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A Duke Energy Company

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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Duke Energy
Oconee Nuclear Station, Unit 2
Docket Nos. 50-270
Third Ten Year Inservice Inspection Interval
Requests for Relief No. 04-ON-002 and 003
Request for Additional Information

On April 9, 2004, Duke Energy Corporation (Duke) submitted Requests for Relief No. 04-ON-002 and No. 04-ON-003. These requests sought to address eleven (11) limited ultrasonic examinations on welds specified in the request and twelve (12) limited ultrasonic examinations on welds specifically associated with the Reactor Vessel.

During examination of the subject Unit 2 welds, the ultrasonic examination coverage did not meet the 90% examination requirements of Code Case N-460. Duke personnel determined it was impractical to meet the volumetric requirements for ultrasonic examination of the specified welds due to piping/vessel geometry, interferences, and existing examination technology. Therefore, Duke Energy requested that the NRC grant relief as authorized under 10 CFR 50.55a(g)(6)(i).

Subsequently the staff requested additional information to facilitate their review of the requests. Accordingly, the attachments to this letter document the request from the staff, provide the additional information requested, and clarify our request.

If there are any questions or further information is needed you may contact R. P. Todd at (864) 885-3418.

A047

Very truly yours,

R. A. Jones
Site Vice President

Attachments

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ISI Relief Request File
NRIA File/ELL EC050
Document Control

Attachment 1

TECHNICAL LETTER REPORT

REQUEST FOR ADDITIONAL INFORMATION
ON THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
REQUESTS FOR RELIEF 04-ON-002 AND 04-0N-003

TECHNICAL LETTER REPORT
REQUEST FOR ADDITIONAL INFORMATION
ON THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
REQUESTS FOR RELIEF 04-ON-002 AND 04-0N-003
FOR
DUKE POWER COMPANY
OCONEE NUCLEAR STATION, UNIT 2
DOCKET NUMBER 50-270

1. SCOPE

By letter dated April 9, 2004, the licensee, Duke Power Company, submitted Requests for Relief 04-ON-002 and 04-ON-003 from the requirements of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code*, Section XI, for Oconee Nuclear Station, Unit 2 (Oconee 2). The requests for relief are for the third 10-year inservice inspection (ISI) interval, in which Oconee 2 adopted the 1989 Edition of ASME Section XI as the Code of record.

In accordance with 10CFR50.55a(g)(5)(iii), the licensee has submitted Relief Requests 04-ON-002 and 04-ON-003 for certain vessel, piping and nozzle welds. The Code requires that 100% of the examination volumes described in Tables IWB- and IWC-2500-1 be completed. The licensee has claimed that 100% of the Code-required volumes are impractical to obtain at Oconee 2. 10CFR50.55a(g)(5)(iii) states that when licensees determine that conformance with Code requirements is impractical at their facility, they shall submit information to support this determination. The NRC will evaluate such requests based on impracticality, and may impose alternatives, giving due consideration to public safety and the burden imposed on the licensee.

Pacific Northwest National Laboratory (PNNL) reviewed the information submitted by the licensee, and based on this review, determined the following information is required to complete the evaluation.

2. REQUEST FOR ADDITIONAL INFORMATION

2.1 Request for Relief 04-ON-002

2.1(a) Examination Category B-F, Dissimilar Metal Weld 2-PZR-WP45 (Spray nozzle-to-safe end weld) on the Pressurizer

For Weld 2-PZR-WP45, the licensee states that, "75% coverage of the required examination volume was obtained. Scanning limitations were caused by the taper of the nozzle which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned in two circumferential and one axial direction using 45° shear wave and longitudinal wave search units."

From this description, it is slightly unclear as to which scan volume(s) were completed. Confirm that full volumetric coverage(s) for scans to detect axial and circumferential flaws in the base material, weld and Alloy 600 buttering (if existing), were performed from the safe-end side of the weld, and across the weld, with 45° shear wave and longitudinal wave search units. Further clarify that only the axial scans for circumferentially-oriented flaws could not be performed from the nozzle side of the weld.

Attachment C, page 3 of 59, shows a UT profile/plot sheet for Weld 2-PZR-WP45. Please clarify what is depicted on this sheet; specifically, describe the relevance of the 60° notation in the sketch.

Answer: One hundred percent coverage was achieved scanning from the safe end side of the weld using 45 degree shear wave and longitudinal wave search units. An axial scan from the nozzle side of the weld could not be performed because of the nozzle taper. Circumferential scans were performed over 100% of the examination volume in two opposite directions. The 60 degree notation is an error. It should read 45 degrees. A revised drawing (page 3 of 59) is enclosed. A review of the nozzle detail drawings shows no buttering at this weld location.

The licensee stated that personnel, equipment and procedures for this examination were qualified through ASME Appendix VIII, Supplement 10, as administered through EPRI PDI. Please list any limitations or conditions associated with the qualification, as related to dissimilar metal Weld 2-PZR-WP45.

Answer: This statement is in error. It should reference ASME Section XI, Appendix III not Appendix VIII, Supplement 10 or PDI. Paragraph K in Relief request 04-ON-002 was revised. (enclosed)

2.1(b) **Examination Category B-J, Pipe-to-Valve Weld 2LP-189-15 on Low Pressure Safety Injection**

The licensee stated that scanning limitations were caused by the valve configuration which prevented scanning from both sides of the weld, and that circumferential scans (clockwise and counter-clockwise) were obtained with a 45 degree shear wave probe and axial scans were performed with 60° shear and longitudinal wave probes. Confirm that full volumetric coverage was obtained from the pipe side with the axial scans. Indicate which scans were limited, e.g., no axial scans from the valve side or partial circumferential scans from the valve side of the weld.

Answer: Full coverage was obtained from the pipe side with 60 degree axial scans. No axial scan could be performed from the valve side of the weld due to valve body taper. Circumferential scans were performed over 100% of the examination volume in two opposite directions.

2.1(c) **Examination Category C-B, Main Steam Nozzle Welds 2-SGA-WG23-1 and 2-SGA-WG23-2 in Steam Generator A**

The licensee provided a cross-sectional sketch of the coverage limitations for these welds. The sketch shows that nozzle blend radii and the set-in design of the nozzles prevent circumferential scans and axial scans from the nozzle side, respectively. However, it is unclear if 100% volumetric examination was obtained from the shell side of the welds for the axial scans on these carbon steel nozzles. Please clarify. In addition, please confirm that the Code-required surface examinations were completed for these welds. Although presently not a requirement, please state whether the examinations

were performed using personnel, equipment and procedures qualified through ASME Appendix VIII for other nozzle-to-vessel weld configurations.

Answer: One hundred percent of the examination volume was covered from the vessel shell side of the weld scanning perpendicular to the weld. The code required surface exams (MT) were performed. 100% coverage was achieved on the surface exams and the results from the examinations were acceptable. Examinations were performed in accordance with the requirements of ASME Section XI, Appendix I and ASME Section V, Article 4. (See Paragraph N of RFR 04-ON-002). Relief request 03-GO-006 to use Appendix VIII qualifications on pressure vessel welds other than the reactor pressure vessel was submitted to the NRC in the summer of 2003. No SER has been issued yet.

2.1(d) **Examination Category C-F-1, Class 2 Welds in Stainless Steel or High Alloy Piping**

Confirm that 100% of the Code-required surface examinations were completed on the subject welds, and whether any recordable surface indications were detected.

Answer: The code required surface exams (PT) were performed. 100% coverage was achieved on the surface examinations and the results from the examinations were acceptable. (See Paragraph P of Relief Request 04-ON-002)

2.1(e) **Examination Category C-F-2, Class 2 Pipe-to-Flange Socket Weld for BWST Outlet Nozzle**

Confirm that BWST stands for *Borated Water Storage Tank*, and confirm that this tank and associated piping is low carbon steel. In addition, further describe the surface area limitation caused by the steel support member (a sketch or photograph would be useful - no sketch was included in the Liquid Penetrant Report, Attachment C, page 58 of 59). The licensee stated that magnetic particle examination was performed on this socket welded joint, however a liquid penetrant report is included. Clarify which type of surface examination was actually performed. Finally, report any other examination results for similar components (large diameter C-F-2, Item C5.70 socket welds) that were performed during the interval.

Answer: BWST stands for Borated Water Storage Tank and the material associated with the tank is A283 GR.C carbon steel, the piping material is A-106 GR B carbon steel and the flange material is SA-181 carbon steel. There are several factors that contribute to the surface area limitation. The first factor is that the BWST is sitting on a concrete base of which the bottom of the piping associated with the limited weld is located at approximately 5 inches from the concrete base surface. The second factor is that the backside of the flange surface is located only 2.75 inches from the BWST wall surface and the distance from the outside diameter of the flange to the concrete base surface is only 2.187 inches. The third factor is that there are 39 anchor bolt brackets evenly spaced around the bottom of the BWST that have a siding plate attached to the anchor brackets. One of the anchor brackets is the support steel member that has minimum clearance from the pipe which was noted in Paragraph I of Relief Request 04-ON-002. It is this very confined space that caused the liquid penetrant examination to be limited. A liquid penetrant examination was the method of surface examination performed on this weld. Paragraph I in Relief Request 04-ON-002 was corrected (enclosed) to show that a

Liquid Penetrant exam was performed. There were no other C05.070 items examined during this inspection interval.

2.2 **Request for Relief 04-ON-003**

2.2(a) **Examination Category B-A, RPV Lower Head-to-Shell Welds**

The licensee stated: "Some areas received no coverage at all while some areas were completely covered from four directions. 13.3% of the near surface (inner 15% of wall thickness) volume of the weld and base material was covered in four scan directions using a 70° beam angle from one axial and circumferential direction. Only 10.1% of the near surface volume of the weld and base material received no coverage."

These statements are unclear. For instance, if only 13.3% of the near surface volume examinations were completed, explain how only 10.1% received no coverage. Please describe the actual coverages for Welds 2-RPV-WR-34 and 2-RPV-WR35. Include lengths of weld fully examined to Code requirements, lengths of weld partially examined, and lengths of weld with no coverage due to RPV appurtenances in the proximity of the welds. Describe these weld length coverages in terms of volumes and sound beams required and obtained.

Answer: The reference to 13.3% of the near surface volume is incorrect. It should read as follows:

The near surface volume of the weld and base material (inner 15% of wall thickness) received the following coverage:

13.4% of the weld length covered in four scan directions
38.3% of the weld length covered in one axial and one circumferential direction
48.3% of the weld length received no coverage
All near surface volume scans were conducted using a 70° beam angle.

The outer 85% of the weld and base material received the following coverage:

13.4% of the weld length covered in four scan directions
38.3% of the weld length covered in one axial and one circumferential direction
48.3% of the weld length received no coverage
The outer 85% volume scans were conducted using 45° and 60° beam angles

Paragraph A of Relief Request 04-ON-003 was revised to incorporate the above information. (enclosed).

2.2(b) **Examination Category B-D, RPV Nozzle-to-Vessel Welds**

Confirm that Code Item B3.100, Inner Radius Section examinations were completed for outlet nozzle-to-vessel Welds 2-RPV-WR13 and 2-RPV-WR13A in accordance with Code volumetric requirements. Describe any indications that were detected.

The licensee stated: "The Core Flood Nozzles of a B&W 177 plant have several obstructions which limit ultrasonic examination coverage. In order of significance these are:
1. The flow restrictor which is welded to the inner bore of the nozzle.
2. The inlet nozzles located 30° on either side of each core flood nozzle.
3. The taper above the core flood nozzles associated with the Core Support Ledge."
However, drawings provided by the licensee appear to show that more coverage can be obtained for these nozzles by moving the scan package further on the shell. For core flood nozzle Welds 2-RPV-WR54 and 2-RPV-WR54A, further describe the access limitations associated with the flow restrictors, inlet nozzle proximity, and RPV shell taper which prevent scanning the Code-required volumes of the nozzle-to-vessel welds and inner radius examinations. Use drawings or sketches to augment these descriptions. Also, provide information to support a determination that coverage could not be reasonably increased from the outside surface of the nozzle.

Answer:

- The B03.100 (inner radius sections) examinations for 2-RPV-WR13 and 2-RPV-WR13A were performed. The results of the examinations were acceptable and 98% coverage was achieved for each of the items.

- The flow restrictor is welded to the inner bore of the nozzle. Since the flow restrictor is permanently attached to the inside of the nozzle it prevents scanning from the nozzle bore area. Reference drawing on Attachment E, page 7 of 15.

- The inlet nozzles are located 30° on either side of each core flood nozzle. The inlet nozzles limit scanning between 90° to 150° and between 225° to 270°. Reference drawing on Attachment E, page 4 of 15.

- The shell taper above the core flood nozzles is associated with the Core Support Ledge. The Core Support Ledge limits scanning to a maximum scan distance of 31.44 inches from the nozzle center line between 315° and 45°. Reference drawing on Attachment E, page 7 of 15.

- (The information in the previous 3 bullets (bullets 2, 3, and 4) were incorporated into revised Paragraph C of Relief Request 04-ON-003.)

The following information is offered to support the determination that additional coverage could not reasonably be increased by examination from the outside nozzle surface:

Approximately 40 man-hours would be required to prepare each weld for examination. The preparation would involve removing the refueling canal seal plate, shielding bricks, shielding supports and insulation. The radiation dose rate in the nozzle area is estimated to be 0.51 R/hr. An alternative approach is to enter from the bottom of the vessel and build a scaffold approximately 30 feet high to reach the nozzles. This effort would require approximately 80 man-hours, 40 in a 0.51 R/hr radiation field and another 40 in a 1-2 R/hr field at the bottom of the reactor pressure vessel. The total anticipated exposure would be 80-140 Man/Rem. Shielding is considered impractical in this area. The dose information noted in this paragraph was the reason Relief Request ONS-001 was submitted to perform UT from the ID surface in lieu of performing the OD surface

examinations for the Core Flood Nozzle to safe end welds. Relief Request ONS-001 was approved by SER dated 11-15-1995 (TAC # M88484, M88485, and M88486). The same problem with dose would be incurred if examinations were to be performed from the OD surface for welds 2-RPV-WR54 and 2-RPV-WR54A.

2.2(c) **Performance Demonstration Requirements Examination Category B-J, Nozzle Safe End-to-Pipe Welds**

The licensee stated that the examinations were performed using personnel, equipment and procedures qualified to ASME Section XI, Appendix I, 1989 Edition. These examinations were reported to have been performed during October 2002. For Examination Category B-J safe end-to-pipe Welds 2-53A-8-63 and 2-53A-8-64 on the core flood nozzles, the licensee is required by 10 CFR 50.55a(g)(6(ii)(C) to implement Appendix VIII, Supplement 2, 1995 Edition with 1996 Addenda for qualifying personnel, equipment and procedures to examine austenitic piping welds. This requirement became effective on May 22, 2000. Explain why this requirement was not followed.

Answer: When the Performance Demonstration Initiative (PDI) proposed an alternative implementation schedule, the inside surface examinations of Category B-J welds performed from the inside surface were not considered during the public comment period. Qualification specimens for the B-J welds past the RPV nozzle were not available at the time the examinations were scheduled for Oconee Unit 2. Specimens that existed prior to November 2002 were not suitable for an inside qualification. Duke Power has prepared relief request 04-ON-014 to explain our use of Appendix III, 1989 Edition as an alternative to Appendix VIII, Supplement 2, 1995 Edition with 1996 addenda for qualifying personnel, equipment and procedures for the examination of these welds.

2.2(d) **Performance Demonstration Requirements for Examination Category B-D, RPV Nozzle Welds**

The licensee stated that the examinations were performed using personnel, equipment and procedures qualified to ASME Section XI, Appendix I, 1989 Edition. For RPV nozzle-to-shell Welds 2-RPV-WR13, 2-RPV-WR13A, 2-RPV-WR54 and 2-RPV-WR54A, and their associated inner radius sections, the implementation date for Appendix VIII, Supplements 5 and 7 was November 22, 2002. The Staff realizes that this date was one month after the examinations. However, personnel would have been qualified to Supplements 4 and 6 in order to perform the RPV head-to-shell welds (Welds 2-RPV-WR-34 and 2-RPV-WR35), and the licensee stated in Request for Relief 04-ON-002 that for Examination Category B-F, dissimilar metal Weld 2-PZR-WP45, the examination was qualified in accordance with Appendix VIII, Supplement 10. This examination was also completed during October 2002.

Given the circumstances above, justify why the procedures, personnel and equipment used to examine the RPV nozzle-to-shell welds were sufficient to provide a similar level of NDE reliability as would be expected if the licensee used systems qualified to Appendix VIII, which was required within one month of these examinations. State when the next examination of these welds is scheduled.

Answer: At the time of RPV examination, the requirements for examining the nozzle-to-shell welds and the nozzle inner radius sections were ASME Section XI, Appendix I, 1989 Edition with no addenda and Regulatory Guided 1.150. The vendor contracted to perform these examinations was not prepared to qualify under Supplements 5 and 7 until the spring of 2003. However, they did perform the exams according to the requirements in effect at the time.

The next examinations of the RV nozzle welds, based on Appendix VIII requirements, are scheduled for Unit 2 EOC-26 (April 2013).

Attachment 2

Relief Request 04-ON-002
Rev 1
Page 1 through 9

Proposed Relief in Accordance with 10 CFR 50.55a(g)(5)(iii)
Inservice Inspection Impracticality

Duke Energy Corporation
Oconee Nuclear Station – Unit 2 (EOC-19)
Third 10-Year Interval – Inservice Inspection Plan
Interval Start Date= 12-16-1994 Interval End Date=9-9-2004
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 Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
2-PZR-WP45	Reactor Coolant System Pressurizer Spray Nozzle to Safe-End Weld	Exam Category B-F Item No. B05.040.002A Section XI, Appendix III, III-4420 Fig. IWB-2500-8(c) 75% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "A"	See Paragraph "J"	See Paragraph "K"	See Paragraph "S"
2LP-189-15	Low Pressure Injection System Valve 2LP-47 to Pipe	Exam Category B-J Item No. B09.011.005 Fig. IWB-2500-8(c) 62.5% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "B"	See Paragraph "J"	See Paragraph "L"	See Paragraph "S"
2-SGA-WG23-1	NC System Steam Generator A Main Steam Outlet Nozzle to Shell Weld	Exam Category C-B Item No. C02.021.001 Fig. IWC-2500-4 (b) 22.22% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "C"	See Paragraph "J"	See Paragraph "N"	See Paragraph "S"

	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 Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
2-SGA-WG23-2	NC System Steam Generator A Main Steam Outlet Nozzle to Shell Weld	Exam Category C-B Item No. C02.021.002 Fig. IWC-2500-4 (b) 22.22% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "C"	See Paragraph "J"	See Paragraph "N"	See Paragraph "S"
2-SGA-WG23-1	NC System Steam Generator A Main Steam Outlet Nozzle Inside Radius Section	Exam Category C-B Item No. C02.022.001 Fig. IWC-2500-4 (b) 88.11% Volume Coverage Limited Scan of Examination Volume G-H	See Paragraph "D"	See Paragraph "J"	See Paragraph "N"	See Paragraph "S"
2-SGA-WG23-2	NC System Steam Generator A Main Steam Outlet Nozzle Inside Radius Section	Exam Category C-B Item No. C02.022.002 Fig. IWC-2500-4 (b) 88.11% Volume Coverage Limited Scan of Examination Volume G-H	See Paragraph "D"	See Paragraph "J"	See Paragraph "N"	See Paragraph "S"
2LP-150-70	Low Pressure Injection System Valve 2LP-17 to Reducer Weld	Exam Category C-F-1 Item No. C05.011.012 Fig. IWC-2500-7(a) 56.75% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "E"	See Paragraph "J"	See Paragraph "P"	See Paragraph "S"
2HP-219-14	High Pressure Injection System Valve 2HP-409 to Pipe Weld	Exam Category C-F-1 Item No. C05.021.013 Fig. IWC-2500-7(a) 37.5% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "F"	See Paragraph "J"	See Paragraph "P"	See Paragraph "S"

	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 Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
2HP-396-5	High Pressure Injection System Valve 2HP-140 to Pipe Weld	Exam Category C-F-1 Item No. C05.021.093 Fig. IWC-2500-7(a) 62.5% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "G	See Paragraph "J"	See Paragraph "P"	See Paragraph "S"
2HP-221-22	High Pressure Injection System Valve 2HP-410 to Elbow Weld	Exam Category C-F-1 Item No. C05.021.115 Fig. IWC-2500-7(a) 62.5% Volume Coverage Limited Scan of Examination Volume C-D-E-F	See Paragraph "H"	See Paragraph "J"	See Paragraph "P"	See Paragraph "S"
2-BWST-OUT-2	Low Pressure Injection System Pipe to Flange Weld	Exam Category C-F-2 Item No. C05.070.001 Fig. IWC-2500-7 63.66% Area Coverage Exam Surface A-B	See Paragraph "I"	See Paragraph "J"	See Paragraph "Q"	See Paragraph "S"

See Attachment A for C05.070.001 area/weld locations.
See Attachment B for Steam Generator A Main Steam Outlet Nozzle area/weld locations.
See Attachment C for inspection data on all 11 items with limited coverage.
See Attachment D for Pressurizer Spray Nozzle to Safe-End area/weld locations.

Note: The C05.011, C05.021, and C05.070 welds were inspected in August of 2002 and the B05.040, B09.011, C02.021, and C02.022 items were inspected in October of 2002.

IV. Basis for Relief

Paragraph A: (The Pressurizer Spray Nozzle material is SA508 CL. 1 and the Safe-End material is SB-166. The diameter of the Nozzle to Safe-End weld is 4 inches and it has a wall thickness of .75 inches.)

During the ultrasonic examination of dissimilar metal weld 2-PZR-WP45, 75% coverage of the required examination volume was obtained. Scanning limitations were caused by the taper of the nozzle which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned in two circumferential and one axial direction using 45° shear wave and longitudinal wave search units. In order to scan all of the required surfaces for the inspection of this weld, the nozzle would have to be redesigned to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of this weld.

Paragraph B: (The valve and pipe material was stainless steel. Weld 2LP-189-15 has a diameter of 10 inches and a wall thickness of 1.0 inches.)

During the ultrasonic examination of weld 2LP-189-15, 62.5% coverage of the required examination volume was obtained. Scanning limitations were caused by the valve configuration which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned in two circumferential directions using 45° shear waves and in one axial direction using 60° shear and longitudinal waves. In order to scan all of the required surfaces for the inspection of this weld, the valve would have to be redesigned to allow scanning from both sides of the weld, which is impractical. There was a recordable indication found during the inspection of this weld. It was determined to be a geometric reflector due to root geometry.

Paragraph C: (The Steam Generator shell material is SA212 GR. B and the nozzle material is SA 508 CL. 1. The diameter of the Nozzle to Steam Generator shell weld is 29 inches and it has a wall thickness of 6.75 inches.)

During the ultrasonic examination of welds 2-SGA-WG23-1 and 2-SGA-WG23-2, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 22.22%. Limitations were caused by the nozzle configuration. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned with 45° and 60° shear waves from one axial direction. No coverage could be achieved in the circumferential direction or with the straight beam scan because of the interference caused by the nozzle blend radius. The percentage of coverage reported represents the aggregate coverage. In order to scan all of the required surfaces for the inspection of this weld, the nozzles would have to be redesigned to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of these welds.

Paragraph D:
During the ultrasonic examination of the inside radius sections for 2-SGA-WG23-1 and 2-SGA-WG23-2, 100% coverage of the required examination volume was not obtained. The examination coverage was limited to 88.11%. The percentage of coverage reported represents the aggregate coverage. The inner radius examination volume was scanned from the vessel shell side using 60° and 70° shear waves. Duke Energy Corporation had been investigating the use of computer modeling of the nozzles to develop ultrasonic techniques that would achieve 100% coverage of the examination volume. However, these techniques were not ready at the time these examinations were scheduled. Therefore, a best effort examination was performed. The steam generators will be replaced in the spring of 2004. There were no recordable indications found during these inspections.

Paragraph E: (The valve and reducer material was stainless steel. Weld 2LP-150-70 has a diameter of 12 inches and a wall thickness of 1.312 inches.)

During the ultrasonic examination of weld 2LP-150-70, 56.75% coverage of the required examination volume was obtained. Scanning limitations were caused by the valve configuration which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned using 45° shear waves in two circumferential directions covering 63.5% of the volume and in one axial direction using 60° shear and longitudinal waves covering 100% of the examination volume. In order to scan all of the required surfaces for the inspection of this weld, the valve would have to be redesigned to allow scanning from both sides of the weld, which is impractical.
There were no recordable indications found during the inspection of this weld.

Paragraph F: (The valve and pipe material was stainless steel. Weld 2HP-219-14 has a diameter of 4 inches and a wall thickness of .674 inches.)

During the ultrasonic examination of weld 2HP-219-14, 37.5% coverage of the required examination volume was obtained. Scanning limitations were caused by the valve configuration which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned using 45° shear waves in two circumferential directions covering 50% of the volume and in one axial direction using 60° shear and longitudinal waves covering 100% of the examination volume. In order to scan all of the required surfaces for the inspection of this weld, the valve would have to be redesigned to allow scanning from both sides of the weld, which is impractical.
There were no recordable indications found during the inspection of this weld.

Paragraph G: (The valve and pipe material was stainless steel. Weld 2HP-396-5 has a diameter of 4 inches and a wall thickness of .531 inches.)

During the ultrasonic examination of weld 2HP-396-5, 62.5% coverage of the required examination volume was obtained. Scanning limitations were caused by the valve configuration which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned using 45° shear waves in two circumferential directions covering 50% of the volume and in one axial direction using 60° shear and longitudinal waves covering 100% of the examination volume. In order to scan all of the required surfaces for the inspection of this weld, the valve would have to be redesigned to allow scanning from both sides of the weld, which is impractical.
There were no recordable indications found during the inspection of this weld.

Paragraph H: (The valve and elbow material was stainless steel. Weld 2HP-221-22 has a diameter of 4 inches and a wall thickness of .531 inches.)

During the ultrasonic examination of weld 2HP-221-22, 62.5% coverage of the required examination volume was obtained. Scanning limitations were caused by the valve configuration which prevented scanning from both sides of the weld. The percent coverage reported represents the aggregate coverage from all scans performed on the weld. The examination volume was scanned using 45° shear waves in two circumferential directions covering 100% of the volume and in one axial direction using 60° shear and longitudinal waves covering 100% of the examination volume. In order to scan all of the required surfaces for the inspection of this weld, the valve would have to be redesigned to allow scanning from both sides of the weld, which is impractical.
There were no recordable indications found during the inspection of this weld.

Paragraph I: (The diameter of the pipe to flange weld is 14 inches and it has a wall thickness of .375 inches The material was carbon steel.)

During Liquid Penetrant examination of weld 2BWST-OUT-2, 100% coverage of the required examination surface could not be obtained. The examination coverage was limited to 63.66%. Limitations were caused because the pipe has minimum clearance from steel support members; thus, access for the inspection of 100% of the weld is not possible. The percentage of coverage reported represents the aggregate coverage. There were no recordable indications found during the inspection of this weld. In order to achieve more coverage, the pipe would have to be relocated to allow full access to MT or PT 100% weld, which is impractical.

V. Alternate Examinations or Testing

Paragraph J:
The scheduled 10-year code examination was performed on the referenced area/weld and it resulted in the noted limited coverage. No additional examinations are planned for the area/weld during the current inspection interval.

VI. Justification for Granting Relief

Paragraph K:
Ultrasonic examination of areas/welds for item number B05.040 were conducted using personnel, and procedures qualified in accordance with ASME Section XI, Appendix III , and Appendix VII. Although 100% of the required scanning could not be achieved, the amount of coverage of the examination volume obtained for this weld provides an acceptable level of quality and integrity. In addition to the limited volumetric examination, Duke Energy performed a surface examination (code required) on the B05.040 item and achieved 100% coverage. The result from the surface examination was acceptable. (See Paragraph M for additional justification.)

Paragraph L:
Ultrasonic examination of areas/welds for item number B09.011 were conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix VIII Supplement 2 of the 1995 Edition with the 1996 Addenda as administered by the PDI. Although 100% of the required scanning could not be achieved, the amount of coverage of the examination volume obtained for this weld provides an acceptable level of quality and integrity. In addition to the volumetric examination with limited scan, Duke Energy performed a surface examination (code required) on the B09.011 item and achieved 100% coverage. The result from the surface examination was acceptable. (See Paragraph M for additional justification.)

Paragraph M:
Duke Energy will use Class 1, Examination Category B-P, pressure testing and VT-2 visual examination to compliment the limited scan examinations. The Code requires that a pressure test be performed after each refueling outage for Class 1. These tests require a VT-2 visual examination for evidence of leakage. This testing provides adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), there are other activities which provide a high level of confidence that, in the unlikely event that leakage did occur through these welds, it would be detected and isolated. Specifically, leakage from these welds would be detected by monitoring of the Reactor Coolant System (RCS), which is performed once each shift under procedure PT/1,2,3/A/0600/10, "RCS Leakage". This RCS leakage monitoring is a requirement of Technical Specification 3.4.13, "Reactor Coolant System Leakage". Leakage is also evaluated in accordance with this Technical Specification. The leakage could also be detected through several other methods. One is the RCS mass balance calculation. A second is the Reactor Building air particulate monitor. This monitor is sensitive to low leak rates; the iodine monitor, gaseous monitor and area monitor are capable of detecting any fission products in the coolant and will make these monitors sensitive to coolant leakage. A third is the level indicator in the Reactor Building normal sump. A fourth is a loss of level in the Letdown Storage Tank. Based on the portions and results of the required volumetric, surface and VT-2 examinations performed during this outage, it's Duke's belief that this combination of examinations provides a reasonable assurance of component integrity.

Paragraph N:
Ultrasonic examination of welds for item numbers C02.021 and C02.022 were conducted using personnel, qualified in accordance with ASME Section XI, Appendix VII. Procedures were in compliance with ASME Section V, Article 4 and Section XI, Appendix I. Due to the design of the Steam Generator Shell and Steam Outlet Nozzle; it is not feasible to obtain the examination scanning and volume coverage required. Duke Energy has examined the weld/area to the maximum extent possible utilizing the latest in examination techniques and equipment. The weld was rigorously inspected by volumetric NDE methods during construction and verified to be free from unacceptable fabrication defects. Although 100% of the required scanning could not be achieved, the amount of coverage of the examination volume obtained for this weld provides an acceptable level of quality and integrity.
(See Paragraph O for additional justification.)

Paragraph O:
Duke Energy will use Class 2, Examination Category C-H, pressure testing and VT-2 visual examination to compliment the limited scanning and examination volume coverage. The Code requires that a pressure test be performed once each period for Class 2 items. These tests require a VT-2 visual examination for evidence of leakage. This testing provides adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (surface and pressure test), there are other activities which provide a high level of confidence that, in the unlikely event that leakage did occur through these welds, it would be detected. The Steam Generator C2.21 Main Steam outlet nozzle welds are located in the reactor building and not accessible for routine inspection. However, Table IWB-2500-1 of ASME Section XI, Class 1, Examination Category B-P, requires that a pressure test be performed after each refueling outage for Class 1 systems. This test requires a VT-2 visual examination for evidence of leakage at normal operating conditions. A portion of this test is near the Class 2 shell to main steam nozzle welds and a leak from the Steam Generator shell to nozzle weld would be observed during this test. Once a leak is identified, its location needs to be determined and assessed. This would provide adequate assurance of pressure boundary integrity. Further, the level of the Reactor Building normal sump is monitored daily and any change in the level or pumping frequency must be evaluated to verify there is no RCS leakage. Due to the location of these nozzles, any leakage would eventually end up in the reactor building sump. All of these together will provide reasonable assurance that if the weld/component developed a leak during a fuel cycle the leakage would be identified.

Paragraph P:
Ultrasonic examination of areas/welds for the item numbers C05.011 and C05.021 were conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix VIII Supplement 2 of the 1995 Edition with the 1996 Addenda as administered by the PDI. Although 100% of the required scanning could not be achieved, the amount of coverage of the examination volume obtained for each of these welds provides an acceptable level of quality and integrity. In addition to the volumetric examinations with limited scan, Duke Energy performed a surface examination (code required) on each of the C05.011 and C05.021 items and achieved 100% coverage. The results from the surface examinations were acceptable. (See Paragraph R for additional justification.)

In addition to C05.021 welds that relief is being requested for limited scanning and limited examination coverage, there were 23 additional C05.021 welds that surface and volumetric examinations were performed on. The examinations didn't identify any reportable indications and greater than 90% coverage was obtained on each of the 23 welds. The 23 additional welds were from the same system as the C05.021 welds of this request.

Duke Energy Corporation does not claim credit for coverage of the far side of austenitic piping welds. The characteristics of austenitic weld metal attenuate and distort the sound beam when shear waves pass through the weld. Refracted longitudinal waves provide better penetration but cannot be used beyond the first sound path leg. Duke Energy Corporation uses a combination of shear waves and longitudinal waves to examine single sided austenitic piping welds.

The procedures, personnel and equipment have been qualified through the Performance Demonstration Initiative (PDI). However, although longitudinal wave search units were used in the qualification and cracks were detecting

through the weld metal, PDI does not provide a qualification for single sided examination of similar metal austenitic piping welds.

Paragraph Q:
Liquid Penetrant examination of area/weld for item number C05.070 was conducted using personnel, equipment and procedures qualified in accordance with the1989 Edition with no Addenda of the ASME Section XI Code. Although 100% coverage of the examination area could not be achieved, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. (See Paragraph R for additional justification.)

Paragraph R:
Duke Energy will use Class 2, Examination Category C-H, pressure testing and VT-2 visual examination to compliment the limited examination coverage. The Code requires that a pressure test be performed once each period for Class 2 items. These tests require a VT-2 visual examination for evidence of leakage. This testing provides adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (surface and pressure test), there are other activities which provide a high level of confidence that, in the unlikely case that leakage did occur through this weld, it would be detected and isolated. One activity is that leakage from this weld would be detected by Operations personnel during their regular rounds. The Nuclear Equipment Operator has been trained to look for any unusual conditions, such as leaks. The C05.011, C05.021, C05.070 items, and item C05.051.012 in this request are located in an area where operations personnel will be walking through as part of their rounds; therefore, any leak would be identified by visual observation. All of these activities together will provide reasonable assurance of weld/component integrity.

Duke Energy has examined the weld/component referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. The welds/components were rigorously inspected by volumetric NDE methods during construction and verified to be free from unacceptable fabrication defects. Based on the coverage and results of the required volumetric exams this outage and the additional pressure testing (VT-2) exams, it's our opinion that this combination of examinations provides a reasonable assurance of component integrity.

VII. Implementation Schedule

Paragraph S
The scheduled third 10-year interval plan code examination was performed on the referenced area/weld resulting in limited volumetric coverage. No additional examinations are planned for the area/weld during the current inspection interval. With the exception of welds on the Oconee Unit 2 Steam Generators (because the generators will be replaced in the spring of 2004), the same areas/welds may be examined again as part of the next (fourth) 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 relief request:

James J. McArdle (NDE Level III Examiner) provided Sections II through V and part of Section VI.

B. W. Carney, Jr. (Oconee Engineering) provided part of Section VI.

Larry C. Keith (Oconee ISI Plan Manager) compiled the remaining sections.

Sponsored By: Larry C. Keith **Date** 11-16-04

Approved By: R. Kevin Rhyne **Date** 11/16/04

Attachment 3

Relief Request 04-ON-002
Rev 1

Attachment C
Page 3 of 59

(Revised to show 45 degree angle)

ATTachment C

PAGE 01

Supplemental Report

Report No.: _____

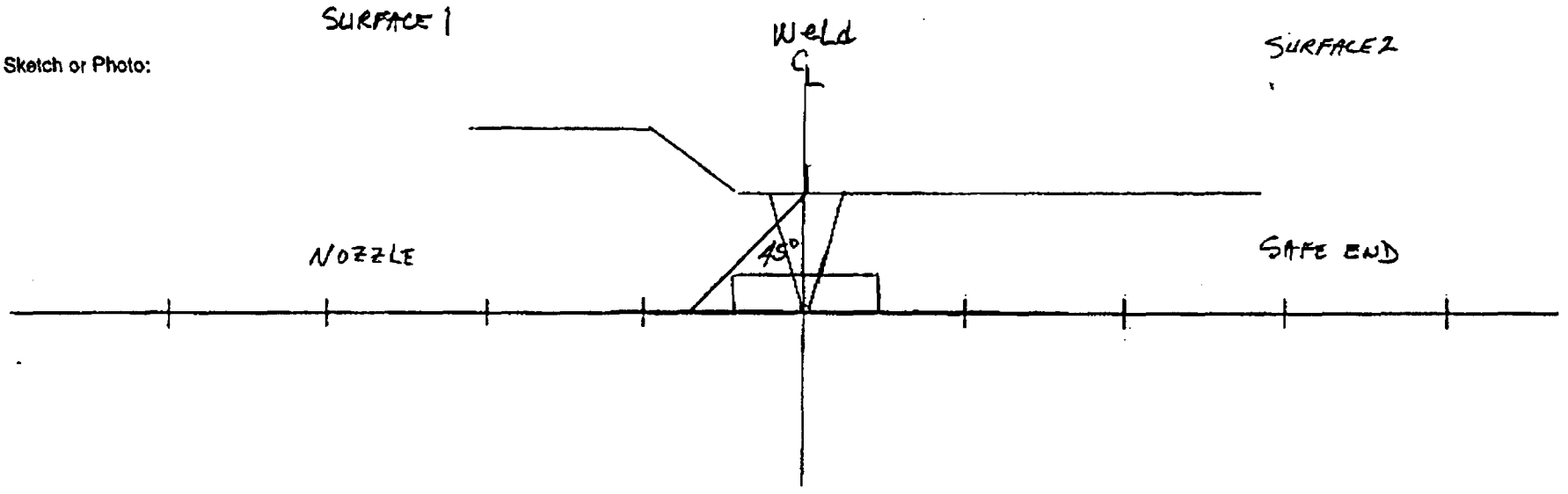
Page: 3 of 59

Summary No.: B05.040.002A

Examiner:		Level:	Reviewer:		Date:
Examiner:		Level:	Site Review:		Date:
Other:		Level:	ANII Review:		Date:

Comments:

Sketch or Photo:



2-PZR-WPA5 B05.040.002A

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Attachment 4

Relief Request 04-ON-003
Rev 1
Page 1 through 8

Proposed Relief in Accordance with 10 CFR 50.55a(g)(5)(iii)
Inservice Inspection Impracticality

Duke Energy Corporation
Oconee Nuclear Station – Unit 2 (EOC-19)
Third 10-Year Interval – Inservice Inspection Plan
Interval Start Date= 12-16-1994 Interval End Date=9-9-2004
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 Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
2-RPV-WR34	NC System Reactor Vessel Lower Shell to Lower Head Ring Circumferential Weld	Exam Category B-A Item No. B01.011.004 Fig. IWB-2500-1 36% Volume Coverage due to limited scanning.	See Paragraph "A"	See Paragraph "F"	See Paragraph "G"	See Paragraph "J"
2-RPV-WR35	NC System Reactor Vessel Lower Head Cap to Lower Head Ring Circumferential Weld	Exam Category B-A Item No. B01.021.003 Fig. IWB-2500-3 42% Volume Coverage due to limited scanning.	See Paragraph "A"	See Paragraph "F"	See Paragraph "G"	See Paragraph "J"
2-RPV-WR13	NC System Reactor Vessel Outlet Nozzle-to-Vessel Weld @ 90°	Exam Category B-D Item No. B03.090.001 Fig. IWB-2500-7(a) 82% Volume Coverage due to limited scanning. (UT from vessel I.D.)	See Paragraph "B"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-RPV-WR13A	NC System Reactor Vessel Outlet Nozzle-to-Vessel Weld @ 270°	Exam Category B-D Item No. B03.090.002 Fig. IWB-2500-7(a) 82% Volume Coverage due to limited scanning.	See Paragraph "B"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"

		(UT from vessel I.D.)				
	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 Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
2-RPV-WR54	NC System Reactor Vessel Core Flood Nozzle-to-Vessel Weld @ 0°	Exam Category B-D Fig. IWB-2500-7(a) Item No. B03.090.007 (UT from vessel I.D.) 81% Volume Coverage due to limited scanning.	See Paragraph "C"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-RPV-WR54A	NC System Reactor Vessel Core Flood Nozzle-to-Vessel Weld @ 180°	Exam Category B-D Fig. IWB-2500-7(a) Item No. B03.090.008 (UT from vessel ID) 81% Volume Coverage due to limited scanning.	See Paragraph "C"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-RPV-WR54	NC System Reactor Vessel Core Flood Nozzle Inside Radius Section @ 0°	Exam Category B-D Item No. B03.100.007 Fig. IWB-2500-7(a) 52% Volume Coverage due to limited scanning.	See Paragraph "D"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-RPV-WR54A	NC System Reactor Vessel Core Flood Nozzle Inside Radius Section @ 180°	Exam Category B-D Item No. B03.100.008 Fig. IWB-2500-7(a) 52% Volume Coverage due to limited scanning.	See Paragraph "D"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-53A-8-63	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 0°	Exam Category B-J Item No. B09.011.011 Fig. IWB-2500-8(c) 76% Volume Coverage due to limited scanning.	See Paragraph "E"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"

	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 Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
2-53A-8-63	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 0°	Exam Category B-J Item No. B09.011.011A Fig. IWB-2500-8(c) 76% Volume Coverage due to limited scanning. (UT from nozzle I.D. in lieu of PT from O.D.)	See Paragraph "E"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-53A-8-64	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 180°	Exam Category B-J Item No. B09.011.013 Fig. IWB-2500-8(c) 71% Volume Coverage due to limited scanning.	See Paragraph "E"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"
2-53A-8-64	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 180°	Exam Category B-J Item No. B09.011.013A Fig. IWB-2500-8(c) 71% Volume Coverage due to limited scanning. (UT from nozzle I.D. in lieu of PT from O.D.)	See Paragraph "E"	See Paragraph "F"	See Paragraph "H"	See Paragraph "J"

Note: The welds in the above table were inspected in October of 2002.

Note: See Attachment A for a drawing on all the welds listed above.

IV. Basis for Relief (See Attachment A for area/weld locations.)

Paragraph A:

During the ultrasonic examination of welds 2-RPV-WR34 and 2-RPV-WR35, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 36% and 42% respectively. Limitations were caused by the core guide lugs & flow stabilizers for WR34 and incore nozzles & flow stabilizers for WR35 that restrict the scanning surface as shown on the Attachment A, B, and C drawings. The percentage of coverage reported represents the aggregate coverage from all scans. Some areas received no coverage at all while some areas were completely covered from four directions.

The near surface volume of the weld and base material (inner 15% of wall thickness) received the following coverage:

13.4% of the weld length covered in four scan directions
38.3% of the weld length covered in one axial and one circumferential direction
48.3% of the weld length received no coverage
All near surface volume scans were conducted using a 70° beam angle

The outer 85% of the weld and base material received the following coverage with a 45° beam angle:

13.4% of the weld length covered in four scan directions
38.3% of the weld length covered in one axial and one circumferential direction
48.3% of the weld length received no coverage
The outer 85% volume scans were conducted using 45° and 60° beam angles

There were no recordable indications found in the areas that were examined for either of these two welds. In order to achieve more coverage the core guide lugs, incore nozzles and flow stabilizers would have to be moved to allow greater access for scanning, which is impractical.

(See Attachment B for drawings on Weld 1-RPV-WR34)

(See Attachment C for a drawing on Weld 1-RPV-WR35)

Paragraph B:

During the ultrasonic examination of welds 2-RPV-WR13 and 2-RPV-WR13A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 82%. Limitations were caused by the outlet nozzle boss that restricts the scanning surface both from the nozzle I.D. and the vessel I.D. The percentage of coverage reported represents the aggregate coverage from all scans. The weld and adjacent base material received 100% coverage from the nozzle bore with 15° and 45° beam angles. Scans from the vessel shell side resulted in 42% coverage of the weld and base material with a 45° beam angle of the outer 85% of the vessel wall and coverage of the inner 15% with a 70° beam angle. There were no recordable indications found in the areas that were examined for item number B03.090.001. There were 21 recordable indications found during examination of item number B03.090.002. All of the indications were detected from the nozzle bore and were determined to be acceptable, sub-surface flaws. In order to achieve more coverage, the outlet nozzle boss would have to be moved to allow greater access for scanning, which is impractical.

(See Attachment D for drawing on both welds)

Paragraph C:

During the ultrasonic examination of welds 2-RPV-WR54 and 2-RPV-WR54A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 81% of the required volume.

The Core Flood Nozzles of a B&W 177 plant have several obstructions which limit ultrasonic examination coverage. In order of significance these are:

- The flow restrictor is welded to the inner bore of the nozzle. The flow restrictor is permanently attached to the inside of the nozzle which prevents scanning from the nozzle bore area. Reference drawing on Attachment E, page 7 of 15 for a drawing.

- The inlet nozzles are located 30° on either side of each core flood nozzle. The inlet nozzles limit scanning between 90° to 150° and between 225° to 270°. Reference drawing on Attachment E, page 4 of 15.

- The shell taper above the core flood nozzles is associated with the Core Support Ledge. The Core Support Ledge limits scanning to a maximum scan distance of 31.44 inches from the nozzle center line between 315° and 45°. Reference drawing on Attachment E, page 7 of 15.

The percentage of exam volume coverage reported represents the aggregate coverage as follows:

- Weld and adjacent base material = 81% scanned parallel to the weld centerline in two directions and perpendicular to the weld centerline from one direction.

- Inner 15% from the vessel ID = 97%, in four orthogonal directions.

There were no recordable indications found in the areas that were examined for item number B03.090.007. There was one recordable indication found during examination of item number B03.090.008. This indication was detected from the vessel ID and was determined to be an acceptable, sub-surface flaw. In order to achieve more coverage, the inlet nozzles would have to be moved and the taper on the flange would have to be redesigned to allow greater access for scanning, which is impractical. In addition, because of the proximity of the flow restrictors no scanning was performed from the nozzle I.D. (0% examination coverage). In order to achieve more coverage, the flow restrictor would have to be moved to allow access for scanning, which is impractical.

(See Attachment E for a drawing on the core flood nozzle)

Paragraph D:

During the ultrasonic examination of inside radius sections 2-RPV-WR54 and 2-RPV-WR54A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 52%. Limitations were caused by the flow restrictor that prevents scanning from the nozzle bore surface. The percentage of coverage reported represents the aggregate coverage from all scans. There were no recordable indications found in the areas that were examined for either of these inside radius sections. In order to achieve more coverage, the flow restrictor would have to be moved to allow greater access for scanning, which is impractical.

(See Attachment E for a drawing on the core flood nozzle)

Paragraph E:

During the ultrasonic examination of welds 2-53A-8-63 and 2-53A-8-64, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 76% and 71%, respectively. Limitations were caused by air at the top of nozzle that prevented the transducer from making contact for scanning the surface. The reactor vessel inspection services vendor made two attempts to evacuate the air with equipment made for the purpose but additional air was reintroduced from an unknown source. After the second attempt was unsuccessful and the source for the air could not be determined, a decision was made to perform the scan and obtain

as much coverage as possible (the percentages shown above). The vendor noted that similar problems with eliminating trapped air have been experienced on other reactor vessels with small diameter piping.

Alternatively, it is impractical to perform this exam from the outside nozzle surface due to the excessive personnel radiation exposure. Approximately 40 man-hours would be required to prepare each safe-end to pipe weld for examination from the outside surface. The preparation involves removing the refueling canal seal plate, shielding bricks, shielding supports in the nozzle area and insulation. The radiation levels in this area are expected to be 0.51 R/hr. An alternative path would be to enter from the bottom of the reactor vessel and build scaffolding approximately 30 feet high to reach the core flood nozzles. This activity would require approximately 80 man-hours. 40 man-hours in a 0.51/hr radiation field and 40 man-hours in a 1-2 R/hr radiation field. Total estimated exposure would be 80-140 man-rem. shielding in this area is impractical. Any remote inspection would require the same preparatory work.

The percentage of coverage reported represents the aggregate coverage. There were no recordable indications found in the volumes that were examined for either of these two welds. In order to achieve more coverage, the air would have to be eliminated which proved to be impractical during the subject inspection.

(See Attachment F for a drawing on safe-end to pipe welds)

V. Alternate Examinations or Testing

Paragraph F:
The scheduled 10-year code examination was performed on the referenced area/weld and it resulted in the noted limited scanning and coverage of the required ultrasonic volume. No additional examinations are planned for the area/weld during the current inspection interval.

VI. Justification for Granting Relief

Paragraph G:
Ultrasonic examination of welds for item numbers B01.011 and B01.021 were conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6, 1995 Edition with the 1996 Addenda as administered through the Performance Demonstration Initiative (PDI) Program. Although limited scanning prevented 100% coverage of the examination volume, the amount of coverage obtained for these examinations along with the additional volumetric and visual examinations (listed in the next paragraph) provides an acceptable level of quality and integrity. (See Paragraph I for additional justification.)

In addition to the Category B-A welds that relief is being sought for, there were 4 circumferential Category B-A welds that were inspected and all obtained greater than 90 % coverage and there were no reportable indications found during the inspections. Visual examinations were also performed as part of the reactor vessel inspections (item number B13.010.001 and B13.050.001) and were found to be without any reportable indications.

Paragraph H:
Ultrasonic examination of areas/welds for item numbers B03.090, B03.100, and B09.011 were conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix I, 1989 Edition with no Addenda. Inspection of B09.011 welds from the outside diameter is not a viable alternate due to the dose that would be received to prepare and perform the inspections. Relief Requests ONS-001 and ONS-002 were written to perform UT from the ID surface in lieu of a surface exam from the OD surface of all reactor vessel nozzles to pipe welds due to the radiation exposure that is involved with performing inspections from the OD surface. Relief for ONS-001 and ONS-002 was granted on an SER dated 11-15-95. Approximately 40 man-hours would be required to prepare each weld for examination. The preparation would involve removing the refueling canal seal plate, shielding bricks, shielding supports and insulation. The radiation dose rate in the nozzle area is expected to be 0.51 R/hr. An alternative approach is to enter from the bottom of the vessel and build a scaffold approximately 30 feet high to

reach the nozzles. This effort would require approximately 80 man-hours, 40 in a 0.51 R/hr radiation field and another 40 in a 1-2 R/hr field at the bottom of the reactor pressure vessel. The total anticipated exposure would be 80-140 Man/Rem. Shielding is considered impractical in this area. Although limited scanning prevented 100% coverage of the examination volume, the amount of coverage obtained for these examinations provides an acceptable level of quality and integrity. (See Paragraph I for additional justification.)

Paragraph I:
Duke Energy will use the Code required pressure testing and VT-2 visual examination to compliment the limited examination coverage. The Code requires (reference Table IWB-2500-1, item numbers B15.010 and B15.050) that a system leakage test be performed after each refueling outage for Class 1. Additionally a system hydrostatic test (reference Table IWB-2500-1, item numbers B15.011 and B15.051) is required once during each 10-year inspection interval. These tests require a VT-2 visual examination for evidence of leakage. This testing provides adequate additional assurance of pressure boundary integrity.

Duke Energy will use VT-3 visual examination to compliment the limited examination coverage. The Code requires (reference Table IWB-2500-1, item number B13.010) that a VT-3 examination be performed after the first refueling outage and subsequent refueling outages at approximately 3 year periods. During the first and second periods of an interval a VT-3 examination is performed on areas above and below the reactor core that are made accessible for examination by removal of components during normal refueling outages. During the third period of an interval the VT-3 examination is performed on all of the reactor vessel interior surfaces at the same time that the automated UT exams are performed on the reactor vessel welds. These examinations provide adequate additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric, pressure test, and VT-3), there are other activities which provide a high level of confidence that, in the unlikely case that leakage did occur through these welds, it would be detected and isolated. Specifically, leakage from these welds would be detected by monitoring of the Reactor Coolant System (RCS), which is performed once each shift under procedure PT/1,2,3/A/0600/10, "RCS Leakage". This RCS leakage monitoring is a requirement of Technical Specification 3.4.13, "Reactor Coolant System Leakage". Leakage is also evaluated in accordance with this Technical Specification. The leakage could also be detected through several other methods. One is the RCS mass balance calculation. A second is the Reactor Building air particulate monitor. This monitor is sensitive to low leak rates; the iodine monitor, gaseous monitor and area monitor are capable of detecting any fission products in the coolant and will be activated by coolant leakage. A third is the level indicator in the Reactor Building normal sump. A fourth is a loss of level in the Letdown Storage Tank.

Duke Energy Corporation has examined the welds/components referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. These welds were rigorously inspected by volumetric NDE methods during construction and verified to be free from unacceptable fabrication defects. Based on the portions and results of the required volumetric and visual examinations performed during this outage, it is Duke's belief that this combination of elements provides a reasonable assurance of component integrity.

VII. Implementation Schedule

Paragraph J
The scheduled third 10-year interval plan code examination was performed on the referenced area/weld resulting in limited scanning and volumetric coverage. No additional examinations are planned for the area/weld during the current inspection interval. The same area/weld may be examined again as part of the next (fourth) 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 relief request:

James J. McArdle (Principal NDE Level III Inspector) provided Sections II through V and part of Section VI.

B. W. Carney, Jr. (Oconee Engineering) provided part of Section VI.

Larry C. Keith (Oconee ISI Plan Manager) compiled the remaining sections.

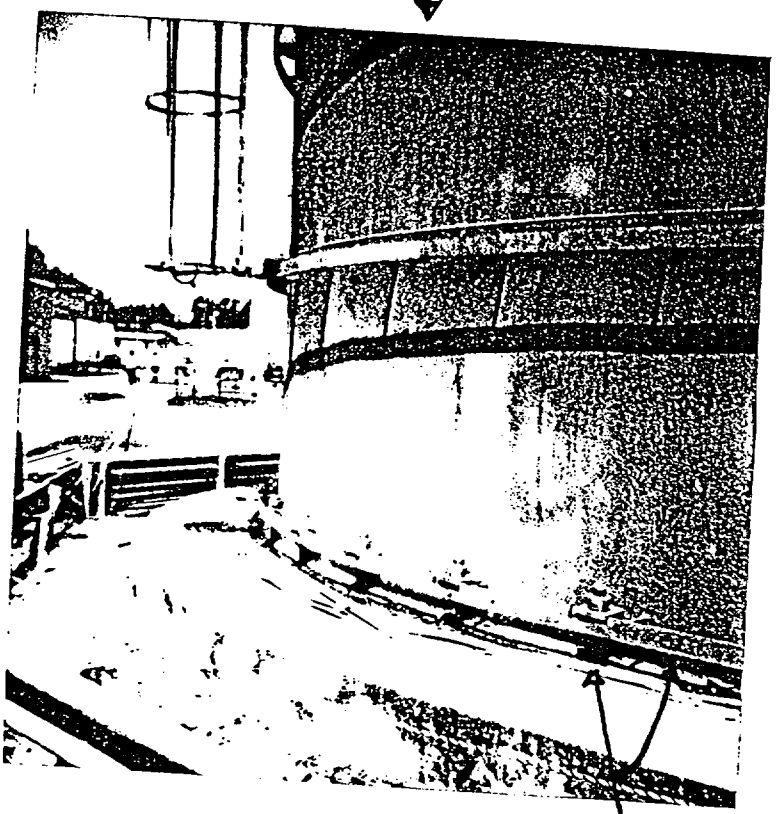
Sponsored By: Larry C. Keith **Date** 11-16-04

Approved By: R. Kevin Rhyne **Date** 11/16/04

Attachment 5

Photograph of BWST

BWST



Picture showing the 39 anchor brackets and siding plate

Attachment 6

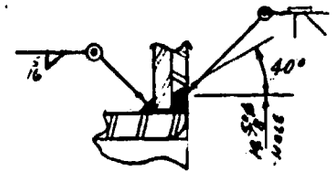
Drawing OM-2201-839
BWST 14" Shell Nozzle

18825

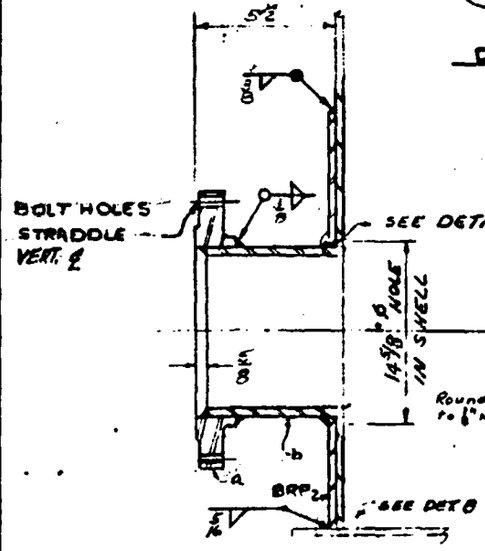
JDA - 1-13-69

SHIP LIST		BILL OF MATERIAL					
NO OF PIECES	MARK	NO OF PIECES	MARK	SECTION	LENGTH FEET	LENGTH INCHES	REMARKS / WEIGHT
1	BSN			14" SHELL NOZZLE			
		1	a	14"-150# FS RF SLIP ON FLG.			
		1	b	14" STD WKT PIPE 0 5 3/4			
1	BRP	1		PL 8 1/2 x 1/2			

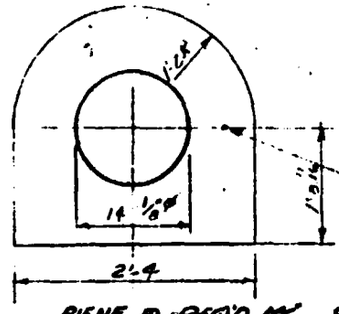
MAT'L: PLATE A-516-B NORMALIZED
A-234 GR WPB SMLS FITTING
MAT'L UNLESS OTHERWISE NOTED.



DETAIL A



DETAIL B



REINF. PAD REQ'D MK BRP1
ROLL TO 48" O.D. RAD. 1.6.

14" SHELL NOZZLE
1 REQ'D MK BSN

ON 2201-839

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DUKE POWER COMPANY
DESIGN ENGINEERING

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DRAWING NUMBER
620-8109
36-44-002-00

APPROVED

THIS APPROVAL COVERS GENERAL ARRANGEMENTS AND OVERALL DIMENSIONS ONLY AND DOES NOT RELATE TO DETAILED DIMENSIONS EXCEPT AS OTHERWISE APPROVED

DUKE POWER COMPANY

By: S. R. BLACKLEY Date: MAR 0 1972
PRINCIPAL MECH ENGINEER

NO.	DATE

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS-FABRICATORS-CONTRACTORS
PITTSBURGH PA. DENVER CO. DES MOINES IOWA PHOENIX UTAH
STOCKTON CALIF. SANTA CLARA CALIF. FRESNO CALIF.

14" SHELL NOZZLE
36'ϕ X 51'-2 1/4 HG BOLTED WATER STORAGE TK
SENECA, S.C.

DWG. PREPARED AT Memphis
FABRICATED AT Elmore

	BY	DATE
DRAWN	IBE	11-23-71
CHECKED	[illegible]	12-16-71

DRAWING NO. B
CONTRACT NO. 51099

BS-502-A

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