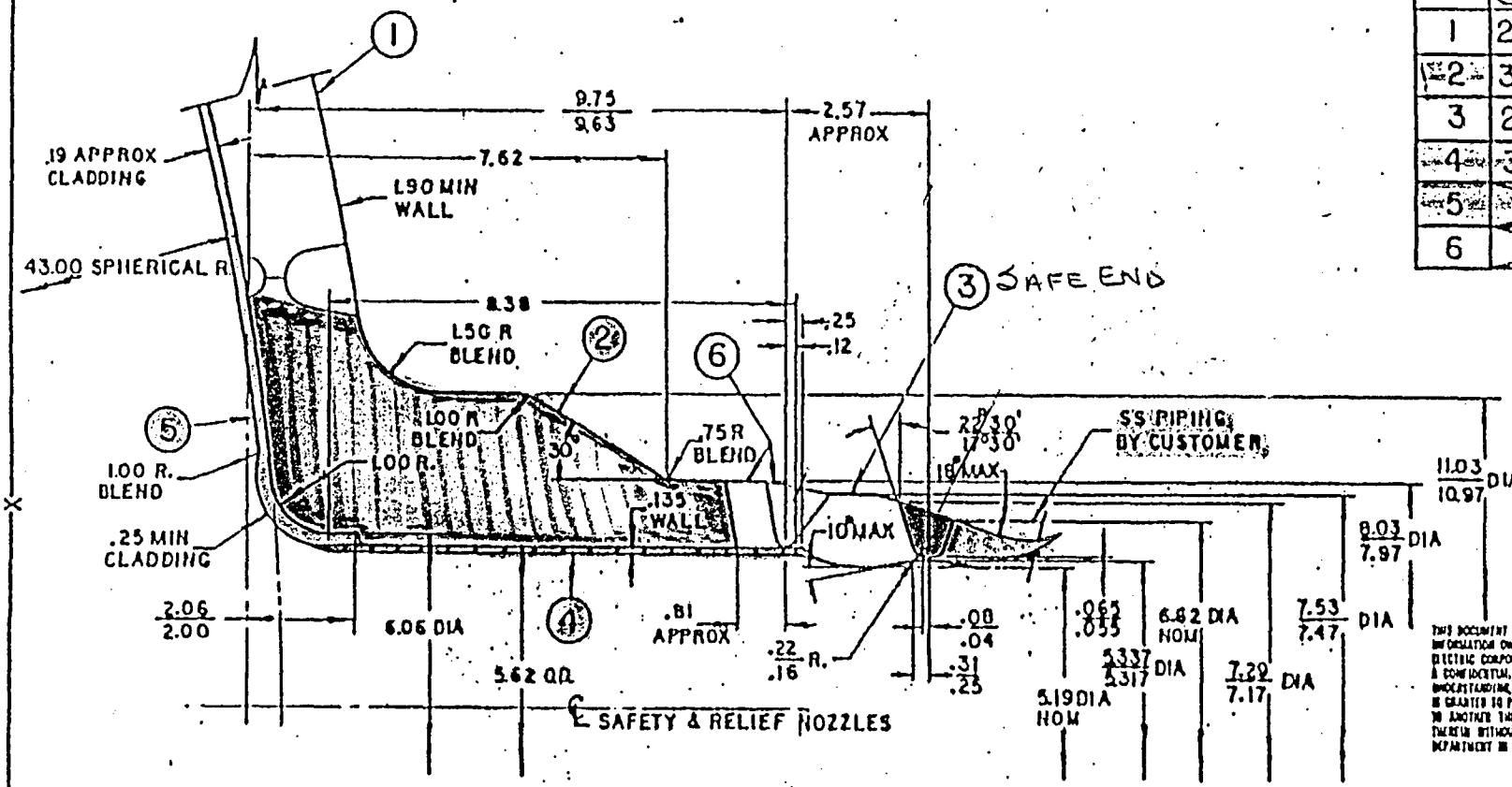
DETAIL B - FLANGE TO SHELL WELD

ISI ITEM NO. C01.010.002

SCALE: FULL

NOTES:

1: WELD PREP PER PWRSD DWG 271C900



ITEM	MATERIAL W PDS/DWG No	ASME No
1	2656A90	SA-533 GR A CLASS 2
2	393A708	SA-508 CLASS 2 or 2a
3	2656A96	SA-182 GRADE F-316L
4	398A009	SA-213 GRADE TP 304
5		SS-CLADDING
6		INCONEL WELD

WESTINGHOUSE PROPRIETARY CLASS 2

S.O. 1 | DS | ITEM | CHANGE

LAST NUMBER USED | PARTS LIST ITEM 005

ISSUE DATE | ENGR REV DWG

Westinghouse Electric Corporation
TAMPA DIVISION TAMPA FLA.
APPARATUS PRESSURIZER (84 SERIES)
TITLE SAFETY & RELIEF NOZ DET (FAB HD) 4A

DFTM J.E. SIMON | CHKD | DESIGN | MAT'L & WELD APP RLN | ENGR | MFG APP | QUAL CNTL | DRAWING NOT TO SCALE

EDSK 379443B

SHEET NO | OF | SHEETS

872C799001

RFR #02-002 REV. 1
ATTACHMENT 2.