

May 12, 2006

Bill Eaton, BWRVIP Chairman  
Entergy Operations, Inc.  
Echelon One  
1340 Echelon Parkway  
Jackson, MS 39213-8202

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - BWRVIP-41, REVISION 1:  
BWR VESSEL AND INTERNALS PROJECT, BWR JET PUMP ASSEMBLY  
INSPECTION AND FLAW EVALUATION GUIDELINES  
(TAC NO. MD0048)

Dear Mr. Eaton:

By letter dated October 6, 2005, the Boiling Water Reactor Vessel and Internals Project (BWRVIP) submitted for NRC staff review, Electric Power Research Institute (EPRI) Technical Report (TR) 1012137, "BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (BWRVIP-41, Revision 1)." The BWRVIP-41, Revision 1 report provides the generic inspection strategy for ensuring the continued integrity of all jet pump safety functions and maintaining the design basis of the jet pump assembly.

The staff has determined that additional information is needed to complete the review. The staff's request for additional information (RAI) regarding the BWRVIP-41, Revision 1 report is enclosed. In order to complete the staff's review of the BWRVIP-41, Revision 1 report in an efficient and effective manner, your complete response to the enclosed RAI is required no later than six months from the date of this letter. If you cannot provide a complete response within six months, please contact Meena Khanna at (301) 415-2150 to discuss the withdrawal of the BWRVIP-41, Revision 1 report and its future resubmittal when you are prepared to respond to the RAI. In addition, if you have any other questions regarding the enclosed RAI, please contact Ms. Khanna.

Sincerely,

*/RA/*

Matthew A. Mitchell, Chief  
Vessels & Internals Integrity Branch  
Division of Component Integrity  
Office of Nuclear Reactor Regulation

Project No. 704

Enclosure:  
Request for Additional Information  
cc: BWRVIP Service List

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REQUEST FOR ADDITIONAL INFORMATION  
BWRVIP-41, REVISION 1  
BWR JET PUMP ASSEMBLY INSPECTION AND FLAW EVALUATION GUIDELINES

RAI No. 41-1

- (a) The staff requests that the Boiling Water Reactor Vessel and Internals Project (BWRVIP) discuss how the predicted life of the jet pump holddown beams for Groups 2 and 3 designs is calculated.
- (b) The BWRVIP report states that the predicted life was calculated based on statistical evaluations. The staff requests that the BWRVIP clarify whether a stress analysis or fracture mechanics analysis was used.
- (c) The staff requests that the BWRVIP discuss how the probability of failure for the beams is calculated. In addition, the staff requests that the BWRVIP describe the link from life prediction and probability of beam failure to the inspection strategy for the holddown beams.

RAI No. 41-2

In Section 2.3.3.7 of the BWRVIP-41, Revision 1 report, the BWRVIP states that "... there is currently no inspection technique developed to inspect the thermal sleeve welds. The BWRVIP is pursuing analyses which may reduce or alleviate inspection of the TS-1 through TS-4 welds. Inspection is recommended when technique or accessibility become available..." The staff requests that the BWRVIP provide a discussion of its analysis or inspection strategy for the thermal sleeve welds and include this information in the -A version of the BWRVIP-41, Revision 1 report.

RAI No. 41-3

In Section 2.3.11.7 of the BWRVIP-41, Revision 1 report, the BWRVIP states that inspection of jet pump adapters (AD-1 and AD-2) will be recommended once techniques are developed. The staff requests that the BWRVIP discuss the status of the inspection technique development. The staff will consider this issue to be an open item until the inspection techniques are developed and incorporated in the -A version of the BWRVIP-41, Revision 1 report.

RAI No. 41-4

- (a) As shown in Table 3.3-1 of the BWRVIP-41, Revision 1 report, the BWRVIP recommends that all jet pump holddown beams for BWR/3 and Group 1 designs be replaced at the next refueling outage. The staff requests that the BWRVIP provide the strategy for the baseline inspection and re-inspection for the replacement beams at the BWR/3 and Group 1 designs.
- (b) The staff requests that the BWRVIP provide an inspection strategy for successive examinations for all holddown beams if an indication is detected in the BB-1, BB-2 or BB-3 jet pump locations.

ENCLOSURE

- (c) For Groups 2 and 3 designs, the BWRVIP recommends "...UT [ultrasonic testing] or other acceptable NDE [non-destructive examination]..." The staff requests that the BWRVIP specify "other acceptable NDE," or provide criteria which can be used to determine what other NDE options may be acceptable.

RAI 41-5

Table 3.3-1 of the BWRVIP-41, Revision 1 report provides a matrix of inspection options for the various jet pump locations. With respect to the inspection of the BB-1, BB-2, and BB-3 jet pump locations, the staff is not clear on the baseline inspection and re-inspection strategy for Group 2 and 3 designs. The baseline inspection strategy would allow Group 2 and Group 3 designs to perform a baseline inspection at or before the [ ] of service, respectively. If a licensee performs a baseline inspection at the [ ] of service it would defeat the purpose of the baseline inspection, which should be conducted as early as possible. The staff believes that a condition should be imposed in the baseline inspection strategy to disallow the inspection of the holddown beams at the end of the [ ] period. Therefore, the staff requests that the BWRVIP confirm that for the Group 2 design that has more than [ ] of service and the Group 3 design that has more than [ ] of service, baseline inspections are performed immediately in order to satisfy the inspection strategy in Table 3.3-1 of the BWRVIP-41, Revision 1 report.

RAI 41-6

- (a) In Table 3.3-1 of the BWRVIP-41, Revision 1 report, with respect to the WD-1 jet pump location, the BWRVIP states that "[ ]" [ ] because it is the staff's understanding that the re-inspection is already reduced to [ ] as stated in the first sentence of the above quotation.
- (b) The staff requests that the BWRVIP provide the technical basis of the re-inspection strategy since it is not presented in Section 2.3.8.7 of the BWRVIP-41, Revision 1 report.

RAI 41-7

In Section 5.1.2.1 of the BWRVIP-41, Revision 1 report, the BWRVIP provides guidance on how to evaluate the circumferential cracks in the riser, inlet-mixer, and diffuser. The staff requests that the BWRVIP provide a discussion and justify why guidance was not provided for the axial cracks in these components.

RAI 41-8

With respect to Section 5.1.2.3 of the BWRVIP-41, Revision 1 report, the staff requests that the BWRVIP identify the actions that must be taken when (1) the actual flaw size exceeds the allowable flaw size and (2) the actual flaw size is less than the allowable flaw size. The staff assumes that even though the actual flaw size is less than the allowable flaw size, the flaw will be monitored for growth.

RAI 41-9

Inspection of most jet pump components is based on visual examinations, which identify the length, not the depth of the flaw. However, jet pump beams are required to have ultrasonic examinations, which provide depths and lengths of the flaw. The staff noted that the allowable flaw size equation in Section 5.1.2.3 of the BWRVIP-41, Revision 1 report applies to flaw length only.

- (a) The staff requests that the BWRVIP discuss whether the allowable flaw size equation in Section 5.1.2.3 of the BWRVIP-41, Revision 1 report can be used to calculate the allowable depth of the flaw.
- (b) The staff requests that the BWRVIP discuss whether the flaw would be accepted based on the length criterion or depth criterion or both, if a flaw is detected ultrasonically.
- (c) The staff requests that the BWRVIP provide an allowable flaw depth equation.