

July 26, 1991

Docket Nos. 50-269

LICENSEE: DUKE POWER COMPANY

FACILITY: OCONEE NUCLEAR STATION, UNIT 1

SUBJECT: SUMMARY OF JUNE 18, 1991 MEETING TO DISCUSS 10-YEAR ISI
VESSEL INSPECTION FOR OCONEE UNIT 1

On June 18, 1991, the NRC staff met with representatives of Duke Power Company (DPC), and a consultant from Babcock and Wilcox at ODFN, Rockville, Maryland. The purpose of the meeting was to discuss DPC's upcoming reactor vessel ISI inspection for Oconee Unit 1. Meeting attendees are listed in Enclosure 1, and the meeting agenda is included in Enclosure 2.

Following brief introductory remarks, Mr. C. B. Cheezem of DPC addressed present ASME Code requirements, the weld layout on the reactor vessel, and the impact of proposed augmented requirements. Mr. M. G. Hacker of B&W presented technology enhancements as applicable to B&W Owners Group and their impact on the forthcoming reactor vessel inspection for Oconee Unit 1. Handouts used during these two presentations are provided as Enclosure 3.

Members of RII/DRS/EB and NRR/DET/EMCB discussed the proposed 10-year ISI vessel inspection program and expressed interest in observing portions of the upcoming reactor vessel inspection. The inspection is scheduled to take place August 13-27, 1991.

/s/
Frank Rinaldi, Project Engineer
Project Directorate II-3
Division of Reactor Projects - 1/II
Office of Nuclear Reactor Regulation

Enclosures:
As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555
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Frank Rinaldi

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Division of Reactor Projects - I/II
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Enclosures:
As stated

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ATTENDANCE LIST

OCONEE - UNIT 1

MEETING WITH DUKE POWER COMPANY

REGARDING ISI REACTOR VESSEL INSPECTION PROGRAM

<u>NAME</u>	<u>ORGANIZATION</u>
Frank Rinaldi	NRC/NPR/DRPE/PD11-3
Jerome Blake	NRC/NRR/DRS/EB
George Johnson	NRC/NRR/DET/EMCB
James L. Coley, Jr.	NRC/R11/DRS/EB
David E. Smith	NRC/NRR/DET/EMCB
M. G. Hacker	B&W NUCLEAR SERVICE CO.
C. B. Cheezem	DUKE POWER CO.
R. G. Rouse	DUKE POWER CO.
Lynn Conner	SOUTHERN TECHNICAL SERVICES
Luellen Jones	DUKE POWER CO.
C. Y. Cheng	NRC/NRR/DET/EMCB
R. A. Hermann	NRC/NRR/DET/EMCB
S. G. Benesole	DUKE POWER COMPANY

**MEETING AGENDA
OCONEE UNIT 1
ARIS - II EXAMINATION**

JUNE 18, 1991

- | | |
|---|---------------|
| • Introduction and Purpose | C. B. Cheezem |
| • Present Code Requirements | C. B. Cheezem |
| • Impact of the Proposed Augmented Requirements | C. B. Cheezem |
| • Technology Enhancements | M. G. Hacker |
| • Discussion | All |

Review Of The Present Code Requirements

10CFR 50.55 ¶ a.b.2 requires use of 1980 Edition of ASME Section XI, Division 1 to include 1980 Winter Addenda

Welds¹ to be examined include those outlined in Categories:

B-A Reactor Vessel

B-D Full Penetration Welds and Nozzles in Reactor Vessel

B-F Dissimilar Metal Welds - Core Flood Nozzles

B-J Main Loop Piping

¹ Reference page 4 for diagram of Reactor Vessel

Supplemental Information For Present Requirements

ASME Section XI states that Category B-D Items shall be examined by the end of the first inspection period and the remainder by the end of the third inspection period of each inspection interval.

ASME Section XI ¶ IWB-2420(a) states that the sequence of component examinations established during the first inspection interval shall be repeated during each successive inspection interval to the extent practical.

Request for Relief serial number ONS-014 was originated in 1990 for Units 1, 2 and 3 at Oconee. This request allows Duke Power Company to take credit for the 3rd interval, 1st period requirement for the 36" outlet nozzle-to-vessel welds, as well as nozzle-to-pipe welds. We plan to examine these welds during RFO#13 in August 1991 using an enhanced ultrasonic technique that will meet the 1989 edition of ASME Section XI. This will establish the examination sequence for future intervals.

ASME Section XI Table IWB-2500-1 requires that Category B-F welds receive a volumetric and surface examination.

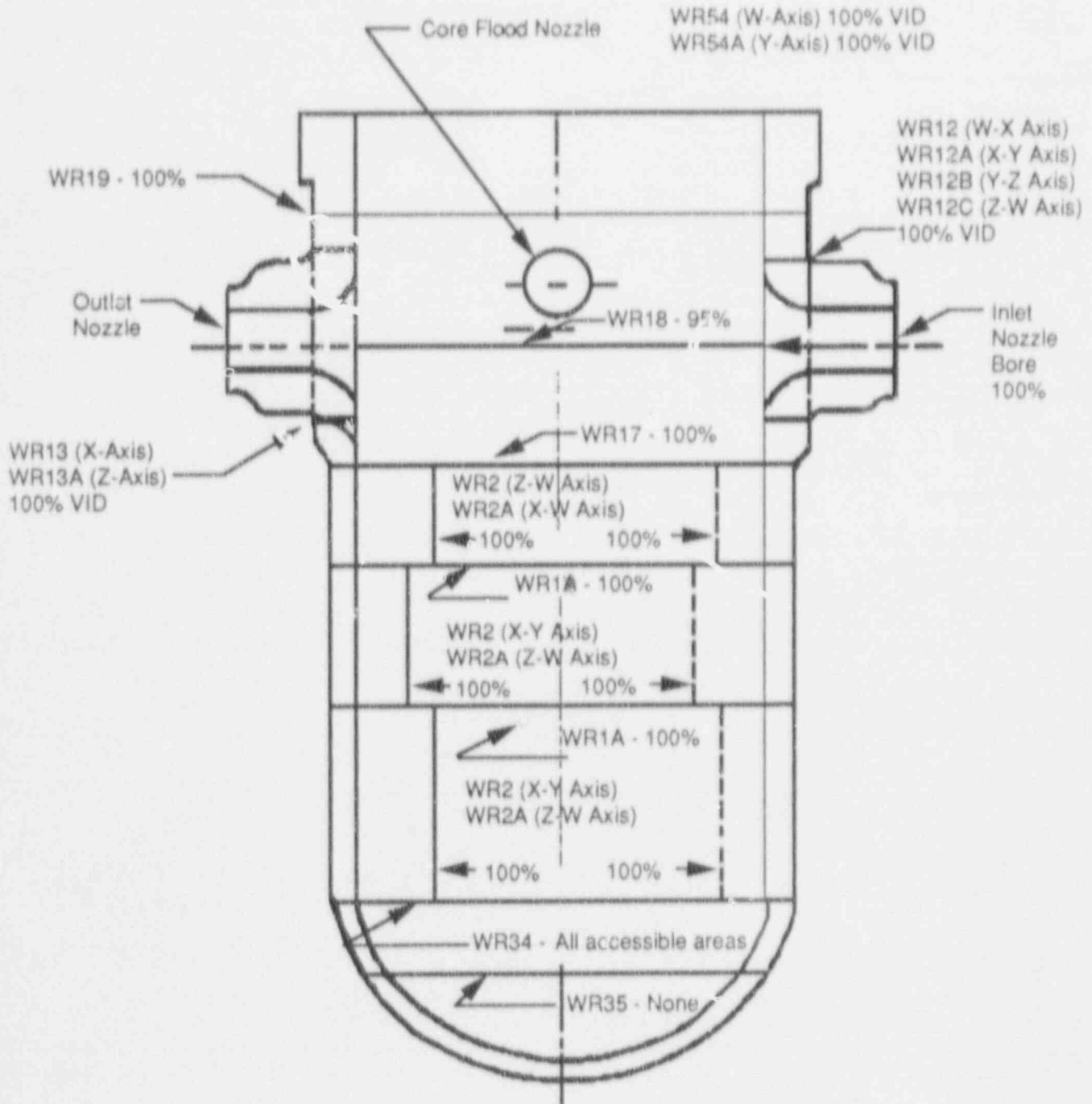
Request for Relief serial number ONS-001 was originated in 1984 for Units 1, 2, and 3 at Oconee. This request allows Duke Power Company to examine Category B-F (Item B5.10, Core Flood Nozzle) welds using ultrasonics from the inside surface, in lieu of performing a surface examination. This examination will provide adequate assurance of weld integrity at the OD surface.

ASME Section XI Table IWB-2500-1 requires that Category B-J welds receive a volumetric and surface examination.

Request for Relief serial number ONS-002 was originated in 1984 for Units 1, 2, and 3 at Oconee. This request allows Duke Power Company to examine Category B-J (Item B9.11, Reactor Vessel Nozzle to Pipe) welds using ultrasonics from the inside surface, in lieu of performing a surface examination. This examination will provide adequate assurance of weld integrity at the OD surface.

² Reference Page 6 for Diagram of areas to be examined

Weld Layout Sketch of Oconee Unit 1 Reactor Vessel

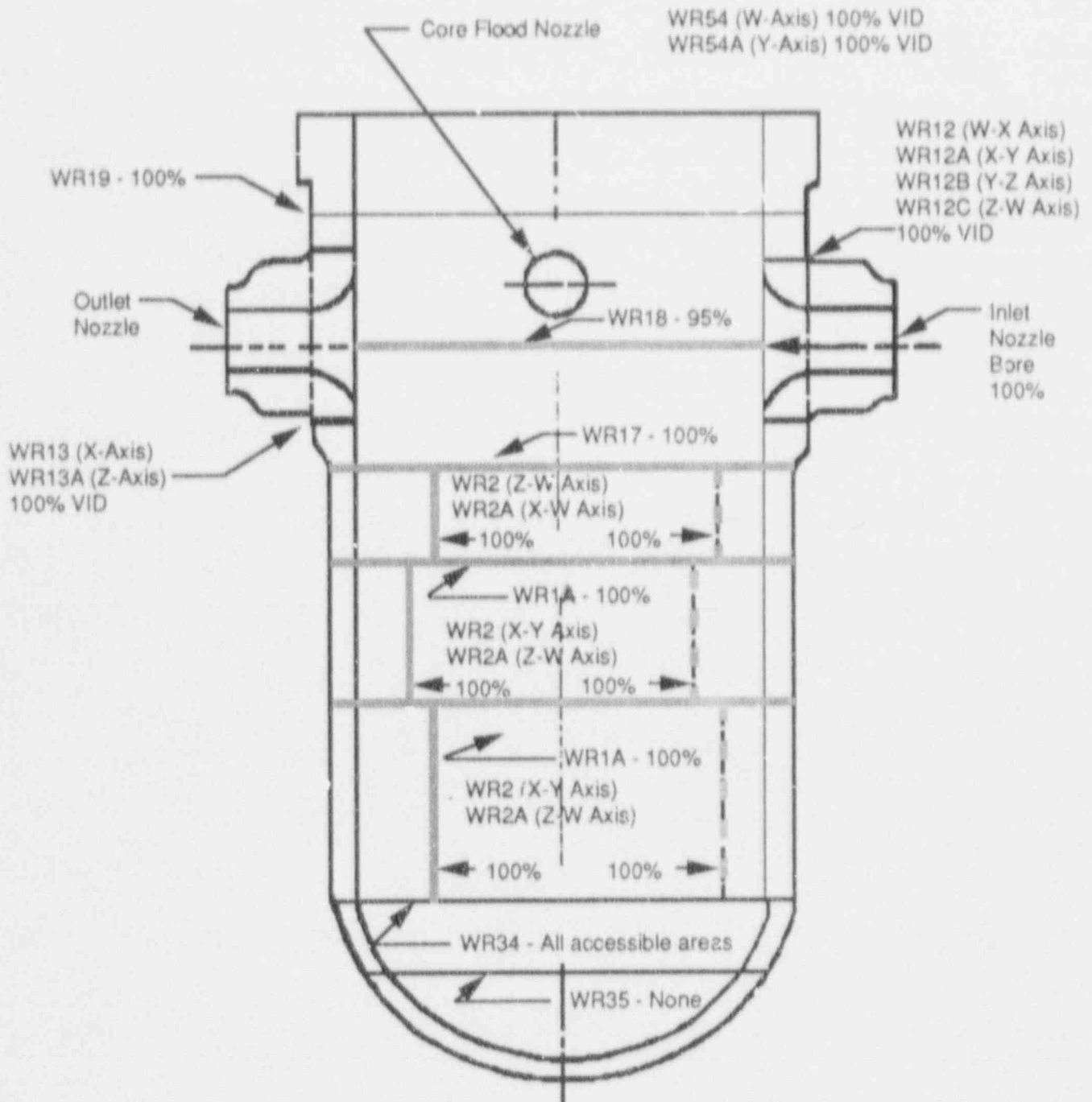


Impact Of The Proposed Augmented Requirements

The proposed augmented examination will require inspection of 100% of all B1.10 Category welds (see Page 6) during this inspection, or within 3 years after this inspection.

We will examine all of the accessible length of all B1.10 Category welds during this examination. The first interval examination of this vessel in 1981 included 100% of the length of these welds with the exception of WR18.

**Weld Layout Sketch of
Oconee Unit 1
Reactor Vessel
Category B1.10 Welds**



Gray Indicates B1.10 Category Welds

Technology Enhancements

BACKGROUND

- B&W and the B&W Owners Group (BWOOG) have conducted several programs to evaluate and improve examination capability for flaw detection and sizing for reactor vessels.
- Development efforts utilized EPRI and BWOOG test blocks:
 - Near Surface Blocks (EPRI)
45 flaws
 - Heavy Section Blocks (EPRI)
34 flaws
 - Reactor Nozzle Mock-Up (BWOOG)
20 flaws
- Programs evaluated UT parameters:
 - Transducer designs
 - Beam Spread
 - Frequency
 - Element Size
 - Element Arrangements
 - Scanning Sensitivity
 - Recording Threshold
 - Signal Processing Techniques
 - Sizing Methods

Technology Enhancements

ALTERNATE EXAMINATION METHODS

REACTOR COOLANT NOZZLE TO PIPE WELDS

Section XI requires a surface examination of the O. D. surface. UT from the I. D. is proposed to satisfy this requirement.

Detection capability has been demonstrated on axial and circumferential notches in a pipe section. Minimum detectable depth determined to be 0.034".

This is the same technique used to satisfy previous relief request from Toledo Edison for the Davis Besse Plant.

CORE FLOOD NOZZLE TO SAFE END AND SAFE END TO PIPE

Section XI requires a surface examination of the O. D. surface. UT from the I. D. is proposed to satisfy this requirement.

Detection capability has been demonstrated on axial and circumferential notches in a pipe section. Minimum detectable depth determined to be 0.030".

This is the same technique used to satisfy previous relief request from Toledo Edison for the Davis Besse Plant.

Technology Enhancement

IMPACT OF PERFORMING AN ENHANCED EXAMINATION

TRANSDUCER REQUIREMENTS

- Contact Method
- Dual Element
- Low Frequency
- 50% Bandwidth

SCANNING REQUIREMENTS

- 25% Transducer Overlap (.56" index)
- 20 dB (MIN) Gain Increase over ASME Calibration
- Recording Threshold set between 5 and 10 % DAC

ANALYSIS

VOLUMETRIC INDICATIONS

Detection data is evaluated to determine acceptability to IWB-3500. Any indication exceeding IWB-3500 is rescanned at .2" increments for better characterization.

LAMINAR INDICATIONS

Detection data is evaluated to determine acceptability to IWB-3500. Any indication exceeding IWB-3500 is rescanned at .2" increments for better characterization.

PLANAR INDICATIONS

Detection data is evaluated. If a planar flaw is detected, it is rescanned with characterization transducers for tip diffraction techniques.

Technology Enhancement

RESULTS OF PROGRAMS

DETECTION

- Near surface flaw detection rate = 98% (1986)
- Balance of volume flaw detection rate = 100%
- High confidence exists for flaw detection
- Techniques used would probably meet Appendix VIII criteria.

SIZING

- Tip diffraction techniques more accurate than amplitude based sizing prescribed by ASME Section XI for planar flaws.
- Volumetric flaws are the most difficult to accurately size because time based methods are not generally possible.

July 26, 1991

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