



**Nebraska Public Power District**

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NLS2015112  
October 29, 2015

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

**Subject:** Response to Nuclear Regulatory Commission Requests for Additional Information for Relief Request No. RR5-01, Alternate Weld Overlay Repair for a Dissimilar Metal Weld Joining Nozzle to Control Rod Drive End Cap  
Cooper Nuclear Station, Docket No. 50-298, DPR-46

- References:**
1. Email from Lois M. James, Nuclear Regulatory Commission, to Jim Shaw, Nebraska Public Power District, dated September 15, 2015, "Request for Additional Information - Relief Request for RR5-01, Cooper - TAC No. MF6332"
  2. Letter from Oscar A. Limpias, Nebraska Public Power District, to the U.S. Nuclear Regulatory Commission, dated June 9, 2015, "10 CFR 50.55a Requests for Fifth Ten-Year Inservice Inspection Interval" (ML15167A066)

Dear Sir or Madam:

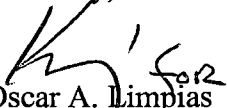
The purpose of this letter is for the Nebraska Public Power District to respond to the Nuclear Regulatory Commission's Requests for Additional Information (RAI) (Reference 1) related to the Cooper Nuclear Station "10 CFR 50.55a Requests for Fifth Ten-Year Inservice Inspection Interval" (Reference 2).

The response to the specific RAI questions is provided in the attachment to this letter.

This letter does not contain any new regulatory commitments.

If you have any questions concerning this matter, please contact Jim Shaw, Licensing Manager, at (402) 825-2788.

Sincerely,

  
Oscar A. Limpias  
Vice President - Nuclear  
and Chief Nuclear Officer

/dv

A047  
NRR

NLS2015112

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Attachment: Response to Nuclear Regulatory Commission Requests for Additional Information for 10 CFR 50.55a Requests for Fifth Ten-Year Inservice Inspection Interval

cc: Regional Administrator w/ attachment  
USNRC - Region IV

Cooper Project Manager w/ attachment  
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector w/ attachment  
USNRC - CNS

NPG Distribution w/o attachment

CNS Records w/ attachment

**Attachment**

**Response to Nuclear Regulatory Commission Requests for Additional Information for  
10 CFR 50.55a Requests for Fifth Ten-Year Inservice Inspection Interval**

**Cooper Nuclear Station, Docket No. 50-298, DPR-46**

The Nuclear Regulatory Commission (NRC) requests for additional information (RAI) regarding the 10 CFR 50.55a Request for Fifth Ten-Year Inservice Inspection Interval are shown in italics. The Nebraska Public Power District (NPPD) response to the requests is shown in normal font.

RAI-1

*In the submittal dated June 9, 2015, the licensee proposed to use Code Case N-638-4 with the Conditions that "Demonstration for ultrasonic examination of the repaired volume is required using representative samples which contain construction type flaws" and that "CNS will comply with 3(e)(1) of the code case." NRC staff notes that paragraph 2.1(j) of the code case states:*

*"The average lateral expansion value of the three HAZ Charpy V-notch specimens shall be no less than the average lateral expansion value of the three unaffected base metal specimens. However, if the average lateral expansion value of the HAZ Charpy V-notch specimens is less than the average value for the unaffected base metal specimens and the procedure qualification meets all the other requirements of this Case, either of the following shall be performed:*

- (1) The welding procedure shall be requalified.*
- (2) An Adjustment Temperature for the procedure qualification shall be determined in accordance with the applicable provisions of NB-4335.2 of Section III, 2001 Edition with 2002 Addenda. The  $RT_{NDT}$  or lowest service temperature of the materials for which the welding procedure will be used shall be increased by a temperature equivalent to that of the Adjusted Temperature."*

*Based on the above information, the staff requests that the licensee provide the following information:*

- (a) Identify whether aforementioned option (1) or option (2) was used in the temperbead weld qualification for Cooper weld overlays.*
- (b) If the welding procedure specification (WPS) was qualified with option (2), provide the value for the new Adjusted Temperature for the vessel component (where temperbead structural overlay is to be applied). Identify if this Adjusted Temperature value was considered in the evaluation of the vessel integrity analyses (e.g., pressure-temperature curves-if applicable).*

NPPD Response

Until a vendor is selected to install the overlay and the WPS with their procedure qualification records are reviewed, Cooper Nuclear Station (CNS) will not know how the requirements of 2.1(j) have been satisfied by the chosen vendor. As CNS understands the NRC's approval of Code Case N-638-4 in Regulatory Guide 1.147, Revision 17, the NRC has not placed any conditions on meeting 2.1(j), including its options. In the event the selected vendor's WPS qualification is based on average lateral expansion values of the three Heat Affected Zone (HAZ) Charpy V-notch specimens being less than the average lateral expansion value of the three unaffected base metal specimens, CNS will require requalification (option 1). In the unlikely event the WPS cannot be requalified demonstrating average lateral expansion in the weld area equal to or greater than the unaffected area, option 2 would be selected or another vendor chosen.

If option 2 is determined to be the only available solution, the effects of the Adjusted Temperature would be determined before the Full Structural Weld Overlay (FSWOL) is installed. If the new Adjusted Temperature is determined to affect the pressure-temperature curves, the curves would be revised before plant startup from refuel outage 29. However, because the location of the FSWOL is outside of the beltline region [fluence values greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> (E>1 MeV)], it is not expected that minor changes to the Adjusted Temperature would affect the pressure-temperature curves.

RAI-2

*In the submittal dated June 9, 2015, the licensee proposed to use Code Case N-638-4 with the Conditions that "Demonstration for ultrasonic examination of the repaired volume is required using representative samples which contain construction type flaws" and that "CNS will comply with 3(e)(1) of the code case." NRC staff notes that paragraph 2.1(c) of the code case states:*

*"Consideration shall be given to the effects of irradiation on the properties of material, including weld material for applications in the core belt line region of the reactor vessel. Special material requirements in the Design Specification shall also apply to the test assembly materials for these applications."*

*NRC staff notes that Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix G, Section II.G defines the beltline region of reactor vessel as:*

*"the region of the reactor vessel (shell material including welds, heat affected zones, and plates or forgings) that directly surrounds the effective height of the active core and adjacent regions of the reactor vessel that are predicted to experience sufficient neutron radiation damage to be considered in the selection of the most limiting material with regard to radiation damage."*

*NRC staff notes that Regulatory Issue Summary (RIS) 2014-11 defines the beltline as follows:*

*“the beltline definition in 10 CFR Part 50, Appendix G is applicable to all reactor vessel ferritic materials with projected neutron fluence values greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> (E>1 MeV), and this fluence threshold remains applicable for the design life as well as throughout the licensed operating period.”*

*Based on the above information, the staff requests that the licensee provide the following information:*

- (a) Identify whether or not the subject weld joint is considered to be in the beltline region per the definitions of 10 CFR Part 50 Appendix G and RIS 2014-11.*
- (b) If the subject weld joint is considered to be in the beltline region as defined by 10 CFR Part 50 Appendix G and RIS 2014-11, identify what consideration was given to the effect of irradiation on the properties of material, as required by paragraph 2.1(c) of Code Case N-638-4.*

NPPD Response

(a) The weld subject to the FSWOL is the Control Rod Drive Return Line Nozzle-to-Cap weld and is located outside the beltline region of the reactor vessel as defined by 10 CFR 50 Appendix G and RIS 2014-11. The nozzle is at elevation 452 inches above vessel 0 and the beltline region is located between elevations 195.35 inches and 372.5 inches assumed at 54 Effective Full Power Years.

(b) N/A

RAI-3

*In the submittal dated June 9, 2015, the licensee states that the current configuration of the subject weld joint is an “A-508, Class 2 low alloy steel nozzle” joined to an “SB-166, Alloy 600 nickel alloy cap” with “Alloy 182/82 materials”. The licensee proposed to perform the FSWOL welding using “ERNiCrFe-7A (Alloy 52M) filler metal.” Later in the submittal, the licensee states that the “overlay will completely cover the area of the flaw and other Alloy 182 or susceptible austenitic stainless steel material with the highly resistant Alloy 52M weld filler material.”*

*Based on the above information, the staff requests that the licensee provide the following clarification:*

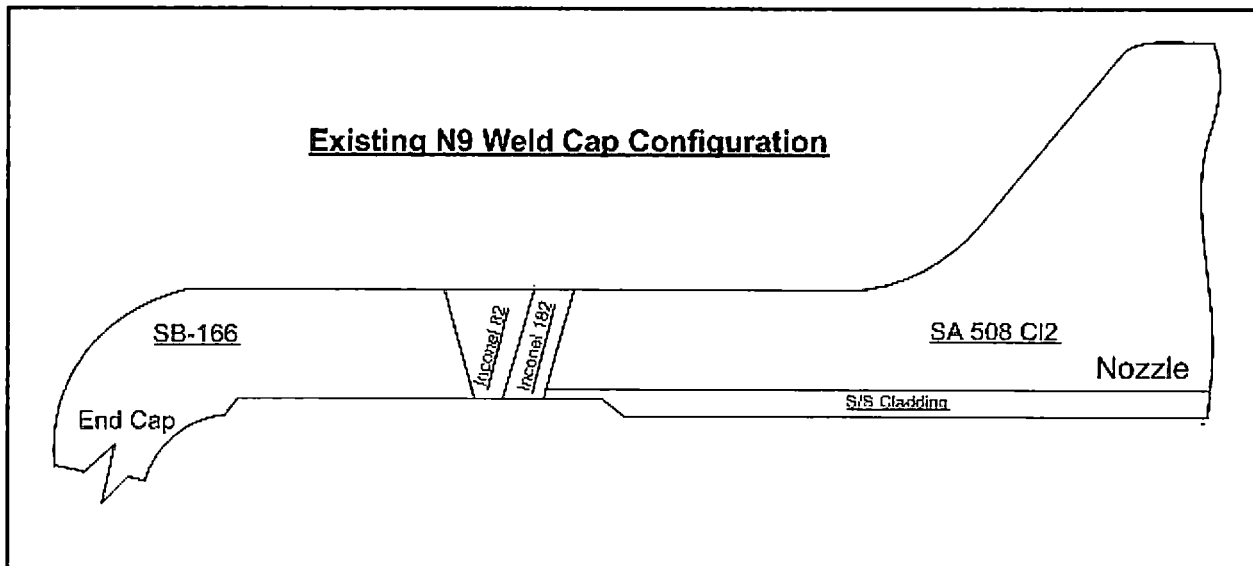
- (a) Identify whether alloy 82 or 182 is used in the final layer of the existing weld joint to which the FSWOL is proposed to be applied.*

- (b) Clarify whether or not austenitic stainless steel material is used in the existing weld joint to which the FSWOL is proposed to be applied. If austenitic stainless steel material is used in the existing weld joint, provide a detailed weld sketch identifying all the following materials: A-508 Class 2, Stainless Steel (specify type), SB-166 Alloy 600, Alloy 82 filler metal, and Alloy 182 filler metal.

NPPD Response

- (a) When the cap was installed, the existing 182 open butt weld was cut and machined back to approximately 0.350" remaining at the bevel. CNS installed the cap using a full open butt 82 (ER-NI-CR-3) weld. Stainless steel cladding originally covered the 182 weld but was removed to facilitate fit up of the SB-166 Alloy 600 cap exposing a small portion of the 182 at the inside diameter. See Figure 1.
- (b) As described on page 57 of the Attachment to NLS2015025, the configuration to receive the FSWOL consists of an SA-508, Class 2 low alloy steel nozzle, Alloy 182/82 weld materials, and an SB-166, Alloy 600 cap. There are no stainless steel weld filler materials contained in the weld joint. See Figure 1.

Figure 1



RAI-4

*Provide a sketch or diagram of each subject weld that is applied with a FSWOL demonstrating that the ultrasonic examination of the overlaid weld will achieve 100 percent coverage of the required volume per the ISI alternative. The sketch/diagram should include lines that represent the ultrasonic beam angles and signal path that cover the required volume.*

NPPD Response

The FSWOL will be designed in accordance with the requirements of Nonmandatory Appendix Q, Article Q-3000 and will be examined in accordance with Article Q-4000. The examination volume specified by Q-4100-1 will be ultrasonically examined to assure adequate fusion with the base metal and to detect welding flaws such as interbead lack of fusion, inclusions, or cracks.

For preservice and inservice examination, the volume specified by Q-4300-1 will be ultrasonically examined to meet the requirements of Q-4300. The design of the FSWOL will ensure that an adequate configuration is provided to facilitate examination of the required volumes. The requested diagram/sketch without specific dimensions would not provide meaningful information. While there may be conceptual designs developed in advance of refuel outage 29, the specific design would not be finalized until the actual flaws are characterized.

Request No. RR5-01 does not propose an alternative to the required examination volumes specified by ASME Section XI, Nonmandatory Appendix Q. If the required examination volume cannot be obtained, a revision to RR5-01 would be submitted for NRC approval before restart from the refueling outage.