

**From:** Wengert, Thomas  
**Sent:** Monday, October 11, 2021 5:54 PM  
**To:** Keele Jr, Riley D  
**Cc:** Clark, Robert; Lee, Samson; Dixon-Herrity, Jennifer  
**Subject:** ANO-2 Final RAI RE: Relief Request ANO2-R&R-012 Concerning RV Closure Head Penetration #46  
**Attachments:** ANO-2 - Final RAI Concerning Relief Request ANO2-R&R-012.pdf

On October 11, 2021, the U.S. Nuclear Regulatory Commission (NRC) staff sent Entergy Operations, Inc. (Entergy, the licensee) the draft Request for Additional Information (RAI) identified below. This RAI relates to the October 10, 2021, Relief Request ANO2-R&R-012 for Arkansas Nuclear One, Unit 2 (ANO-2).

On October 11, 2021, the NRC staff held a clarification conference call with the licensee. At the conclusion of the call, the licensee indicated that they expect to provide the requested information by 1300 ET on October 12, 2021. Attached is the final RAI with "draft" removed.

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**From:** Wengert, Thomas  
**Sent:** Monday, October 11, 2021 2:58 PM  
**To:** Keele Jr, Riley D <rkeele@entergy.com>  
**Cc:** Clark, Robert <RCLARK@entergy.com>; Lee, Samson <Samson.Lee@nrc.gov>; Dixon-Herrity, Jennifer <Jennifer.Dixon-Herrity@nrc.gov>  
**Subject:** ANO-2 Draft RAI RE: Relief Request ANO2-R&R-012 Concerning RV Closure Head Penetration #46

By letter dated October 10, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21283A001), Entergy Operations, Inc. (the licensee) submitted Relief Request ANO2-R&R-012 for Arkansas Nuclear One, Unit 2 (ANO-2). In ANO2-R&R-012, the licensee stated that a flaw located in Reactor Vessel Closure Head Penetration #46 nozzle was determined to be unacceptable based on requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). The licensee stated that it has developed a strategy to perform a local excavation of penetration Nozzle #46 and the adjacent J-groove weld to remove the indication to repair this nozzle. In ANO2-R&R-012, the licensee proposed an alternative to the requirements of the 1968 Edition with Addenda through Summer 1970 of ASME Code Section III, N-462.4(d), Figure N-462.4(d) *Attachment of Connections Using Partial Penetration Welds*, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(z)(1), "Acceptable level of quality and safety."

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information, as described in the attached request for additional information (RAI), is required for the staff to complete its review of this application. This RAI is identified as draft at this time to confirm your understanding of the information that the NRC staff needs to complete the evaluation.

Please contact me if you would like to set up a conference call with the NRC staff to clarify this request for information. Also, please confirm that this request does not contain any proprietary information.

Tom Wengert

Project Manager – Arkansas Nuclear One  
NRR/DORL/LPL4  
(301) 415-4037

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**From:** Wengert, Thomas

**Created By:** Thomas.Wengert@nrc.gov

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**Sensitivity:** Normal  
**Expiration Date:**

REQUEST FOR ADDITIONAL INFORMATION

RELIEF REQUEST ANO2-R&R-012

CONCERNING REPAIR OF THE REACTOR VESSEL

CLOSURE HEAD PENETRATION #46

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

By Letter No. 2CAN102102 dated October 10, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21283A001), Entergy Operations, Inc. (the licensee) submitted Relief Request ANO2-R&R-012 for Arkansas Nuclear One, Unit 2 (ANO-2). In ANO2-R&R-012, the licensee stated that a flaw located in Reactor Vessel Closure Head Penetration #46 nozzle was determined to be unacceptable based on requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). The licensee stated that it has developed a strategy to perform a local excavation of penetration Nozzle #46 and the adjacent J-groove weld to remove the indication to repair this nozzle. In ANO2-R&R-012, the licensee proposed an alternative to the requirements of the 1968 Edition with Addenda through Summer 1970 of ASME Code Section III, N-462.4(d), Figure N-462.4(d) *Attachment of Connections Using Partial Penetration Welds*, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(z)(1), "Acceptable level of quality and safety."

The U.S. Nuclear Regulatory Commission (NRC, the Commission) staff has determined that additional information is needed to complete its review, as described below.

**Regulatory Basis**

The inservice inspection (ISI) of the ASME Code, Section XI, Class 1, 2 and 3 components shall be performed in accordance with the requirements of Section XI, "Rules for In-service Inspection of Nuclear Power Plant Components," of the ASME Code and applicable editions and addenda as required by 10 CFR Part 50 Paragraph 50.55a(g), except where specific written relief has been granted or proposed alternative authorized by the Commission. In order to assess the licensee's proposed alternative, the NRC staff requires the following additional information to complete the review.

**Request for Additional Information (RAI)**

RAI-1 Proprietary Withholding Assertion

With regard to the proprietary markings of the paragraphs on the bottom of page 8 and the top of page 9 of Enclosure 1 of the licensee's submittal, the licensee has marked certain "Conclusions" paragraphs as proprietary. However, this is a summary, which does not disclose the specific licensee calculation. The NRC staff requests justification for the licensee's basis for meeting the requirements of 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," for proprietary withholding of these paragraphs in accordance with Enclosure 3 of the licensee's submittal.

## RAI-2 Documenting and Confirming Excavation

The NRC staff requests information concerning the maximum dimensions of the excavation as described in the licensee's proposed alternative in paragraph in Section 5 of the submittal. The maximum dimensions of the excavation, or limits, should be bound by the licensee's calculations and the licensee's statement, "If not, Entergy will continue to excavate until the limits described above are reached or a successful PT [liquid dye penetrant examination] is achieved prior to reaching the limits."

- a. Provide the maximum allowable dimension of excavation for Nozzle #46 and the adjacent J-groove weld including the vertical length, radial depth, and circumference under this alternative.
- b. Describe the process to document and confirm the actual excavation, such as in non-destructive evaluation (NDE) reports, or corrective action documentation. The information should include the final dimensions of the weld including ultrasonic testing (UT) records demonstrating final weld height, photographs of acceptable NDE results (e.g., "PT White"), and the as-left condition of Nozzle #46 and the adjacent J-groove weld. This information will be subject to NRC inspection, as appropriate.

## RAI-3 Liquid Dye Penetrant Clarifications

In Part 3 of the licensee's submittal, "Other Considerations," the licensee notes the intended use of NB-5000 of the 1992 Edition of Section III for performance of the post-excavation liquid dye penetrant examination (PT). This examination must be able to identify any remnant primary water stress corrosion cracking or other defects that may have contributed to, or be part of, the overall defect and have been left in the nozzle after the excavation. The licensee is requested to:

- a. Justify that the use of NB-5000 of the 1992 Edition of Section III for the PT will ensure that the examination method is demonstrated to be capable of detecting relevant primary water stress corrosion cracking indications.
- b. Confirm, specifically in the proposed alternative paragraph in Section 5 of the submittal, that the acceptance criterion for the PT will be "PT White" (i.e., no indications (linear or rounded) are allowed of any size). The NRC staff has determined that the acceptance criteria of NB-5352 in accordance with NB-5000 of the 1992 Edition of Section III for PT is not sufficient for this purpose.

## RAI-4 Primary Water Stress Corrosion Cracking (PWSCC) Concern

The excavated location may create a crevice between the nozzle and J-groove weld, which may lead the excavation location to be more susceptible to the initiation of PWSCC. In addition, the surface of the nozzle and weld at the excavation location may be more susceptible to PWSCC because it is being cold worked due to grinding, although the proposed relief request does state that the licensee will use emery cloth buffing to remove cold working. Provide an evaluation of a potential crevice and/or cold working with regard to its effect on PWSSC and the structural integrity of Nozzle #46 and the adjacent J-groove weld during the next cycle of operation.

#### RAI-5 Peening

The NRC staff understands that during the current outage, the licensee is peening the inner surface of the reactor vessel closure head penetration nozzles. The relief request describes the use of “emery cloth buffing” after grinding. However, peening is effective in addressing PWSCC initiation. Provide justification for not applying peening to the outside diameter and wetted weld surface of penetration Nozzle #46 after grinding is complete.

#### RAI-6 Enhanced Leakage Detection During Operating Cycle

The licensee’s submittal does not discuss leakage detection during normal operation, which would provide a defense-in-depth measure to address any possible indications missed by NDE or the initiation of new flaws in the potentially more susceptible ground area. Describe any defense-in-depth measures, such as enhanced leakage detection guidance, that the licensee has implemented that addresses changes in leakage as little as 0.1 gallons per minute (gpm) during the next cycle of operation.

#### RAI-7 Operating Experience with Removal of Indications via Grinding

The “Conclusions” section of the proposed alternative discusses previous experience at ANO-2 for two locations that had indications successfully removed via grinding. Provide additional details on the repairs and operating experience of these locations during subsequent inspections. Also, include a discussion of those situations, as compared with the current request.

#### RAI-8 Clarifying Dates

Section 6 of the proposed relief request states that “...This proposed alternative is requested for one operating cycle...” Identify the operating cycle and approximate end date of the operating cycle. Also provide the start and end dates for the current 5<sup>th</sup> ten-year inservice inspection interval.

#### RAI-9 Clarifying 10 CFR 50.55a(g)(6)(ii)(D) Applicability

Section 2 of the proposed relief request states that the examination category for Nozzle #46 is ASME Code Case N-729-6. However, ASME Code Case N-729-6 is conditioned by 10 CFR 50.55a(g)(6)(ii)(D). State/confirm that all of the conditions in 10 CFR 50.55a(g)(6)(ii)(D) will be satisfied.