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Omaha NE 68102-2247

April 2, 2004  
LIC-04-0008

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

- References:
1. Docket No. 50-285
  2. American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition and 1998 Edition through 2000 Addendum
  3. ASME Section XI, Appendix VIII
  4. Letter from OPPD (R. L. Phelps) to NRC (DCD), Relief Request Pertaining to Reactor Vessel Nozzle Inspections for Third 10-Year Interval, Dated October 22, 2003 (LIC-03-0146)
  5. Letter from OPPD (R. T. Ridenoure) to NRC (DCD), Relief Request Pertaining to Reactor Vessel Nozzle Inspections for Third 10-Year Interval, Dated November 21, 2003 (LIC-03-0154)
  6. Letter from NRC (A. B. Wang) to OPPD (R. T. Ridenoure), Fort Calhoun Station, Unit No. 1 – Request for Additional Information on Request for Relief Related to Reactor Pressure Vessel Nozzle Inspections (TAC No. MC1115), Dated March 12, 2004 (NRC-04-034)

**SUBJECT: Relief Request Pertaining to Reactor Vessel Nozzle Inspections for the Third 10-Year Interval, Revision**

This letter revises and replaces the relief request, RR-9, submitted in Reference 4 and 5. The revised relief request, Attachment 1 to this letter, incorporates Omaha Public Power District (OPPPO) responses to the NRC's request for additional information in Reference 6. Attachment 2 to this letter provides a sketch of the reactor pressure vessel nozzle-to-safe-end welds configuration in response to Reference 6. The other attachments to Reference 5 have not been modified and remain as submitted in November, 2003.

In accordance with 10 CFR 50.55a(a)(3)(ii), FCS is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for surface examination of Class 1, Reactor Pressure Vessel (RPV) nozzle-to-safe-end welds. The examination requirement is for a surface and volumetric examination of ASME Section XI, examination category B-F, "pressure retaining dissimilar metal welds," item number B5.10, "reactor vessel NPS 4 or larger."

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LIC-04-0008  
Attachment 1  
Page 2

FCS proposes to implement the requirements consistent with 1989 Edition of Section XI, paragraph IWA-2240 "Alternative Examinations." FCS proposes to utilize these alternative ultrasonic methods for the surface examinations for the six (6) RPV nozzle-to-safe-end dissimilar metal welds, category B-F, item number B5.10 for the nozzle inspections performed during the FCS 2003 refueling outage conducted in September and October of 2003.

If you have any questions or require additional information, please contact Dr. R. L. Jaworski at (402) 533-6833.

Sincerely,

Handwritten signature of R. L. Phelps in cursive, with the number "04-1-04" written in the bottom right corner of the signature.

R. L. Phelps  
Division Manager  
Nuclear Engineering

RLP/RRL/trl

Attachment: 1. Performance of Surface Examinations of RPV Nozzle to Safe-end  
Welds Using Ultrasonic Methods  
2. RPV Nozzle to Safe-end Welds Configuration

c: B. S. Mallett, NRC Regional Administrator, Region IV  
A. B. Wang, NRC Project Manager  
J. G. Kramer, NRC Senior Resident Inspector

# **ATTACHMENT 1**

## **Fort Calhoun Station Relief Request**

### **Performance of Surface Examination of RPV Nozzle to Safe-end Welds Using Ultrasonic Methods**

## **ISI Relief Request RR-9**

### **Performance of Surface Examination of RPV Nozzle to Safe-end Welds Using Ultrasonic Methods**

#### **ASME CODE COMPONENTS AFFECTED**

**System:** Reactor Vessel, Class 1

**Category:** B-F

**Item:** B5.10

**Components affected:** RPV nozzle to safe-end welds; MRC-1/01, MRC-1/18, MRC-1/30, MRC-2/01, MRC-2/18, and MRC-2/30.

#### **APPLICABLE CODE EDITION AND ADDENDA**

ASME Section XI, 1989 Edition, no addendum.

#### **ALTERNATIVE CODE REQUIREMENTS**

In accordance with 10 CFR 50.55a(a)(3)(ii), FCS is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for surface examination of Class 1, Reactor Pressure Vessel (RPV) nozzle-to-safe-end welds. The examination requirement is for a surface and volumetric examination of ASME Section XI, examination category B-F, "pressure retaining dissimilar metal welds", item number B5.10, "reactor vessel NPS 4 or larger."

FCS proposes to implement requirements consistent with 1989 Edition of Section XI, paragraph IWA-2240 "Alternative Examinations." FCS would implement alternative ultrasonic methods for the surface examinations for the six (6) RPV nozzle-to-safe-end dissimilar metal welds, category B-F, item number B5.10 for the nozzle inspections performed during the 2003 refueling outage. These nozzle to safe-end welds are MRC-1/01, MRC-1/18, MRC-1/30, MRC-2/01, MRC-2/18, and MRC-2/30.

#### **REASON FOR REQUEST**

The code required surface examinations for the six (6) RPV nozzle-to-safe-end dissimilar metal welds in FCS's Reactor Coolant System represents a hardship or unusual difficulty without compensating increase in level or quality of safety when compared with the proposed alternative testing.

## PROPOSED ALTERNATIVE AND BASIS FOR USE

FCS proposes to implement alternative ultrasonic examination methods in place of the code required surface exams. The proposed ultrasonic examination methods as submitted in Reference 5 are described in non-proprietary versions of the qualification documentation (Framatome ANP "Results from ID & OD Clad Safe-end Mockup Block Demonstration for Fort Calhoun," 54-PQ-189-01) and the procedure for the performance of the ultrasonic examination technique used at the Fort Calhoun Station during the 2003 refueling outage to perform the surface examinations of the reactor vessel B-F welds (Framatome ANP Nondestructive Examination Procedure, "ID Automated Ultrasonic Examination of Welds for Detection of OD Initiated Flaws," 54-ISI-189-01). It should be noted that in the proprietary version of ANP 54-ISI-189-01 previously submitted, contained tables on pages 3 and 4 that noted the abbreviation "NDD" for "no detectable degradation." The non-proprietary version does not include these tables.

## JUSTIFICATION

The ultrasonic examination techniques utilized for this examination were qualified by demonstration at the EPRI NDE center in Charlotte, NC. The use of these qualified techniques assures that the dissimilar metal welds remain free of service related flaws thus enhancing quality and ensuring plant safety and reliability.

The surface inspections of the outside weld surfaces once accessed, are limited due to the confined space and limited access due to the close proximity of the wall of the sand box to the outside of the pipe/nozzle. Only 60% of the required weld can be inspected from the outside diameter (OD) surface, where 100% of the weld surface can be inspected using the alternative ultrasonic (UT) technique from the ID surface.

The area dose rate is estimated to be 120 mr/hr with the RPV head on the vessel. The dose rate in the small cavity surrounding each nozzle is unknown. An ex-core detector was removed from one of the nozzle boxes last refueling outage and read 40,000 mr/hr on contact. The surface dose rate near the welds in question would be very close to these detectors. It is estimated that the total dose for this examination from the OD surface would be 3-6 man-rem. There is no additional dose for performing these examinations from the ID surface, since all the equipment is already in place for the other Reactor Pressure Vessel (RPV) automated examinations. Therefore, the implementation of this alternative method reduces the radiation exposure by 3-6 man-rem while providing an acceptable level of quality and safety.

Attachment 2 describes the FCS "RPV Nozzle to Safe-end Welds Configuration and Materials." The alternate UT examination from the inside surface was unrestricted and provided 100% coverage of the weld surface plus ½ inch on each side of the weld as described in ASME XI, Figure IWB-2500-8(c).

It should also be noted that ID surface weld profilometry was performed on the RPV nozzle welds during the 2003 RFO and no counterbore or ID profiles were detected that interfered with transducer contact during any UT examinations in either the circumferential or axial direction.

The alternative ultrasonic examinations were performed during the fall 2003 refueling outage and no OD surface indications were identified.

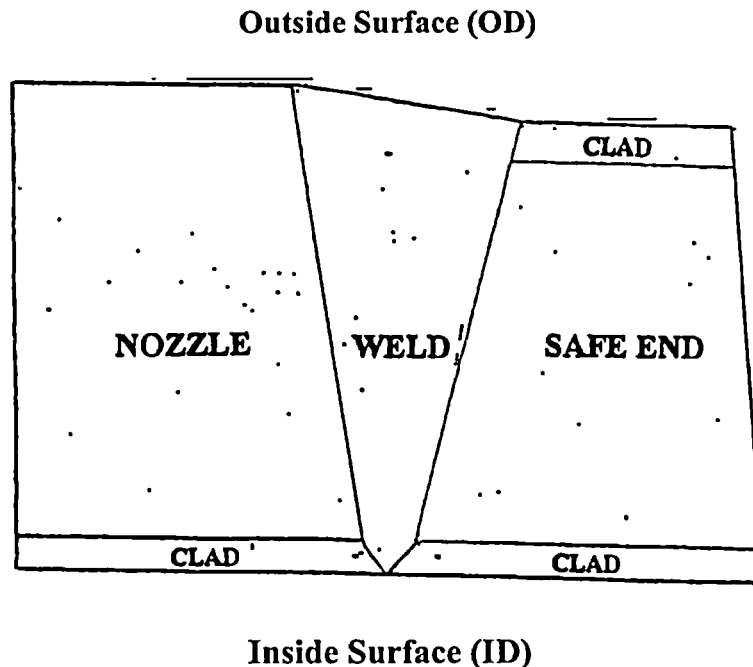
#### **DURATION OF PROPOSED ALTERNATIVE**

This relief is being requested for the FCS 3<sup>rd</sup> Ten Year ISI Interval which commenced in September of 1993.

## **ATTACHMENT 2**

### **Fort Calhoun Station Relief Request**

### **RPV Nozzle to Safe-end Welds Configuration**



The reactor vessel hot leg nozzles are 32" ID and the cold leg nozzles are 24" ID.

Nominal thickness of the hot legs is 3.0"; nominal thickness of the cold legs is 2.5".

All welds are single V-prep with no buttering.

All nozzles are carbon steel A-508 CL-2.

All safe-ends are stainless steel SA-182 F-316.

All cladding is 304 stainless steel.

All filler metal is alloy 182, back gouged and back welded with alloy 182 filler.

Note 1: The safe-ends were welded to the nozzles and then the entire vessel was placed into a furnace. Since this process sensitizes the 316 SS to IGSCC, the safe-ends were machined down on the ID and OD and the 304 SS cladding was then applied. This is the only Combustion Engineering vessel done this way.

Note 2: During the FCS 2003 refueling outage ID surface weld profilometry was performed on the RPV nozzle welds. No counter-bore or ID profiles were detected that would interfere with transducer contact during any UT examinations in either the circumferential or axial direction.