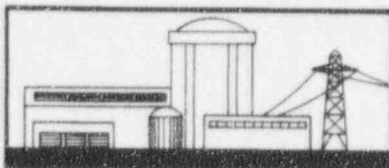


THE B&W OWNERS GROUP

Duke Power Company
Entergy Operations, Inc.
Florida Power Corporation

Oconee 1, 2, 3
ANO-1
Crystal River 3



GPU Nuclear Corporation
Toledo Edison Company
Framatome Technologies, Inc.

TMI-1
Davis-Besse

Working Together to Economically Provide Reliable and Safe Electrical Power

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November 22, 1996
OG-1627

Project No. 683

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Thomas T. Martin, Director
Division of Reactor Program Management

Subject: B&WOG Generic License Renewal Program
"Demonstration of the Management of Aging Effects for the
Pressurizer Topical Report," BAW-2244, August 1995.

Gentlemen:

By letter dated September 13, 1996, the NRC Staff provided the Draft Safety Evaluation (DSE) for BAW-2244. The DSE contained three open issues which were the subject of a November 6, 1996 meeting between the Staff and the B&WOG Generic License Renewal Program (GLRP). Attached are responses to the three open issues.

The GLRP has observed that the Staff has generally taken a conservative approach when evaluating that aging effects are not a concern and in accepting established utility programs that manage aging effects. This conservatism has manifested itself in the staff recommending that renewal license applicants perform two new augmented inspections on the pressurizer that go beyond those dictated by the code governing bodies (e.g., ASME Code Section XI). While the

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GLRP obviously supports showing that all known aging effects are managed by programs both in the current and extended period of operation, we believe that these new augmented inspections should be pursued through the code governing bodies. As such, our general response will be to defer the resolution of these two items to the plant-specific application to give time for the code governing bodies to become involved in the evaluation and recommended resolution of these two items.

In another topic, during the November 6, 1996 meeting, we also discussed the following from pages 29-30 of the DSE:

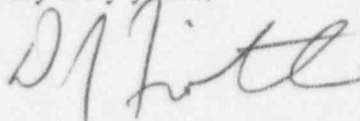
"7. Since the report was not meant to be a complete listing of the pressurizer components subject to an aging management review for the B&WOG GLRP member plants as required by 10 CFR 54.21(a)(1) nor did it describe and justify any methodology for the generation of such a list as required by 10 CFR 54.21(a)(2). Individual plant applicants will need to identify and list pressurizer components subject to an aging management review and provide a methodology for developing this list as part of their license renewal applications."

The GLRP indicated that this report contains a complete listing of all the pressurizer components subject to an aging management review and that the member plants did not anticipate providing any further identification or listing of pressurizer components or description of the methodology for developing such a list of pressurizer components in their license renewal applications. The Staff indicated that they would review this action item and determine if it could be deleted.

Finally, we call your attention to the fact that the utilities participating in the preparation of this generic topical report have changed since the report was first submitted. Florida Power Corporation dropped out of the GLRP in April 1996, so the report no longer applies to the Crystal River-3 unit.

The GLRP appreciates the Staff's efforts as we near the completion of this review. If there are any questions on the attached response, please call me at 804-832-3635.

Very truly yours,



David J. Firth, Director
B&WOG Generic License Renewal Program

DJF/bcc
Attachments

c: J. P. Moulton - ONRR
B&WOG GLRP Team Members

NRC OPEN ITEM	OPEN ITEM	GLRP RESPONSE	STATUS	PROPOSED REVISION TO BAW-2244	REMARKS
DSE-1	<p>Cracking of Stainless Steel Cladding inside the pressurizer vessel (Section 3.2.1 of the safety evaluation)</p> <p>The staff noted that cracking in cladding could potentially propagate into the base metal material and should be addressed by an aging management program. Industry experience at one site has shown that this is a potential aging effect. The staff maintains that cracking of the stainless steel is a potential aging effect that should be addressed by an aging management program for the period of extended operation. A program to provide a reasonable demonstration of the integrity of the pressurizer cladding could be a one-time inspection for license renewal. The inspection should include the cladding and any attachment welds to the cladding. The additional inspection would provide information on condition of the cladding or if cracking is discovered that the underlying base metal is not degraded due to the clad cracks. The staff notes that the inspection technique chosen (i.e. surface or volumetric) must be capable of adequately determining the condition of the cladding and must be submitted for staff review and approval. Without such additional demonstration provided, the staff cannot conclude that all aging effects applicable to the pressurizer vessel cladding have been adequately addressed by the aging management programs delineated in the report for the period of extended operation.</p>	<p>The GLRP maintains the position that cracking of stainless steel cladding, including attachment welds to cladding, is not an applicable aging effect. The industry operating experience (Haddam Neck) cited by the staff is not applicable to the B&W designed plants owing to differences in design, fabrication, and operation. The GLRP maintains that the cracking experienced at Haddam Neck was not attributed to the normal aging of the pressurizer. The cracking was either attributed to the spray of cold water from the spray nozzle during a low water level transient in the 1970 time frame, or present during initial startup. Since the initial detection of the Haddam Neck pressurizer clad cracking, the existing indications have been reexamined and found not to propagate due to normal conditions of operation.</p> <p>Further, in response to NRC concerns, Southern California Edison Company performed a remote visual inspection of the internal clad surface of their San Onofre Unit 1 pressurizer (same design as the Haddam Neck pressurizer). No evidence of clad cracking was noted.</p> <p>The GLRP does not consider pressurizer clad cracking an applicable aging effect for the period of extended operation. The GLRP defers resolution, including alternate reasoning for a one-time inspection, to the plant specific renewal application.</p>	Open	None	<p>At the 11/6/96 meeting, between the GLRP and the NRC regarding the DSE for the pressurizer, the GLRP maintained that the cracking experienced at Haddam Neck was event driven. The NRC responded by suggesting that additional data would be needed to support the event driven hypothesis. Specifically, the NRC suggested that the conditions surrounding the event that caused the clad cracking at Haddam Neck would need to be defined. In addition, the B&W plants would need to review their operating history to ensure that similar conditions have never occurred to date, and must take measures to ensure that these conditions would not occur in the future.</p> <p>As an alternative, the NRC suggested that a one-time visual inspection of the pressurizer cladding, at each operating plant, at or near the end of the current term of operation would be acceptable.</p>
DSE-2	<p>Cracking of Stainless Steel Safe Ends (Section 3.2.2.1 of this safety evaluation)</p> <p>The staff noted that the B&WOG indicates that general stress corrosion cracking (SCC) of stainless steel safe ends is not considered an applicable aging effect because of reactor coolant chemistry control. The staff disagrees with the B&WOG that general SCC of stainless steel safe ends is not an</p>	<p>The GLRP does not agree that cracking of stainless steel safe ends owing to SCC is an applicable aging effect, as discussed in Open Item 2. SCC has not been observed in stainless steel safe ends at any of the participating plants. The GLRP does agree with the NRC text in Section 3.2.2 that a water chemistry program can maintain an environment where parameters are kept within required limits so as to preclude SCC of stainless steel safe ends. The GLRP agrees</p>	Closed	<p>Page 3-17--line 37 Delete the last sentence of that paragraph and replace with the following text. The reactor coolant chemistry program is an aging management program that is credited to preclude aging effects and is discussed in Section 4.0.</p> <p>Page 4-3--Technical Specifications Delete the first two sentences (beginning with line 20) and replace with the following text:</p> <p>The aging management elements contained in the Plant</p>	<p>At the 11/6/96 meeting, between the GLRP and the NRC regarding the DSE for the pressurizer, the NRC agreed to change the wording in the DSE from "...the presence of a water chemistry program is to inhibit cracking..." to "...the presence of a water chemistry program is to preclude cracking...". The GLRP agreed to credit RCS</p>

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	applicable aging effect because of the implementation of a water chemistry program. The presence of a water chemistry program is to inhibit cracking of stainless steel and does not preclude consideration of SCC as an aging effect. Therefore, the B&WOG should propose a program to manage general SCC of stainless steel safe ends.	that the primary water chemistry program is an aging management program. Statements made in Sections 3.0, 4.0, and 5.0 that primary water chemistry is required to validate the design basis of the component will be modified to include appropriate references to an aging management program.		<p>Technical Specifications include primary leakage limits, primary water chemistry requirements (primary water chemistry requirements are found in the FSAR for those plants using Standard Technical Specifications), and surveillance requirements. All of these ...</p> <p>Delete the following sentence, which appears on page 4-3, line 39, and page 5-2, line 45. The reactor coolant chemistry requirements are required to ensure that the design basis of the component is maintained.</p> <p>Page 4-19--Under Programs, (Surge Nozzle SE & PRN Long Neck Welds), add: <u>Technical Specifications - Primary Water Chemistry Requirements</u></p> <p>The Technical Specifications primary water chemistry requirements manage cracking of stainless steel safe ends.</p>	water chemistry as an aging management program.
DSE-3	<p>Aging management of pressurizer heater penetration welds (Section 3.3.2.2.4 of this safety evaluation)</p> <p>The staff regards the provision for examination of pressurizer heater penetration welds in ASME Code Section XI "Examination Category B-E" as applicable to pressurizer heater partial penetration welds. The B&WOG considers the "Examination Category B-E" requirement not applicable to the B&W design because "Examination Category B-E" concerns pressure retaining partial penetration welds in vessels. The B&WOG states that, "Although the 'Parts Examined' listing under Item B4.20 of 'Examination Category B-E' uses the term 'Heater Penetration Welds,' the 'Extent and Frequency of Examination' specifically requires only 'All Nozzles' to have examination." There are no heater penetration nozzles or pressure retaining heater nozzle partial penetration welds in the vessels of the B&W pressurizer design." The staff disagrees with the</p>	<p>The heater penetration welds at the B&W designed plants are structural welds that connect the heater sheaths to diaphragm plates (or heater sheaths to heater sleeves and heater sleeves to diaphragm plates for ONS-1 and TMI-1). These welds are partial penetration welds, and the NRC suggests that these welds should be examined in accordance with ASME Section XI, Examination Category B-E. However, the heater penetrations at the B&W designed plants are considered to be part of the bolted closure consisting of the diaphragm plate, cover plate, and associated bolting. As such, the closure is inspected visually for leakage each refueling outage and during each hydrostatic test in accordance with Examination Category B-P.</p> <p>A review of the ISI plans for the participating utilities was performed to determine if insulation is removed from the heater bundle area during the B-P examination in accordance with IWA-5242. ONS-1,2,3 has permanently removed the insulation from the heater bundle area and performs a visual examination (VT-2) of each heater bundle/closure area in accordance with Examination Category B-P. TMI-1 removes</p>	Open	None.	At the 11/6/96 meeting, between the GLRP and the NRC regarding the DSE for the pressurizer, the NRC suggested that a commitment to inspect selected pressurizer heater partial penetration welds of one heater bundle at one operating plant, at or near the end of the current operating term, would be acceptable. The NRC suggested that the inspection could be performed when a heater bundle is replaced owing to inoperable heater elements.

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	<p>B&WOG assessment.</p> <p>The B&W pressurizer heaters are inserted through holes in the pressurizer heater bundle diaphragm plates and the heater sheaths (or heater sleeves at ONS-1 and TMI-1) are attached to the diaphragm plates on the inside by partial penetration welds. The staff does not believe that the B&W heater penetrations are substantially different from other vendor designs, except that the B&W heaters are mounted on the diaphragm plates bolted to the side of the pressurizer shell and are mounted horizontally while other heaters are inserted through the bottom of the pressurizer and are mounted vertically. "Examination Category B-E" explicitly states that the pressurizer heater penetration welds are to be examined. Therefore the staff considers the pressurizer heater partial penetration welds pressure retaining, and subject to the requirements set forth in ASME Code Section XI "Examination Category B-E." Operating experience has shown that pressurizer heater partial penetration welds may be susceptible to cracking. To provide reasonable assurance that cracking of the heater penetration welds and the heater sheath-to-sleeve welds (ONS-1 and TMI-1) can be detected, the staff feels an additional more intrusive inspection technique is necessary. The staff would consider ASME Code Section XI "Examination Category B-E," together with an inspection program consisting of surface examinations, the criteria and technique of which would be developed at a later date and subject to staff approval, acceptable for managing the effects of aging during the period of extended operation for the pressurizer partial penetration heater sheath-to-heater bundle diaphragm plate welds, heater sleeve-to-heater bundle diaphragm plates welds and heater sheath-to-heater sleeve welds.</p>	<p>the insulation surrounding one or more heater bundles and performs a visual examination (VT-2) in accordance with Examination Category B-P (bundle inspection rotated during the interval). ANO-1, at this time, performs a visual examination (VT-2) of the heater bundle/closure area in accordance with Examination Category B-E.</p> <p>The GLRP believes that inspection of the closure containing the heaters in accordance with Examination Category B-P provides an equivalent or superior level of inspection standard when compared to Examination Category B-E. Specifically, Examination Categories B-E and B-P are identical with respect to parts examined, test requirements, examination method (i.e., VT-2), and acceptance standards. However, Examination Category B-P requires that a visual examination (VT-2) be performed each refueling outage and during the hydrostatic test or in accordance with plant specific ISI plans, whereas Examination Category B-E requires that a visual inspection (VT-2) be performed only during the hydrostatic test. As further justification of our position, it is noted that Examination Category B-E was deleted from the 1993 Addenda of ASME Section XI owing to duplications with the requirements of Examination Category B-P.</p> <p>Thus, all participating plants examine the heater bundle region via Examination Category B-P or B-E. Either examination category is acceptable. However, with the elimination of Examination Category B-E, in the 1993 Addenda of ASME Section XI, all plants will examine the heater bundle/closure area in accordance with Examination Category B-P as they update their ISI program.</p> <p><u>Surface Inspection of the Partial Penetration Welds</u></p> <p>The NRC suggests that a surface examination be performed of the partial penetration welds to assure the integrity of these welds for the period of extended operation. The GLRP</p>			

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		<p>does not agree that surface inspection of the partial penetration welds will provide additional assurance of the integrity of the closure and provides the following justification.</p> <p>The subject structural welds were visually inspected during the preservice examination and were found to be acceptable. At present, there is no history of service-induced degradation of these welds, and it is believed that there is a low probability of service-induced cracking owing to low service loadings. Even if cracking of the partial penetration welds were to occur during the service life of the component, the structural integrity of the heater bundle closure would not be compromised during a design basis event.</p> <p>In addition, inspection of the partial penetration welds would be very difficult owing to severe access limitation on the interior of the pressurizer. Surface inspection would require that the diaphragm plate to heater forging seal weld be broken and the entire heater bundle assembly be removed from the vessel thus increasing critical-path outage time, radiation dose during examination of the weld, and cost required to perform the examination.</p> <p>The GLRP contends that the requirement to perform a surface examination of the heater penetration welds results in a hardship that is not technically justified and is not a commensurate safety concern. The GLRP maintains that Examination Category B-P in combination with Technical Specification leakage limits provides an acceptable alternative to visual inspection of the partial penetration welds. Leak detection provides reasonable assurance that the structural integrity of the heater bundle closures will be maintained during the period of extended operation. The GLRP defers resolution, including alternate reasoning for a one-time inspection, to the plant specific renewal application.</p>			