

March 28, 2002

Mr. Michael A. Krupa  
Director  
Nuclear Safety & Licensing  
Entergy Operations, Inc.  
1340 Echelon Parkway  
Jackson, MS 39213-8298

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2, AND WATERFORD STEAM  
ELECTRIC STATION, UNIT 3 - REQUEST FOR ADDITIONAL INFORMATION  
REGARDING PROPOSED ALTERNATIVES TO AMERICAN SOCIETY OF  
MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE  
REQUIREMENTS FOR WELD REPAIRS (TAC NOS. MB4288, MB4289, AND  
MB4286)

Dear Mr. Krupa:

By letter dated March 4, 2002, you proposed an alternative method to the temper bead welding requirements of American Society of Mechanical Engineers (ASME) Section XI IWA-4500 and IWA-4300 (PWR-R&R-001, Revision 0) and requested Nuclear Regulatory Commission (NRC) staff approval. Request No. PWR-R&R-001, Revision 0, proposes performing ambient temperature temper bead welding repairs to reactor pressure vessel head penetration nozzles.

During the course of review of this request, the NRC staff determined that additional information is necessary to complete our review. The enclosed request for additional information (RAI) was e-mailed to your licensing staff on March 19, 2002, and discussed during a telephone call on March 21, 2002, and another RAI was emailed to you on March 26, 2002. Your staff agreed to respond within 30 days of the receipt of this RAI. If circumstances result in the need to revise the target date, please call me at the earliest opportunity.

Sincerely,

/RA/

N. Kalyanam, Project Manager, Section 1  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-313, 50-368, and 50-382

Enclosure: As stated

cc: See next page

## ALTERNATIVES TO ASME CODE REQUIREMENTS FOR WELD REPAIRS

### REQUEST FOR ADDITIONAL INFORMATION

#### TAC NO. MB4286, MB4288, AND MB4289

1. The request for relief must state the specific paragraphs/subparagraphs/sentences/etc., affected by the proposed alternative, state the proposed alternative for each paragraphs/subparagraphs/sentences/etc., and provide a basis and justification for proposed alternative to the specific paragraphs/subparagraphs/sentences. (Any requirements not listed in the "Requirements for which Relief is Requested" is presumed to be met in their entirety). Approval of a process or technique is not an implied approval of requirements not contained in the "Requirements for which Relief is Requested." A process or technique must satisfy all aspects of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) except for the specific requirements stated in the "Requirements for which Relief is Requested." For example, Page 2 and 3, lists bullets that appear to be from the Code but are not identified as complying with all the requirements in Code. Also the proposed temper bead technique in Attachment 1 appears to have differences from Code that are not identified in the "Requirements for which Relief is Requested" part of the submittal.

Please provide the above requested information. In formulating the response to this question, the staff refers you to Surry's submittals of October 30, 2001 as supplemented December 3, 2001, and Davis Besse's submittal of January 11, 2001. Although your application referenced the Surry submittal dated October 30, 2001, the "Requirements for which Relief is Requested" section lacked specificity which was carried through the entire submittal. Each application must stand on its own.

2. Page 3, discusses Electric Power Research Institute (EPRI) Report GC-111050. The EPRI report provided general comments of possible effects from post weld heat treatment. Because they are general, they do not provide a bases for not performing a ASME Code Section III repair. The same report also discussed comparison testing with and without heat treatment and made no mention of distortion. The implications by licensee's submittal that heat treatment is the cause of thermal stress or creates more stress than a weld repair is not substantiated by the EPRI report. Other utilities have performed similar repairs to the RPV head with post and preheat treatments without experiencing the difficulties mentioned in the submittal.

Please explain why Section III of the Code or alternatives to Section III (NB-4622.11) are not applicable or explain why the repair cannot be performed according to Section III or alternatives to Section III.

- a. Page 3, the gas tungsten arc welding (GTAW) process described on page 3 does not meet the criteria in IWA-4500 or NB-4622.11. Please identify the specific subparagraphs/sentences of the Code that the repair will not meet. Also, identify the alternative that will be used in lieu of Code requirements and provide the justification/bases to support the alternative.

- b. Both IWA-4534 and NB-4622.11(d) require radiographic testing (RT) examination after completion of the repair. The submittal does not address RT examinations of the repaired weldment. Because of the absence of RT in the "Requirements for which Relief is Requested," the staff presumes that RT will be performed. Other licensees have asked for relief from RT examinations. If RT will be performed, provide a discussion on how this will be accomplished. If RT will not be performed, it should be specified in the "Requirements for which Relief is Requested" and accompanied with the proposed alternative and justification/bases.
3. In Attachment 1, Section 4.0 "Examination" of the submittal, surface and ultrasonic examination methods for the machined surface prior to repair and after welding is discussed.
- a. Please provide sketches showing the area that will be surface inspected prior to welding and after welding. Indicate any differences in the inspection areas (from Code requirements) for the instrument nozzles, head vent nozzle, and control element drive mechanism nozzles.
  - b. Please provide sketches showing the examination surface and volume required by Code for each inspection method and show the actual surface and volume that will be inspected. Describe the percent of coverage that will be achieved for each transducer and the total coverage for each repair.
  - c. Please describe to what criteria will the ultrasonic testing (UT) examinations be performed. (In accordance with criteria of Section III of the Code, Appendix VIII of Section XI, Appendix III of Section XI, or Section V?
  - d. If UT will be used in lieu of a Section III RT, provide a comparison (advantages, disadvantages, detection sensitivity for different types of flaws, etc) of the different characteristic between the methods.
    - i. For (UT) examination, please describe the differences between a Section III and Section XI UT examination. The description should compare paragraphs/figures/tables with a proposed reconciliation. Items that should be included in the description are examination volume, examination coverage (scanning directions and transducers characteristics) and acceptance criteria.
    - ii. Include in the discussion any demonstrations performed on mock-ups and the types of flaws in the mock-up which demonstrates that the effectiveness of the UT in detecting construction repair related flaws. Are the flaws comprised of representative examples of flaws common to fabrication?
    - iii. Discuss any inspection anomalies and assumptions associated with the UT technique.
4. Please provide a discussion and cross-sectional sketch of the weld repair.

5. Provide a technical justification for granting relief from a welding process standpoint, to show that quality temper bead welds can be made with an ambient temperature automatic or machine GTAW temper bead process. This should include procedure qualification and other test data that make it clear from these results that the machine GTAW temper bead process has the capability of producing acceptable repair welds. These data should show acceptability from notch toughness test results as well as tensile and bend test results.
6. The Relief Request needs to detail the methods to be use for monitoring maximum interpass temperature for the welding. If there is a justification for not using thermocouples for temperature measurement, then this justification needs to be detailed in the Relief Request.
7. The Relief Request needs to detail the base metals, i.e., P-numbers and filler metal classification to be used in these repairs. According to Code both of the base metals in a dissimilar weld shall be qualified by test in which the base metals have been welded to each other and tested in accordance with ASME Section IX and the relief request.
8. Using the 1992 Edition of the Code, Section XI, IWA-4170 (b) "Repairs and installation of replacement items shall be performed in accordance with the Owner's design specification and the original construction code of the component or system." Later editions and addenda of the construction code or of Section III, either in their entirety or portions thereof, and code cases may be used. If repair welding cannot be performed in accordance with these requirements, the applicable requirements of I.A.-4200, IWA-4400, or IWA-4500 may be used.

Please provide an explanation as to why the repair cannot be formed according to Section III. If an alternative to IWB-4000 was determined necessary, explain why the repair should not be performed according to Section III requirements and an alternative requested from Section III.

9. IWA-4170(a) states that "The edition and addenda of Section XI used for the repair/replacement program will correspond with the edition and addenda identified in the inservice inspection program applicable to the inspection interval. Alternatively later editions and addenda of Section XI, either in their entirety or portions thereof, may be used for the repair/replacement program, provided these editions and addenda of Section XI at the time of the planned repair or replacement are acceptable to the enforcement and regulatory authorities having jurisdiction at the plant site."

Please provide an explanation for selecting portions (sentences) from Code and not address 50.55a(g)(4)(iv) states that "ISI [Inservice Inspection] of components and system pressure tests may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in paragraph (b) of this section, subject to the limitations and modifications listed in paragraph (b) of this section, and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met."

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N. Kalyanam, Project Manager, Section 1  
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