APPENDIX B, TABLE B.2.3

DISPOSITION OF NEI COMMENTS ON CHAPTER IV OF GALL REPORT

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Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-1a	General comments	(a) Further evaluation should not be required where existing programs manage applicable aging effects. The meaning of the "Further Evaluation Recommended" column is not clear.	What is meant by "Further Evaluation Recommended?" Every entry has a yes in this column implying that every item requires an evaluation. If the GALL report is to be a useful document, credit for existing programs that are found to be sufficient should be given without the requirement for further evaluation.	The column "Further Evaluation" identifies one or more of the 10 elements of the existing AMP that need augmentation and require further evaluation. If existing programs manage applicable aging effects and no further evaluation is required then a "no" is placed in the column. This comment was simply requesting clarification. The GALL report was not revised to address this comment.
G-IV-1b	General comments	(b)The table should be arranged by common RCS components as follows: reactor vessel (BWR & PWR), vessel internals (BWR & PWR), RCS piping and valves (BWR&PWR), RCS Pumps (BWR&PWR), and steam generators (PWR).		The arrangement proposed by NEI is generally followed in the GALL report. Making a separate section for pumps does not provide added value since the region of interest for the pumps is only the pressure boundary. There is no substantial advantage to be gained by the suggested reformatting. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-1c	General comments	(c) In addition, it is not clear that aging effects for which ISI is done today will be required for the period of extended operation. For example, cracking at vessel welds (e.g., pressurizer, RV, and primary side of OTSGs), nozzle welds, and piping welds is not addressed anywhere, thus implying that Examination Categories B-A, B-B, B-D, and B-J may be discontinued for license renewal. This conclusion is not consistent with the NRC's findings in BAW-2243A, BAW-2244A, BAW-2251A, and the Oconee License Renewal Application.		The GALL report describes the existing aging management programs (AMPs) that may be used to satisfy the requirements of 10 CFR 54. The requirements in 10 CFR 50.55a are for both the current and license renewal terms. The requirements of both 10 CFR 50.55a and 10 CFR 54 must be satisfied during the license renewal term. Cracking at vessel welds was not viewed to be a credible aging effect by NRC and thus is not included in the GALL report. The GALL report was not revised to address this comment.
G-IV-2	B2.1.1, B2.1.4, B2.1.7+ for W internals B3.1.1, B3.1.3+ for CE internals B4.1.1, B4.1.5+ for B&W internals No BWR items at this time	The GALL report states that "The reactor vessel internals receive a visual inspection (VT-3) according to Category B-N-3 of Subsection IWB, ASME Section XI. This inspection is not sufficient to detect the effects of changes in dimension due to void swelling." While the VT-3 examination is capable of detecting significant changes in dimension. At issue is the ability to visually detect loss in ductility. Therefore, the GALL and the SRP-LR should be revised to read "This inspection is capable of detecting significant changes in	The GALL and the SRP-LR should recognize the capability of visual examination to detect significant changes in dimension caused by void swelling, with significant defined to be a dimensional change of 5 % or more. The likely outcome of the industry programs will be to recommend examination of the most affected internals locations, such as baffle/former assemblies (Items B2.4.1 and B2.4.2) in Westinghouse plants. The GALL document would be greatly simplified, and the most affected locations would continue to	The NEI comment is too general and will not be incorporated until reactor vessel internals research programs resolve the void swelling issue. For additional modifications to GALL based on similar comments, see NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-2 (cont.)		dimension, but is not sufficient to detect loss of ductility directly." Too many components are called out in the GALL report. Only the most affected locations should be listed in the GALL report, such as baffle/former assemblies (Items B2.4.1 and B2.4.2) in Westinghouse plants.	be adequately covered by these changes.	
G-IV-3	C1.1.13 (BWR), C2.1.5 (PWR)	The GALL report should be changed so that, for PWR Class 1 small-bore piping, SCC and Unanticipated Thermal and Mechanical Loading are separated. The column labeled Aging Mechanism for one of these will be stress corrosion cracking (SCC) and the other will be Unanticipated Thermal and Mechanical Loading.	Separating these two aging mechanisms permits the industry to comment on two separate GALL entries. The industry considers that Unanticipated Thermal and Mechanical Loading is not a valid aging effect, but rather a design consideration. The industry does not agree that SCC of Class 1 small-bore piping is an issue that should be addressed for license renewal. The combination of material selection, reactor coolant chemistry control, ASME Code Section XI surface and visual examinations, and plant leak detection monitoring systems, are sufficient to address SCC for Class 1 small-bore piping. The report recommends that "A plant-specific destructive examination or a nondestructive examination (NDE) that permits inspection of the inside surfaces of	It is not necessary to separate stress corrosion cracking (SCC) and unanticipated thermal and mechanical loading because the effect can be synergistic. Operating experience demonstrates that small-bore piping has an aging effect that requires managing in the extended term. GALL recommends that a plant-specific destructive examination or a nondestructive examination (NDE) that permit inspection of the inside surfaces of the piping needs to be conducted. For Class 1 piping with a diameter smaller than nominal pipe size (NPS) 4 inch, GALL recommends the one-time inspection be performed to confirm whether crack initiation and growth due to stress corrosion cracking (SCC) or cyclic loading is occurring or not. This one-time inspection can also verify the effectiveness of the chemistry program.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-3 (cont.)			the piping" be performed "to ensure that cracking has not occurred and the component intended function will be maintained during the extended period." This should not be necessary when reactor coolant chemistry programs and plant detection systems are in place.	The GALL report was not revised to address this comment.
G-IV-4	A2.3.1, A2.3.3	The GALL report extends the concern for irradiation embrittlement to reactor vessel inlet and outlet nozzles, and to safety injection nozzles, for PWR plants. GALL should add the following sentences in the column labeled "Evaluation and Technical Basis:" (1) The applicant may choose to demonstrate that the materials in the inlet, outlet, and safety injection nozzles are not controlling for the TLAA evaluations. The applicant may choose to demonstrate that the materials in the inlet, outlet, and safety injection nozzles are not controlling, so that such materials need not be added to the material surveillance program for the license renewal term. (2) The GALL report also states that "Appendix H to 10 CFR Part 50 requires the reactor vessel materials surveillance program to meet the	License renewal applicants have been able to demonstrate that, while nozzle course materials may exceed the neutron fluence threshold of 10^{17} n/cm^2 (E>1 MeV), these materials are not controlling (i.e., traditional beltline base metal and weld materials control PTS limits, pressure-temperature limits, LUST limits, and material surveillance capsule requirements). Other license renewal applicants should have the same opportunity to provide the same type of demonstration.	This comment is similar to several other comments where NEI is suggesting that the threshold should be raised to 10E21. In order to address these type comments the following was modified in GALL. The threshold or trigger value should not be changed to 10E21 as NEI commented because of the lack of data to support this value as a threshold. The GALL recommendation is that the most susceptible locations should be monitored and inspected and it is not necessary to identify all locations exceeding 10E17. For the vessel, the threshold must stay at 10E17 to be consistent with 10 CFR 50 Appendix H. See NRC disposition of NEI comment GIVB3-17 in this Appendix B, Table B.2.3. The GALL was revised by recommending use of an enhanced visual inspection to

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-4 (cont.)		American Society for Testing and Materials (ASTM) E 185 Standard. However, the surveillance program in ASTM E 185 is based on plant operation during the current license term, and additional surveillance capsules may be needed for the period of extended operation."		detect tight cracks in non-bolted applications. Then, no further evaluation will be required for these components. This option is for SCC/IASCC and neutron embrittlement, and the response in "Further Evaluation" column was changed to "no." Specifically, a new program in GALL chapter XI was developed to articulate this approach. The program includes (a) augmentation of the inservice inspection (ISI) in accordance with the American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (1995 edition through the 1996 addenda, or later edition as approved in 10 CFR 50.55a) for certain susceptible or limiting components or locations, and (b) monitoring and control of reactor coolant water chemistry in accordance with the EPRI guidelines in TR-105714 to ensure the long-term integrity and safe operation of pressurized water reactor (PWR) vessel internal components. Augmentation of the ASME Section XI ISI includes enhanced visual examinations of non-bolted components, and other demonstrated acceptable methods for bolted components. The

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-4 (cont.)				inspection methods for bolted components must be submitted for the NRC staff review beginning of the license renewal period. The program is focused on managing the effects of crack initiation and growth due to stress corrosion cracking (SCC) or irradiation assisted stress corrosion cracking (IASCC), and loss of fracture toughness due to neutron irradiation embrittlement or void swelling. The program contains preventive measures to mitigate SCC or IASCC; ISI to monitor the effects of cracking on the intended function of the components; and repair and/or replacement as needed to maintain the ability to perform the intended function. Loss of fracture toughness is of consequence only if cracks exist. Cracking is expected to initiate at the surface and should be detectable by augmented inspection. The program provides guidelines to assure safety function integrity of the subject safety-related reactor pressure vessel internal components, both non-bolted and bolted components. The program consists of the following elements: (a) identify the most susceptible or limiting items, (b) develop appropriate inspection techniques to permit detection and characterizing

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-4 (cont.)				of the feature (cracks) of interest and demonstrate the effectiveness of the proposed technique, and (c) implement the inspection during the license renewal term. For non-bolted components, this program recommends enhanced visual examinations. For bolted components, this program recommends other demonstrated acceptable inspection methods; these methods must be submitted for the NRC staff review beginning of the license renewal period. A comment was made at the January 25th meeting that we should only use the enhanced VT-1 as an example. GALL was verified to contain enhance VT-1 as an example. Specifically for this NEI comment, applicable for both PWR and BWR reactor vessel nozzles, was addressed. (a) The first sentence in (1) applies to TLAA situation on pg. IVA2-15, the first row (August 2000 version of GALL). In NUREG-1801, Vol. 2, the sentence "The applicant may choose to demonstrate that the materials in the inlet, outlet, and safety injection nozzles are not controlling for the TLAA evaluations" was incorporated into the AMPs for

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-4 (cont.)				line items A1.3-e (earlier designation A1.3.4) and A2.3-a (earlier designation A2.3.1-A2.3.3). (b) The second sentence in (1) applies to the second row on p. IV A2-15 (August 2000 version of GALL). In NUREG-1801, Vol. 2, AMP XI.M31 "Reactor Vessel Surveillance" the sentence "The applicant may choose to demonstrate that the materials in the inlet, outlet, and safety injection nozzles are not controlling, so that such materials need not be added to the material surveillance program for the license renewal term" was added as item #8 in the program description. The GALL report was revised to address this comment.
G-IV-5	A2.2.1, A2.7.1, A2.7.2, C2.5.6, C2.5.10	Chapter IV of the GALL report should be revised to eliminate the augmented program requirements for bottom head instrumentation tubes (Item A2.7.1), the vessel head vent pipe (Item A2.7.2), pressurizer instrument penetrations (Item C2.5.4), and pressurizer heater sheaths and sleeves (Item C2.5.6).	The justification for the adequacy of existing activity for Ni-Fe-Cr CRDM nozzles is based on the following information from the GALL report: The program includes inservice inspection (ISI) in accordance with ASME Subsection IWB, Table IWB 2500-1 or, for susceptible components and locations, implementation of an integrated, long-term inspection program based on the guidelines of NRC Generic Letter (GL) 97-01 to detect cracks or coolant leakage.	The AMP for Item A2.2.1 (Control Rod Drive Head Penetration) is sufficient for Items A2.7.2 and A2.7.3. For bottom head instrumentation tubes (Item A2.7.1), pressurizer instrument penetrations (Item C2.5.6) and pressurizer heater sheaths and sleeves (Item C2.5.10) credit is given for Inservice Inspection for Class 1 components and Water Chemistry and the applicant provides a plant-specific

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-5 (cont.)			Preventive measures are in accordance with EPRI guidelines in TR-105714 to mitigate primary water stress corrosion cracking (PWSCC). Control of halogens, sulfates, and oxygen in the primary water to less than 0.05, 0.05, and 0.005 ppm, respectively, during operation, and monitoring and control of water chemistry during shut down, mitigate potential of PWSCC. The applicant performs a susceptibility assessment in accordance with the most current industry susceptibility model and inspection results, to define the most susceptible components and locations to be included in a periodic inspection program. The susceptibility assessment is performed in accordance with the guidelines of GL 97-01, in order to determine the need for an augmented inspection program of nozzle welds, including a combination of surface and volumetric examination. However, several of these same justifications are apparently insufficient for bottom head instrumentation tubes (Item A2.7.1), the vessel head vent pipe (Item A2.7.2), pressurizer instrument penetrations (Item C2.5.4), and	AMP or participate**s** in industry programs to determine appropriate AMP for PWSCC of Inconel 182 welds. The GALL report was revised to address this comment by eliminating the need for an augmented program (plant specific program) for the vessel closure head penetrations such as vessel head vent pipe (Item A2.7.2) and other top head penetration (new Item A2.7.3 added) because they are covered by GL 97-01.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-5 (cont.)			pressurizer heater sheaths and sleeves (Item C2.5.6). This should not be the case. Insufficient credit is given for the reactor coolant water chemistry program and its combination with ASME Code Section XI Examination Category B-P visual (VT-2) inspections. It would appear that some form of susceptibility evaluation is required, along with the water chemistry program and an inservice inspection program, in order for adequacy to be demonstrated. Considering that the CRDM nozzles are lead indicators of potential PWSCC, and considering the lower level of risk associated with leakage from Ni-Fe-Cr components other than the CRDM nozzles, the combination of water chemistry control and Examination Category B-P inspections should be found to be adequate.	
G-IV-6	B2.1.3, B2.1.7, B2.4.2, B2.5.5, B2.5.7, W Plants B3.2.2, B3.4.2, B3.4.3, CE Plants	SRP-LR Section 3.1.2.2.9 states that loss of preload due to stress relaxation could occur in PWR reactor vessel internal bolts and screws of B&W design. The SRP-LR references the GALL report for recommendations for inservice inspection activities to manage loss of preload.	No justification is provided in the GALL report for determining that existing aging management activities for Items B3.4.2 and B3.4.3 for CE plants, and Item B4.3.4 for B&W plants require augmentation. The GALL report says that “However, VT–3 inspection may not be adequate to detect the loss of mechanical	The wording for AMP description for Item B2.1.3 and other similar items in Section B2 and B3 (related to stress relaxation and loss of preload) have been revised as follows: For items B2.1.7 and B2.5.7, an acceptable AMP requiring no further evaluation includes visual inspection

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-6 (cont.)	B4.3.4 B&W Plants Other items in B&W plants: B4.9.2, B4.5.2, B4.5.3, B4.5.5, B4.6.3, B4.6.7, B4.7.2	However, the GALL report is not consistent on the evaluation of aging management activities. Items B2.1.3, B2.1.7, B2.5.5, and B2.5.7 for W plants and Item B3.2.2 for CE plants are consistently evaluated. For the W plant items, the GALL report states that: "Visual inspection (VT–3) is performed according to Category B–N–3 of Subsection IWB, ASME Section XI to monitor the relevant conditions of degradation, and loose part monitoring and/or neutron noise monitoring (excore detectors) to detect core barrel motion." However, the GALL report should be changed so that the aging management activities for Items B3.4.2 and B3.4.3 for CE plants, and Item B4.3.4 for B&W plants require no further evaluation.	closure integrity in components. An augmented inspection program to determine critical locations and appropriate monitoring and inspection techniques may be necessary." This statement could also be made about Items B2.1.3, for example, but the finding by the NRC staff was that the existing activities were adequate. The GALL report also says, "Because VT–3 inspection can only detect degradation that occurs after the loss of preload, in some cases, enhanced inspection may be required." While this may be so, the NRC staff has made findings elsewhere that are not consistent with requiring enhanced inspection. Generally, the finding of adequacy in spite of detection of loss of preload is based on redundancy. Therefore, the enhanced inspection requirements for baffle/former bolts are understandable. Other enhanced inspection requirements are not justified.	performed according to Category B-N-3 of Subsection IWB, ASME Section XI, and either neutron noise monitoring or loose part monitoring to detect relevant conditions of degradation. For remaining items other than baffle bolts (items B2.42 and B4.5.5), an acceptable AMP requiring no further evaluation includes visual inspection performed according to Category B-N-3 of Subsection IWB, ASME Section XI, and loose part monitoring to detect relevant conditions of degradation. The GALL report was corrected for Items B3.4.2 and B3.4.3 (CE plants). For these two items, further evaluation is not needed. This was a misprint. Regarding Item B4.3.4 and other items in B&W plants (there was no item B4.9.2, this was an NEI misprint), ISI in accordance with Section XI, Subsection IWB alone needs to be augmented. This disposition is based on the following information from the Oconee SER (pp. 3-120, 3-121, NUREG-1723): Duke is participating in industry programs to investigate the effect of stress relaxation along with other aging mechanisms. Based on the results of these programs, Duke will be developing an inspection

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-6 (cont.)				program for the RVI. GALL report recommends ISI and loose part monitoring. The GALL report was revised to address this comment as stated above.
G-IV-7	A2.2.2, B2.1.2, B2.5.3, B2.5.4, W Plants B3.2.1, B3.5.4, CE Plants B4.3.2, B4.4.3, B4.4.4, B&W Plants B1.4.8, B1.5.1, C1.1.6 to C1.1.11, C1.2.1, C1.3.1, C1.3.2, BWR Plants C2.1.1 to C2.1.3, C2.2.7, C2.3.1, C2.4.1,	(a) Chapter IV and Chapter XI of the GALL report should be changed to find ASME Code Section XI periodic inservice inspection requirements (Examination Category B-N-3) for CASS internals components adequate for managing the effects of thermal aging embrittlement. (b) Chapter IV and XI should be revised to recognize that the limiting base metal for CASS piping thermal aging embrittlement effects may be the 0.5-inch of base metal on either side of welds inspected in accordance with the ASME Code Section XI Examination Category B-J. (c) The 25 % limit on delta ferrite for which the comparison of SAW crack growth resistance is comparable to thermally aged CASS should be reassessed. (d) The SRP-LR and the GALL report accept the industry screening criteria (i.e., casting method, Mo content, delta ferrite content) for susceptibility of CASS components	The existing ASME Code Section XI inservice inspection activities are adequate to manage the loss of fracture toughness in CASS components caused by thermal aging embrittlement. This adequacy determination applies not only to the Examination Category B-N-3 inspections for internals components, but also to the base metal for reactor coolant system piping components subject to Examination category B-J requirements. Almost all of the ASME Code Section XI inservice inspection activities have been found to be acceptable, with the exception of three items. First, the visual (VT-3) examinations for reactor internals have been found to be inadequate, and supplemental (e.g., VT-1 or enhanced VT-1) examinations are required. Second, the Examination Category B-J inspections for piping welds have been found to be inadequate, with supplemental volumetric inspections of limiting	(a) Examination Category B-N-3 inspections (VT-3 inspections) can not detect cracks in cast stainless steel components and, therefore, needs to be augmented to manage the effects of thermal aging embrittlement. (b) CASS piping thermal aging embrittlement effects are managed by AMP XI.M12, “Thermal Aging Embrittlement of Cast Austenitic Stainless Steel “ (NUREG-1802, Vol. 2). As mentioned in Element 4 “Detection of Aging Effects” the inspection must include base metal to a distance of one-pipe-wall thickness or 0.5 in., whichever is greater, on both sides of the weld. c) The data of EdF (France) on JR curves for CF-8M compositions with >25% ferrite clearly show that the fracture toughness J-R curves of thermally embrittled steels are below the J-R curve for SAW. The evaluation procedures and acceptance criteria of IWB 3640 are applicable to pipe and pipe fittings

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-7 (cont.)	C2.5.3, C2.5.4, PWR Plants	to thermal aging embrittlement, with one minor exception. The exception concerns the comparison of SAW/SMAW crack growth resistance curves with thermally aged CASS crack growth resistance curves.	base metal locations required. This item might be acceptable to the industry, since it is demonstrably likely that the limiting base metal locations can be shown to be within the 0.5-inch zone on either side the welds being examined under the current Examination category B-J procedures. Third, the acceptability of the existing Saw/SMAW flaw acceptance criteria for CAS components has been found to be limited to 25% delta ferrite. The industry finds that the available data, while sparse, shows good comparison out to delta ferrite of 40 %.	that are made of cast SS with ferrite level less than 20% or FN20. The GALL report extends that limit to 25% ferrite. The GALL report recommends that flaw evaluation for components with >25% ferrite is performed on a case-by-case basis by using fracture toughness data provided by the applicant. Extensive research data indicate that the lower-bound fracture toughness of thermally aged CASS material with up to 25% ferrite is similar to that for SAWs with up to 20% ferrite (Lee et al., Intl. J. Pres. Ves. & Piping, 72, 37-44, 1997). Fracture toughness data for CASS materials with 25-35% ferrite are available in the following papers: 1. Jayet-Gendrot, Ould, and Balladon, Fontevraud III, 90-97, 1994. 2. Jayet-Gendrot, Ould, and Meylogan, Nucl. Eng. & Des., 184, 3-11, 1998. 3. Jayet-Gendrot, Ould, and Meylogan, PVP Vol-304, 163-169, 1996. These results clearly show that the fracture toughness J-R curves for CASS materials with 25-35% ferrite are lower than that for SAW.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-7 (cont.)				NEI commented that Chapter IV and XI should be revised to recognize that the limiting base metal for CASS piping thermal aging embrittlement effects may be the 0.5-inch of base metal on either side of welds inspected in accordance with the ASME Code Section XI Examination Category B-J. The GALL report recommends the AMP described in the letter from Grimes to Walters, License Renewal Issue No. 98-0030, May 19, 2000. The AMP recommends inspection of the limiting base metal of CASS components. For thermal embrittlement of potentially susceptible piping, the AMP provides for volumetric examination of the base metal, with the scope of the inspection covering the portions determined to be limiting from the standpoint of applied stress, operating time, and environmental conditions. For thermal and neutron embrittlement of susceptible components, the AMP includes a supplemental inspection covering portions of the susceptible components determined to be limiting from the standpoint of thermal aging susceptibility (i.e., ferrite and molybdenum contents, casting process, and operating temperature), neutron fluence, and cracking susceptibility (i.e., applied

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-7 (cont.)				stress, operating temperature, and environmental conditions). The applicant has the option to demonstrate that the 0.5-inch of base metal on either side of the welds is limiting. d) See NRC disposition of NEI comment G-IV-7, Part (c) in this Appendix B, Table B.2.3. The GALL report was not revised to address this comment for any of the proposed changes.
G-IV-8	Fatigue TLAA	(a) SRP-LR Section 4.3.2.1 describes the TLAA options for Class 1 components. For example, 10 CFR 54.21(c)(1)(I) stipulates that the existing CUF calculations remain valid because the number of assumed transients would not be exceeded during the period of extended operation. 10 CFR 54.21(c)(1)(ii) stipulates that the CUF calculations be re-evaluated based on an increased number of assumed transients to bound the period of extended operation. The resulting CUF must remain less than unity as required by the Code during the period of extended operation. The discussion for 10 CFR 54.21(c)(1)(iii) refers to the GALL report, Chapter X, and implies that the NRC staff accepts only fatigue monitoring programs as the basis	There is no ASME Code requirement that a CUF less than 1.0 must be maintained throughout the operating life of a Class 1 component. The CUF< 1.0 requirement is a design requirement, intended to demonstrate confidence that a Class 1 component can be safely put into service. The requirements for continued service are contained in the ASME Code Section XI. These requirements include demonstration of continued serviceability through periodic inservice inspection and testing. Detection of indications or conditions exceeding acceptance requirements could lead to supplementary examinations, engineering evaluations, or repair/replacement. This Section XI	(a) Fatigue can be included in an inspection program if an applicant can justify it can manage its aging effects. Under the iii option, inspection can be proposed and will be reviewed on a case-by-case basis because there is no staff approved procedure. Appendix L is not referenced in the AMP because of outstanding technical issues against it that require resolution. Further staff review will be required if an applicant proposes use of Appendix L. b) Resolution of GSI 190 requires that GALL must address environmental effects. The NEI rationale is that environmental effects are not a TLAA. The staff does not agree with the NEI recommendation. Environmental

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-8 (cont.)		for managing fatigue effects. The SRP-LR states that "staff has evaluated a program that monitors and tracks the number of critical thermal and pressure transients for the selected reactor coolant system components. The staff has determined that it is an acceptable aging management program to address metal fatigue of the reactor coolant system components according to 10 CFR 54.21(c)(1)(iii)." (b) Finally, the TLAA discussion describes Generic Safety Issue 190, including a statement that "Based on the results of probabilistic analyses, along with the sensitivity studies performed, the interactions with the industry (NEI and EPRI), and different approaches available to the licensees to manage the effects of aging, it was concluded that no generic regulatory action is required, and that GSI-190 is resolved." The SRP-LR goes on to state that "However, the calculations supporting resolution of this issue, which included consideration of environmental effects, and the nature of age-related degradation indicate the potential for an increase in the frequency of pipe leaks as plants continue to operate. Thus,	activity should also be acceptable to the NRC staff. Other activities, such as the use of non-mandatory flaw tolerance methods combined with periodic inservice examination, should be acceptable to the NRC staff as the basis for managing the effects of fatigue. References to augmented TLAA evaluations that include reactor water environmental effects should be eliminated from the SRP-LR and the GALL report. The GALL report should recognize only that the two completed license renewal applications were required to address GSI 190, which was an open issue at the time, and that GSI 190 is now closed. It is the intent of the industry to provide a generic demonstration of the effects of reactor water environments on fatigue life. This generic demonstration has already been submitted, in large measure, to the NRC staff for review. The industry intends to complete this generic demonstration and submit the final set of reports to the NRC staff for review and acceptance, thus avoiding the need for individual license renewal applicant submittals	concerns relate to conservatism of the fatigue calculation that is a TLAA. The issues should not be separated. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IV-8 (cont.)		the staff concluded that licensees must address the effects of coolant environment on component fatigue life as aging management programs are formulated in support of license renewal."	in this regard.	
G-IV-9	GALL	Every place the "aging effect" is identified as "cumulative fatigue damage" should be revised to "cracking."	Fatigue damage will eventually manifest itself as a crack. That is the effect to be managed.	Usage is monitored to prevent cracking directly. The AMP does not directly monitor cracking but tracks the cumulative usage factor to prevent cracking. Cumulative fatigue damage is the appropriate aging effect and terminology. The GALL report was not revised to address this comment.
G-IVA1-1	IV-A1.1.1, A1.1.2, A1.2.7, A1.4.1, A1.4.5, A1.5.1 through A1.5.6	In every location where the GALL refers to BWRVIP-29 (TR-103515), replace the reference with "EPRI TR-103515, Rev. 2 (BWRVIP-79) or later approved version of TR103515.	The EPRI document referred to has been updated as of March 2000. The latest issue is TR-103515, Rev.2. NRC staff in EMCB has the document. This document is updated periodically to identify the latest enhancements to the water chemistry programs. As such, the GALL ought to recognize such.	EPRI TR-103515, Rev. 1 (BWRVIP-29) or later approved version is acceptable. BWRVIP-29 will not be replaced by BWRVIP-79 because generic review of BWRVIP 79 has not been requested and, therefore, it has not been reviewed. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA1-2	IV-A1.1.4	Under the AMP column and in the Evaluation and Technical Basis column, delete the reference to GE RICSIL 055.	While the RICSIL is a tool that can be used by an owner to manage cracking, it is not necessary. The Code examinations are adequate to manage aging effect of cracking.	The references to various RICSIL documents such as RICSIL 055, 455, 462, or 409 have been deleted. While the RICSIL is a tool that can be used by an owner to manage cracking, it is not required by GALL. The staff will revise the program description to delete reference to the RICSIL. The GALL report was revised to address this comment.
G-IVA1-3	IV-A1.2.4 and A1.2.6	In the first occurrence of this item the following changes should be made in the Evaluation and Technical Basis column. In the sentence that begins with " In accordance with approved BWRVIP-74", after the "a)" the words "and axial reactor vessel welds" need to be deleted. In the same sentence, delete item "d)" in its entirety.	Examination of RPV axial welds is already required by ASME Section XI. Therefore, there is no reason to evaluate the need for examining this group of welds. The CLB, in conjunction with the requirements of 10CFR50 Appendix G and H is more than adequate to manage the effects of neutron embrittlement. There is neither basis for requiring an owner to assess failure probability of these welds nor any other component to manage loss of fracture toughness.	(1) The words "and axial reactor vessel welds" were deleted from "a)." (2) The item d) is deleted. The approach specified in a staff letter dated May 7, 2000 was also referenced. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA1-4	IV-A1.3.2	Revise the last 3 lines of the AMP column to read: "NUREG-0619 and NRC Generic Letter 81-11 or alternative recommendation of GE NE-523-A71-0594.	The GE document is an approved alternative to NUREG-0619 and GL 81-11 not an additional requirement.	The appropriate AMPXI.M5 "BWR Feedwater Nozzle" (NUREG-1801, Vol. 2) includes inservice inspection (ISI) in conformance with the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (1995 edition through the 1996 addenda, or later edition as approved in 10 CFR 50.55a), as revised by the provisions of NUREG-0619, the Nuclear Regulatory Commission (NRC) Generic Letter (GL) 81-11, and the alternative recommendation of General Electric (GE) NE-523-A71-0594. The GE document is an approved alternative to NUREG-0619 and GL 88-11. The GALL report was revised to address this comment.
G-IVA1-5	IV-A1.3.2 and A1.3.3	Change the "Further Evaluation" column to read "No, fatigue is managed through an inspection program." Also, change the aging effect to "cracking."	As noted for the same item where the effect to be managed is cracking due to cyclic loading (read fatigue), there is an acceptable inspection program to assure the aging effect is managed. This approved required program assumes the component is cracked and requires a conservative inspection program to assure a postulated flaw would not exceed code allowable limits. The approved alternative program assumes the component is cracked, calculates a	There are approved analyses of feedwater and CRDRL nozzles. However, design fatigue analyses for these nozzles are on record and need to be extrapolated to 60 years. Therefore (for unique identifier A1.3-d, items IV-A1.3.2 and A1.3.3), the fatigue evaluation for a nozzle is a TLAA and there is a "Yes" in the "Further Evaluation" column. NEI commented that every place the "aging effect" is identified as "cumulative fatigue damage," it

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA1-5 (cont.)			remaining life and then specifies an inspection frequency. All of this is done to manage the effect of cracking caused by fatigue. Every time the component is examined and confirmed to be crack free, the time to failure assumed in the evaluation is reset, thus this is not a TLAA. Since this program assumes cracking has occurred (i.e. fatigue has initiated a crack) and conservatively specifies an inspection frequency based on this assumption, it is obvious that the effects of fatigue are being managed by inspection and nothing else is required.	should be revised to "cracking." The staff believes that usage is monitored to prevent cracking directly. The AMP does not directly monitor cracking but tracks the cumulative usage factor to prevent cracking. Cumulative fatigue damage is the appropriate aging effect and terminology. GALL report was not revised to address this comment.
G-IVA1-6	IV-A1.4.1 and A1.4.5	Delete the reference to the BWRVIP-03 internals examination guidelines.	BWRVIP-03 is applicable to components inside the RPV, not to safe-ends outside the vessel.	The aging effects of nozzle safe ends are managed by AMPs XI.M7 "BWR Stress Corrosion Cracking" and XI.M2 "Water Chemistry" (NUREG-1801, Vol. 2). The AMP XI.M7 references the BWRVIP-03 internals examination guidelines. The GALL report was revised to address this comment by deleting the reference from AMP X1.M7 because safe-ends are not covered in the BWRVIP-03.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA1-7	IV-A1.4.3	a) Change the "Further Evaluation" column to read "No." b) Also, change the aging effect to "cracking."	This is not a generic issue. There are only 2 BWRs that have not cut and capped the CRDRL nozzle. Further, for those 2 plants, the aging effect of cracking due to fatigue is managed by NUREG-0619 inspections. Thus fatigue is managed via inspection.	a) The safe-end fatigue evaluation is a TLAA. NUREG-0619 only refers to ASME Section XI, Examination Category B-D, which includes full penetration welded nozzles in vessels and not the nozzle safe ends. (b) NEI commented that every place in GALL the "aging effect" is identified as "cumulative fatigue damage", it should be revised to "cracking." The staff believes that usage is monitored to prevent cracking directly. The AMP does not directly monitor cracking but tracks the cumulative usage factor to prevent cracking. Cumulative fatigue damage is the appropriate aging effect and terminology. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA1-8	IV-A1.5.1 through A1.5.6	Revise the last sentence in the "Preventive Action" statement to read: Also, hydrogen water chemistry may be used as a means to enhance IGSCC mitigation.	Use of HWC is an option an owner may want to use. However, control of water chemistry by implementing TR-103515 is sufficient and HWC is not required. The staff has approved the BWRVIP Program documents for license renewal use based on normal water chemistry that remains within the parameters of EPRI TR-103515.	The aging effects of BWR reactor vessel penetrations are managed by AMPs XI.M8 "BWR Bottom Head Penetrations" and XI.M2 "Water Chemistry" (NUREG-1801, Vol. 2). VIP-62 reference has been added to the GALL report for plants using hydrogen water chemistry. Both VIP-62 and VIP-75 were used as references. (VIP-75 refers to revised inspection program for piping.) The GALL report was revised to address this comment.
G-IVA2-1	A2.1.1	Add cracking at welded joints (growth of fabrication flaws) due to service loadings. See EPRI NP-1406-SR for justification.	Dome welds examined in accordance with Section XI, Examination Category B-A. If this not an aging effect then why are welds examined each inspection interval. If not in the GALL then assume examinations may be discontinued in the period of extended operation. See BAW-2251A and associated NRC SER. GALL is not consistent with approved B&WOG topical reports.	See NRC disposition of NEI Comment G-IV-1c in this Appendix B, Table B.2.3. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-2	A2.1.1, A2.1.3	Remove all references to ISI for managing Boric Acid Corrosion.	See justification for comment on item XI.M5.	The Boric Acid Corrosion program in the GALL report, which relies on implementation of NRC Generic Letter 88-05, provides a stand-alone program for inspection of carbon steel structures and components for evidence of boric acid leakage and corrosion. ASME-Code inservice inspections (ISI) that detect leakage during the performance of pressure and hydrostatic tests were deleted from BAC program since it is independent of the ISI inspections. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-3	A2.1.3	Remove references to RG 1.65 in program element (2).	Design requirements are not part of aging management program preventive actions.	The words "design requirements" were deleted from Element (2), Preventive Actions, of the Evaluation and Technical Basis discussion. The design requirements of Reg Guide 1.65 were removed from GALL because they are not considered an aging management program. RG 1.65 preventive-maintenance features are a CLB requirement and will continue into the extended period. RG 1.65 preventive measures such as the use of acceptable surface treatments and stable lubricants are presented in GALL. These mitigation measures are an effective option for reducing SCC or IGSCC, for the AMP to be effective. The GALL report was revised to address this comment.
G-IVA2-4	A2.1.3	For "wear" in closure head studs, include replacement along with repair in (7) Corrective Action.	Repair or replacement should be jointly used for corrective action descriptions, as in the item for SCC directly above.	Element (7) of the Evaluation and Technical Basis discussion was revised as suggested by the comment to include repair or replacement for corrective action. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-5	A2.1.4	Delete vessel flange leak detection line.	Line is considered as piping at B&W operating plants and was not shipped with the vessel.	This component is included in the vessel report (BAW-2251A). The vessel flange leak detection line has the LR function of pressure boundary in some plants and has been included in earlier LR applications. Even though this component may not be in scope at some plants, the GALL report should be generic and accommodate those plants that have this component in scope. The GALL report was not revised to address this comment.
G-IVA2-6	A2.1.4	Delete the leak detection line.	The line is piping and is not part of a vessel. In addition, for some plants, the line is not subject to aging management review.	See NRC disposition of NEI comment G-IVA2-5 in this Appendix B, Table B.2.3.
G-IVA2-7	A2.2	Add flange bolting.	Missing items. See BAW-2251A description of flange bolting and nut ring.	New item A2.2.3, “Flange Bolting,” was added to the GALL report. (The item is described in BAW-2251A.) The aging effects for this item are loss of preload caused by stress relaxation, cracking caused by SCC (BAW-2251 does not state the mechanism for cracking), and loss of material because of wear. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-8	A2.2.1	CRDM nozzles are SB-167 at B&W-designed plants.	The CRDM nozzle material is SB-167 as described in BAW-2251A.	SB-167 was added along with SB-166 to the "Materials" column. (These are both alloy 600, but just different product form with different susceptibilities to cracking.) The GALL report was revised to address this comment.
G-IVA2-9	A2.2.1	Remove reference in program element (10) to SS.	This requirement has been removed from the latest revision of SRP-LR Chapter 4.2 and does not apply.	Removed reference to SS in AMP element 10. The GALL report, Chapter XI was revised to address this comment.
G-IVA2-10	A2.2.1	Change name of Structure and Component to CRD Head Penetration.	The CRD part of concern is the piece which penetrates the upper head.	Replaced the word "mechanism" with "Head Penetration" in the "Structures and Component column." The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G–IVA2-11	A2.2.1	Modify the wording under "Aging Management Program" to The program includes inservice inspection in accordance with ASME Subsection IWB, Table IWB 2500-1 or for susceptible components and locations an industry wide, integrated, long-term inspection program based on the industry responses to NRC Generic Letter (GL) 97-01 contained in NEI letter Dec, 11, 1998, Dave Modeen to Gus Lainas, "Response to NRC RAIs on GL 97-01" and individual plant responses. Primary water chemistry is monitored and maintained in accordance with EPRI guidelines in TR-105414 (Rev. 3 or later revisions or update) to minimize the potential of crack initiation or growth.	"Integrated" has always been intended to mean "industry wide," yet here it could be construed to be confined to the individual unit and mean something else, like "covering ALL head penetrations," or something else. It is difficult to say that NRC GL97-01 contains "guidelines" of any sort. The appropriate inspection for a given unit may be NEVER, depending on conditions.	The description of the AMP was revised as recommended by the comment. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-12	A2.2.1	Modify the (1) Scope of Program to: The program includes inservice inspection (ISI) in accordance with ASME Subsection IWB, Table IWB 2500-1, or for susceptible components and locations an industry wide, integrated, long-term inspection program based on the industry responses to NRC Generic (GL) 97-01 contained in NEI letter Dec, 11, 1998, Dave Modeen to Gus Lainas, "Response to NRC RAIs on GL 97-01" and individual plant responses. Preventive measures are in accordance with EPRI guidelines in TR-105714 to mitigate primary water stress corrosion cracking (PWSCC). An integrated cracking susceptibility assessment in accordance with industry susceptibility models and inspection results was performed in response to GL 97-01, to define the most susceptible plants and rank them in accordance with their susceptibility. This information is used by each plant to determine the proper timing of vessel head penetration examinations, either during the current license period or the period of license renewal, if necessary. Significant changes in the industry models as future plants inspect may require reassessment.	The assessment referred to was performed in response to GL 97-01 and subsequent RAIs, and would not be expected to significantly change (other than accumulation of time-at-temperature) unless inspection results from lead plants indicate significant deficiencies in the models used by the industry to perform the assessments and plant rankings. The models were used to define the most susceptible "plants," not necessarily the most susceptible "components." The requirements for any "periodic inspections has yet to be established.	The Evaluation and Technical Basis discussion was revised as recommended by the comment. A change in wording was made as NEI recommended. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-13	A2.2.1	Modify (3) Parameters Monitored / Inspected to: The AMP monitors the effects of PWSCC on the intended function of the CRD head penetrations by detection and sizing of cracks and coolant leakage by ISI. Susceptibility assessment was performed in response to GL 97-01 utilizing the most current industry susceptibility models that were based on material and operating parameters and inspection results to date, to rank plants in accordance with their susceptibility. This information is used to develop a plant-specific long-term inspection program, including schedule, scope and determination whether an augmented inspection program of nozzle penetrations, including a combination of surface and volumetric examination, is necessary. Significant changes in industry models may require re-assessment.	The assessment is not performed in response to license renewal. Do not refer to the “mechanism.”	The Evaluation and Technical Basis discussion in the GALL report was revised to address this comment. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-14	A2.2.1	Clarification to (4) (4) Detection of Aging Effects: Aging degradation of the CRD head penetration cannot occur without crack initiation and growth. Based on GL 97-01, the applicant should review the scope and schedule of inspection, including leakage detection system, to assure detection of cracks before the loss of intended function of the components.	Should not refer to “mechanism.”	The word “mechanism” has been deleted from the evaluation and technical basis discussion. The GALL report was revised to address this comment.
G-IVA2-15	A2.2.1	Typo in (5) Monitoring and Trending: change “provides” to “provide.”	Typo.	Typo was corrected in program element (5) Monitoring and Trending. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-16	A2.2.1	Modify wording in (6) Acceptance Criteria: Any SCC degradation is evaluated in accordance with IWB-3000 by comparing ISI results with the acceptance standards of IWB-3400 and IWB-3500. However, if there have been significant changes since the applicants response to GL 97-01 and the RAIs to it, then the applicant should either provide updated information on crack initiation and crack growth models and the data used to validate these models (or references to appropriate industry model revisions) to verify adequacy of the inspection program and acceptance criteria.	The information requested was provided in the responses to GL-97091 and the RAI responses, primarily through references. Applicants should not have to provide it again unless something changes significantly.	The Evaluation and Technical Basis discussion was revised as recommended, the following sentence has been added to element 6: To verify the adequacy of the long-term inspection program and acceptance criteria, if there have been significant changes since the applicants response to GL 97-01 and the RAIs to it, the applicant should either provide references to appropriate industry model revisions or provide updated information on crack initiation and crack growth data and models. The GALL report was revised to address this comment.
G-IVA2-17	A2.3.1 to A2.3.3	Assessment of fracture toughness changes due to neutron irradiation in accordance with 10CFR50, Appendix G for the reactor vessel inlet and outlet nozzles can not be accomplished. Note that Generic Letter 92-01, Revision 1, Supplement 1 did not address the nozzle materials. It appears that GALL intends to backfit these vessel beltline requirements to the nozzles.	Assessment of fracture toughness changes due to neutron irradiation in accordance with 10CFR50, Appendix H for the reactor vessel inlet and outlet nozzles can not be accomplished because the surveillance program adopted for the beltline materials is already in place and can not be changed to include specimens from the nozzles. It does not need to be accomplished for the nozzles because empirical and analytical tools are available to perform the Appendix G analysis.	The Evaluation and Technical Basis discussion was revised to incorporate the NRC disposition of NEI Comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-18	A2.3.1, A2.3.3	Delete fluence threshold of 1.0E17 n/cm2.	Nozzles are not limiting materials in accordance with BAW-2251A. Reduction of fracture toughness is not an applicable aging effect. 10 CFR 50.60 and 50.61 calculations apply to beltline items. Nozzles not in beltline for period of extended operation.	See NRC disposition of NEI Comment G-IV-4 in this Appendix B, Table B.2.3. The magnitude of the fluence threshold was not changed. The GALL report was revised to address this comment.
G-IVA2-19	A2.3.1, A2.3.3	See Comment 31 regarding cracking. Examination Category B-D manages cracking at welded joints at cracking at nozzle IR.	NRC SER of BAW-2251A.	See NRC disposition of NEI Comment G-IV-1c in this Appendix B, Table B.2.3. Note the following error in the comment: Comment 31 should be NEI comment G-IVA2-1 in this Appendix B, Table B.2.3. The GALL report was not revised to address this comment.
G-IVA2-20	A2.3.1, A2.3.3, A2.5.1, A2.5.2	Remove last sentence of Evaluation and Technical Basis, “Applicants are to determine...etc.”	This requirement has been removed from the latest revision of SRP-LR Chapter 4.2 and does not apply.	The last sentence of Evaluation and Technical Basis was removed so that the GALL report is consistent with SRP-LR. The GALL report was revised to address this comment.
G-IVA2-21	A2.4.1, A2.4.3	Remove “Cyclic Loading” from Aging Mechanism entry.	SCC is adequate to describe Mechanism. Cyclic Loading is duplicative of Fatigue entry. Growth of SCC cracks can result from loading other than cyclic.	Cyclic loading was removed from “Aging Mechanism” column of the bottom row on page IV A2-14. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-22	A2.4.1, A2.4.3	For Nozzle Safe Ends, Crack Initiation and Growth is attributed to SCC and Cyclic Loading. Cyclic loading is generally associated with fatigue and is classified as a TLAA. Explain the relation between the identified program elements and cyclic loading.	New application for existing program requires justification.	Cyclic loading was removed from "Aging Mechanism" column of the bottom row on page IV A2-14. The GALL report was revised to address this comment.
G-IVA2-23	A2.5	Add bottom head.	Missing items.	Bottom head was added as an additional component to A 2.5, Shell. Fatigue was identified as an aging mechanism and cumulative fatigue as an aging effect (TLAA). There is no other aging effect for this component. ASME Section XI inservice inspection of this component was continued during license renewal period as required by 10 CFR 50.55a. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-24	A2.5.1, A2.5.2	Vessel Shell—missing cracking at welded joints and intergranular separations of SA 508 Class 2 forgings clad using a high heat input welding process. Exam. Cat. B-A requires volumetric inspections of vessel welds.	NRC SER of BAW-2251A.	Earlier comment (Comment G-IV-1c) on cracking as not being aging mechanism also applies to cracking at weld joint. Intergranular separations of SA 508 Class 2 forging clad using a high heat input welding process was addressed in the GALL report. A line item was added in the GALL report for SA 508 Class 2 forging. Aging mechanism is cyclic loading and aging effect is crack growth. This is a TLAA. TLAA discussion in SRP-LR (p. 4.1-7) was revised. A line item for crack growth was added. The GALL report was revised to address this comment.
G-IVA2-25	A2.5.3	The topic is Loss of Material due to Wear on the Vessel Flange. The Evaluation and Technical Basis discussion is for Core Support Pads. Revise to made the discussion applicable to the Vessel Flange.	Discussion should be applicable to the component being discussed.	The Evaluation and Technical Basis discussion was revised to refer to appropriate component as suggested. Movement of the description of programs to chapter XI minimizes these types of errors in the GALL report. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-26	A2.6	Add parenthetical (interior attachments).	Core guide lugs for B&W plants.	In he "Structure and Component" column, "core support pad" was retained and "core guide lugs" was added. The GALL report was revised to address this comment.
G-IVA2-27	A2.6	Aging mechanism should be PWSCC. Appropriate AMP is ASME Section XI, Examination Category B-N-2.	NRC SER of BAW-2251A.	PWSCC is an aging mechanism for PWR alloy 600 components exposed to reactor coolant. The corresponding aging management program is plant-specific (as recommended by NEI comment G-IVA2-28 in this Appendix B, Table B.2.3) because there is no generic alloy-600 program approved by NRC except for reactor vessel head penetrations. The NEI recommendation for the appropriate AMP to be ASME Section XI, Examination Category B-N-2 is inconsistent with NEI comment G-IVA2-28 which proposed a plant-specific AMP. The GALL report was revised to partially address this comment by identifying PWSCC as the aging mechanism as stated above.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-28	A2.6	For Core Support Lugs, crack initiation and growth, a plant-specific program is to be evaluated. Change the "further evaluation" text from "Yes, No AMP" to "Yes, Plant-Specific AMP."	Consistency with previous format.	See NRC disposition of NEI Comment G-IVA2-27 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment by requiring the AMP to be plant specific.
G-IVA2-29	A2.6	The topic is Loss of Material due to Wear on the Core Support Lugs. The (2) Preventive Actions refers to "attrition" due to wear. Make the words consistent as "loss of material."	Descriptive wording should be consistent throughout.	Word "Attrition" was changed to "loss of material." This change was made throughout GALL. The GALL report was revised to address this comment.
G-IVA2-30	A2.7	Change parenthetical to (bottom head and/or closure head).	Missing instrumentation penetrations in closure heat at 2 B&W operating plants.	Instrument tube penetrations for closure head (top head) were added as separate components (Item A2.7.3). They are not combined with instrument tube penetrations for bottom head because the aging management programs are different. AMP based on GL 97-01 is specified for top head penetrations whereas plant-specific AMP is specified for bottom head penetrations. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVA2-31	A2.7.1, A2.7.2	Change the "further evaluation" text from "Yes, No AMP" to "Yes, Plant-specific AMP."	Consistency with previous format.	For A2.7.1, the response in "Further Evaluation" column was changed to "Yes, Plant-specific." For A2.7.2, the AMP was the same as the one for PWSCC of control rod drive head penetration (Item A2.2.1). The GALL report was revised to address this comment.
G-IVA2-32	A2.5.3	Remove "Design requirements" from element (2) of the Wear/Loss of material Evaluation and Technical Basis.	Design requirements are not an aging management activity.	The words "design requirements" were removed from GALL.. Additional changes were made as mentioned in the NRC disposition of NEI Comment G-IVA2-25 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVA2-33	A2.6	Remove entry for Wear/Loss of Material.	There is insufficient relative motion between the pad and adjacent parts to generate degradation. The entry provides no reference or operating experience to justify this mechanism.	There is insufficient relative motion between the core support pad and adjacent parts to generate degradation. Wear/loss of material for this component is unlikely. The GALL report was revised to address this comment by removing the aging effect "wear/loss of material" for the core support pad.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB1-1	IV-B.1.1.1, B1.1.2, B1.1.3, B1.1.4, B1.1.5, B1.1.6, B1.1.7, B1.2, B1.3.1 through B1.3.4, B1.4.1 through B1.4.8, B1.5.2, B1.6.1 through B1.6.3	Delete the second and third sentence of the "Preventive Action " statement. If the NRC staff insists on retaining a statement related to hydrogen water chemistry it should be revised to read: It is also possible to use hydrogen additions to enhance the inhibition of IGSCC. Hydrogen addition is very effective in reducing the electrochemical potential in recirculation system piping and to a lesser degree, in the core region. Noble metal additions through a catalytic action increase the effectiveness of hydrogen additions in the core region.	Use of HWC is an option an owner may want to use. However, control of water chemistry by implementing TR-103515 is sufficient and HWC is not required. The staff has approved the BWRVIP Program documents for license renewal use based on normal water chemistry that remains within the parameters of EPRI TR-103515.	See NRC disposition of NEI comment G-IV-A1-8 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment by acknowledging hydrogen water chemistry may be used as a means to enhance IGSCC mitigation. .
G-IVB1-2	IV-B.1.1.1, B1.1.2, B1.1.3, B1.1.4, B1.1.5, B1.1.6, B1.1.7, B1.2, B1.3.1 through B1.3.4, B1.4.1 through B1.4.8, B1.5.2, B1.6.1 through B1.6.3	In every location where the GALL refers to BWRVIP-29 (TR-103515), replace the reference with "EPRI TR-103515, Rev. 2 (BWRVIP-79) or later approved version of TR103515.	The EPRI document referred to has been updated as of March 2000. The latest issue is TR-103515, Rev.2. NRC staff in EMCB has the document. This document is updated periodically to identify the latest enhancements to the water chemistry programs. As such, the GALL ought to recognize such.	EPRI TR-103515, Rev. 1 (BWRVIP-29) or later approved version is acceptable. BWRVIP-29 will not be replaced by BWRVIP-79 because BWRVIP 79 has not been generically reviewed. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB1-3	IV-B1.1.2, IV-B1.3.1 through B1.3.4, B1.4.1 through B1.4.8, B1.5.1	For the aging effect of cumulative fatigue damage, change the "Further Evaluation" column to read "No."		For fatigue of vessel internal components, the GALL report was revised to state that for components for which a fatigue analysis has been performed for the 40-year period, fatigue is a time-limited aging analysis (TLAA) to be evaluated for the period of extended operation. This statement will also be added for PWR vessel internals. The GALL report was revised to address this comment.
G-IVB1-4	IVB-B1.1.2 and B1.1.3	Delete the reference to VT-3 and ASME Section XI. Reword first sentence of "AMP" column to read: Visual and ultrasonic examinations are performed in accordance with the guidelines of BWRVIP-03 for reactor pressure vessel internals.	This component is not a "welded core support structure" and is thus not subject to the requirements of ASME Section XI. The BWRVIP requirements are sufficient to manage aging effects.	Inspections are performed according to BWRVIP-25, which is an expanded ISI. Reference to VT-3 and ASME Section XI was deleted. The GALL report was revised to address this comment.
G-IVB1-5	IV-B1.1.5	Add an asterisk to the statement in the "Further Evaluation" column. Add a footnote at the bottom of the table that reads: "The staff is currently reviewing this program. If the program is approved, no further evaluation will be required."	This is similar to B1.1.1. The BWRVIP program, once approved by the staff will be adequate to manage aging effects.	The BWR VIP is now approved and no further evaluation is recommended. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB1-6	IV-B1.1.6	Delete this item.	The NRC approved BWRVIP documents show that the standby liquid control (SLC) line inside the reactor vessel is not necessary and as such no inspections are necessary to manage aging. BWRVIP-27 does have inspection provisions for the SLC lines outside the reactor vessel. Those inspection should be in another section of the GALL and not in the internals portion.	Item B1.1.6 was deleted, because the SLC line inside the vessel has no license renewal intended function. However, the line outside of the vessel is within scope and is covered in item C1.1.11. The program XI.M9 "BWR Vessel Internals" was added which includes BWRVIP-27 to item C1.1.11. The GALL report was revised to address this comment.
G-IVB1-7	IV-B1.2	Delete the reference to VT-3 and ASME Section XI. Reword first sentence of "AMP" column to read: Visual and ultrasonic examinations are performed in accordance with the guidelines of BWRVIP-03 for reactor pressure vessel internals.	This component is not a "welded core support structure" and is thus not subject to the requirements of ASME Section XI. The BWRVIP requirements are sufficient to manage aging effects.	Inspections are performed according to BWRVIP-26 guidelines. Reference to VT-3 and ASME Section XI was deleted. The GALL report was revised to address this comment.
G-IVB1-8	IV-B1.5.1	Delete this item from the GALL.	The approved BWRVIP documents show that management of aging effects is not required for the orificed fuel support casting (BWRVIP-06, etc.).	This line item was deleted because SCC of OFS was considered insignificant in NUREG 1557. The GALL report was revised to address this comment.
G-IVB1-9	IV-B1.6.1 through B1.6.3	Delete this item from the GALL.	The instrument penetrations are addressed in BWRVIP-49 and should be discussed in the RPV section. The housing inside the vessel is not safety related and does not require an aging management program.	This item was mislabeled in the GALL report. These are instrumentation dry tubes; "housing" has been deleted from the heading. The existing AMP is BWR vessel internals program XI.M9 for lower plenum. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB1-10	IV-B1.7	Delete this item from the GALL.	This item is not safety related and not subject to an aging management program.	The correct name for this component is steam dryer support bracket attachment (BWRVIP 15). The susceptible location is the attachment weld for these brackets to the vessel wall. These welds are safety related. This item is covered in the GALL report under Item A1.2.7, "Attachment Welds." The GALL report was not revised to address this comment.
G-IVB2-1	All	Delete void swelling from all items except B2.4.1. For the Evaluation and Technical Basis entry for void swelling, delete "The applicant should address loss of ductility associated with swelling." (STH/FPL)	Wording under the Aging Management Program column appears to be acceptable. The Westinghouse position on this issue is that void swelling is only applicable to the baffle/former plates. Additionally, the change in material properties, if any, will not affect the ability of the baffle/former plates to perform their intended functions (core support and flow distribution).	From Calvert Cliffs SER – the issue of concern is the impact of change of dimension due to void swelling on the ability of the RVI to perform their function. Industry programs may decide whether void swelling is a significant issue. The statement, "The applicant should address loss of ductility associated with swelling," has been deleted, and the following statement has been added in the AMP column for change in dimensions due to void swelling. "The applicant provides a plant-specific AMP or participates in industry programs to investigate aging effects and determine appropriate AMP. Otherwise, the applicant provides the basis for concluding that void swelling is not an issue for the component." The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-2	All	SCC and IASCC have been combined in the latest revision. The only internals parts subject to IASCC per Westinghouse topical are Item Numbers B2.3.1, B2.3.4, B2.4.1, B2.4.2, B2.5.1, B2.5.2, B2.5.4, and B2.5.5. SCC and IASCC should be segregated again and IASCC indicated for the above item numbers only. (STH/FPL)	The Westinghouse position is that only internals parts subject to fluences greater than 1×10^{21} have the potential for IASCC.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB2-3	All	The only internals parts subject to irradiation embrittlement are Item Numbers B2.3.1, B2.3.4, B2.4.1, B2.4.2, B2.5.1, B2.5.2, B2.5.4, and B2.5.5. It should be indicated as a mechanism for these item numbers only. (STH/FPL)	The Westinghouse position is that only internals parts subject to fluences greater than 1×10^{21} have the potential for irradiation embrittlement.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB2-4	All	Reference to ASME Section XI should be deleted from the References, Existing AMP, and Evaluation and Technical Basis columns for all SCC entries. (STH/FPL)	The effects of SCC on PWR austenitic stainless steel are precluded by material selection (e.g., Reg. Guide 1.43) and control of chemistry (oxygen and other debilitating constituents) in the reactor coolant.	Material selection and control of water chemistry do not preclude SCC. See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-5	B2.1.1, B2.1.4, B2.1.7	For SCC/IASCC in the RV upper internals, item (10) Operating Experience refers to cracking in SS baffle former bolts and states that the mechanism of this particular cracking has not yet been resolved. Delete this reference to bolts in (10).	The location and geometry of the bolts is not consistent with the upper internals components being described. The fact that the cracking mechanism has not been identified makes this an inappropriate piece of information.	GALL was reformatted to move all AMPs to a central location in Chapter XI of the GALL report, and new AMP XI.M16 appropriately reflects the concern of this comment in its element (10) Operating Experience. The GALL report was revised to address this comment.
G-IVB2-6	B2.1.1, B2.1.4, B2.1.7	For the aging effect of “changes in dimension due to void swelling” the AMP column identifies the fact that the RV Internals receive a visual inspection per ASME Section XI, implying that this inspection is intended to manage void swelling. This is not correct since void swelling is not recognized as a mechanism, which requires management. An “acceptable” alternate AMP is described in this column. Move the description of an acceptable program to the Technical Basis column. The requirement to address loss of ductility associated with void swelling is included in the Technical Basis. It should be deleted.	Current programs are not intended to detect the effects of void swelling. Since the Technical Basis column identifies what is required of an applicant, it should also describe what is acceptable.If loss of ductility is a valid effect of swelling, then it should be included explicitly in the aging effects column.	In line items on loss of fracture toughness, void swelling was added as a mechanism in addition to neutron irradiation embrittlement. No other change was made in the AMP column for void swelling. Similar changes were made throughout GALL, especially in Sections IV B2, B3, and B4. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-7	B2.1.1, B2.1.4, B2.1.7 B2.1.2 B2.1.3, B2.1.5, B2.1.6 B2.2.1, B2.2.2, B2.2.3, B2.3.1, B2.3.4, B2.4.1, B2.4.2, B2.5.2, B2.5.6 to end	Program cited is Section XI and (4) Detection of Aging Effects describes inspections that are not part of Section XI – the description of detection in addition to B-N-3 should be modified to reflect ongoing industry initiatives and not recommend specific inspections. A statement such as "participation in industry programs to investigate aging effects and determine appropriate inspections, with reports to the NRC on a periodic basis." This applies to void swelling, IASCC, SCC, reduction in fracture toughness due to irradiation embrittlement and thermal embrittlement, and loss of closure integrity due to stress relaxation.	NUREG 1733, Safety Evaluation Report Related to the License Renewal of Oconee Nuclear Station, Units 1,2 and 3. There are significant industry efforts under way to determine appropriate inspections for RV internals as referenced on ONS SER.	The response to this comment is as follows: (a) Void swelling: see NRC dispositions to NEI comments G-IVB2-1 & G-IVB2-6 in this Appendix B, Table B.2.3. (b) IASCC/SCC and loss of fracture toughness: a program based on augmentation of ASME Section XI, Subsection IWB to include enhanced visual inspection for non-bolting components and other demonstrated acceptable inspection methods for bolting, were included. Response in "Further Evaluation" column was changed from a "Yes" to a "No." Similar changes were made in Sections IV B2, B3, and B4. The GALL report was revised to address this comment.
G-IVB2-8	B2.1.2	For "Loss of Fracture Toughness due to Thermal Aging and Neutron Irradiation Embrittlement" the environment includes a Neutron Fluence of greater than 10E17 n/cm2 (E > 1 MeV). Identify the basis for this threshold value for irradiation embrittlement in CASS.	The 10E17 fluence value for irradiation embrittlement is valid for low alloy steels such as the reactor pressure vessel. There is no basis for also assigning it to stainless steel material. –W- expects the threshold to be at least 10E21 n/cm2 (E > 1 MeV).	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-9	B2.1.2	Delete reference to CASS and associated thermal embrittlement for this item.	Per previous comment, Westinghouse plants do not have CASS in the upper support columns. Some plants do have mixing vane devices made of CASS, however these do not perform any intended function.	The comment suggests that some plants do have mixing vane devices made of cast austenitic stainless steel (CASS), and the staff believes a mixing vane has an LR intended function. Section 2.6.8 of proposed Rev. 1 of WCAP-14577 cites service history of vane separation from the RCCA spiders, with free RCCA travel inhibited in some instances. Although these vanes do not in of themselves perform any intended function within Part 50, their ability to prevent satisfactory accomplishment of a safety-function by another system, structure or component places them within the context of license renewal in accordance with 10 CFR 54.4(a)(2), and hence aging management must be provided for these components. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-10	B2.1.7	Loose parts monitoring and neutron noise monitoring (excore detectors were added to the Aging Management Program column. These entries should be deleted.	Visual inspections of the reactor vessel internals performed in accordance ASME Section XI provide an adequate aging management program for portions of the internals outside the fuel assembly region. SRP-LR Appendix A.1.2.3.10 states that operating experience should provide objective evidence to support that the effects of aging will be adequately managed so that the structure and component intended function(s) will be maintained during the period of extended operation. In fact the operating experience provided indicates that there is no need for loose parts monitoring or neutron noise monitoring to manage aging effects associated with the reactor vessel internals.	For items B2.1.7 and B2.5.7, the AMP column was revised to clarify that the AMP recommends loose part monitoring or neutron noise monitoring in addition to ASME Section XI inspections. WCAP 14577 provides justification for keeping both neutron noise monitoring and ISI. The WCAP states (4th paragraph on p. 4-3), "The use of neutron noise monitoring (excore detectors) in combination with ISI is a valuable tool to track/observe core barrel vibrations. A continuation of the above monitoring and ISI would prevent relaxation of the holddown spring and clevis insert bolts from becoming a significant license renewal issue." The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-11	B2.1.7	Delete this item completely.	For the –W- design, the hold-down spring does not perform any intended function, and does not require an aging management review	The hold-down spring does support the functions (1), (2), and (4) cited in Section 2.2 of proposed Rev. 1 of WCAP-14577, specifically to support and orient the reactor core; support, orient, guide and protect control rod assemblies; and, provide a passageway for support, guidance and protection for incore instrumentation. In addition, Section 2.6.5 of the topical report cites two instances in which detection of degradation of this component occurred early enough to prevent development of a safety issue, indicative that failure of this component could lead to a safety issue. The GALL report was not revised to address this comment.
G-IVB2-12	B2.2.1, B2.3.2	Delete wear as an aging effect for these items.	Measurements have shown this effect to be not significant, or insignificant relative motion to result in wear.	The wear of the RCCA guide tubes is not significant and this was confirmed in WCAP 14577. The line item for wear of the guide tubes in GALL will be removed based on this comment. The GALL report was revised to address this comment.
G-IVB2-13	B2.3.1 thru B2.3.4	GALL now has a fluence threshold specified in the Environment column and examination category B-N-2/B-N-3 was added. However, the effect should only be listed for item B2.3.1, the core barrel.	The core barrel is the only item that is exposed to neutron fluences in excess of the embrittlement threshold.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-14	B2.4.1	Category B-N-2 needs to be added with each entry of B-N-3.	Use of the B-N-2 / B-N-3 pairing is not consistently applied to components in this section.	GALL sections IV B2, B3, and B4 were revised according to the following reasoning. For PWRs, Category B-N-2 should only apply to interior attachments to the RPV, and Category B-N-3 should apply to "removable core support structures," gerally all other internal components. For GALL Sections IV-B2, B3 and B4, Category B-N-3 should be the cited reference in all cases. The GALL report was revised to address this comment.
G-IVB2-15	B2.5.1, B2.5.6, B2.5.7	Of this grouping, IASCC should only apply to item number B2.5.1 (Lower Core Plate).	The lower core plate is the only item that is exposed to neutron fluences in excess of the embrittlement threshold.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. This line item provides the AMP for crack initiation and growth that may be caused by SCC and for some components IASCC. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-16	B2.5.2, B2.5.5, B2.5.7	Of this grouping, IASCC should only apply to item number B2.5.2 (Fuel Pins).	The fuel alignment pin is the only item that is exposed to neutron fluences in excess of the embrittlement threshold.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. This line item provides the AMP for crack initiation and growth that may be caused by SCC and for some components IASCC. The GALL report was revised to address this comment.
G-IVB2-17	B2.5.2, B2.5.5	Of this grouping, reduction in fracture toughness due to irradiation embrittlement should only apply to item number B2.5.2 (Fuel Pins).	The fuel pin is the only item that is exposed to neutron fluences in excess of the embrittlement threshold.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB2-18	B2.5.3, B2.5.4	IASCC should not apply to these items.	Neither of these is expected to be exposed to neutron fluences in excess of the embrittlement threshold.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB2-19	B2.5.3, B2.5.4	Reduction in fracture toughness due to irradiation embrittlement should not apply to these items.	Neither of these is expected to be exposed to neutron fluences in excess of the embrittlement threshold.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-20	B2.6.2	For wear, the Reference column should include I&E Bulletin 88-09, existing program material should be replaced with "utility response to Bulletin 88-09", and Technical Basis column should reflect Bulletin 88-09 requirements.	B 88-09 is the basis for the current programs.	NRC BL 88-09 requirements were included in the GALL report. The utility response to the Bulletin was cited in the AMP column, generally in accordance with the NEI comment. In addition, ASME Section XI inspection requirements were included in the AMP column. The GALL report was revised to address this comment.
G-IVB2-21	B2.2.1, B2.4.2	References to the Code were deleted for items B2.2.1 (wear) and B2.4.2 (stress relaxation), and references to the Tech Specs were deleted for item B2.4.2 (SCC/IASCC).	Need to confirm if this is an issue.	NEI confirmed at the December 21, 2000, meeting that this was not an issue. The GALL report was not revised to address this comment.
G-IVB2-22	B2.2.1	Delete rod drop time testing to detect wear of the guide tube cards.	Rod drop time testing will not detect wear of the RCA Guide tube during operation. This test is done prior to startup and if the rods do not meet the rod drop time specified; action must be taken prior to startup.	The wear would be insignificant. This was confirmed in WCAP 14577. The GALL report was revised to address this comment.
G-IVB2-23	Page IVB2-25	The rows on page IVB2-25 are not aligned with their corresponding items on Page IVB2-24. It appears that the last row should be at the top of the page. Correct the alignment.	Editorial.	Alignment of rows and items was corrected. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB2-24	B2.6.2	Loss of Material due to Wear on the Flux Thimbles is described as "same as" wear on the upper core plate alignment pins. Delete this and replace with reference to I&E Bulletin 88-09. Program should be "utility response to Bulletin 88-09." Technical basis should reflect 88-09 requirements.	The type of wearing action is substantially different between the flux thimble and the core plate alignment pins. Utility action was required in response to 88-09.	NRC GL 88-09 requirements were included in GALL report. See NRC disposition of NEI Comment G-IVB2-20 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB3-1	B3.1.1, B3.1.3	Delete IASCC as a contributing mechanism.	IASCC is not a likely aging mechanism because of the very low oxygen environment and the relatively low neutron fluence. SCC is the only likely mechanism. The likelihood of cracking such as was observed in stainless steel baffle bolts has no relevance to Combustion Engineering upper internals assemblies.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-2	B3.1.1, B3.1.3	Delete Void Swelling as a contributing mechanism.	Void swelling is not a likely aging mechanism for the upper internals assembly because of the very low neutron fluence. The likelihood of embrittlement due to swelling is even more remote because irradiation hardening is associated with over 10% swelling in Fast Breeder Reactor cladding. No swelling is expected, therefore, embrittlement due to 10% swelling is not possible. Industry programs to address the occurrence and significance of void swelling will be used as part of the Core Shroud Assembly aging management activity to establish the need for an inspection program.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB3-3	B3.2.1, B3.2.2	Delete IASCC as a contributing mechanism.	IASCC is not a likely aging mechanism because of the very low oxygen environment and the relatively low neutron fluence. SCC is the only likely mechanism. The likelihood of cracking such as was observed in stainless steel baffle bolts has no relevance to Combustion Engineering CEA shroud assemblies and bolts.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-4	B3.2.1, B3.2.2	Delete Void Swelling as a contributing mechanism.	Void swelling is not a likely aging mechanism for the CEA shroud assemblies and bolts because of the very low neutron fluence. The likelihood of embrittlement due to swelling is even more remote because irradiation hardening is associated with over 10% swelling in Fast Breeder Reactor cladding. No swelling is expected, therefore, embrittlement due to 10% swelling is not possible. Industry programs to address the occurrence and significance of void swelling will be used as part of the Core Shroud Assembly aging management activity to establish the need for an inspection program.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB3-5	B3.3.1, B3.3.2	Delete IASCC as a contributing mechanism.	IASCC is not a likely aging mechanism because of the very low oxygen environment and the relatively low neutron fluence. SCC is the only likely mechanism. The likelihood of cracking such as was observed in stainless steel baffle bolts has no relevance to Combustion Engineering Core Support Barrels.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-6	B3.3.1, B3.3.2	Delete Void Swelling as a contributing mechanism.	Void swelling is not a likely aging mechanism for the Core Support Barrel (CSB) because of the very low neutron fluence and the low irradiation temperature. (The CSB is in direct contact with reactor coolant inlet water that is nominally 550F.) The likelihood of embrittlement due to swelling is even less remote because irradiation hardening is associated with over 10% swelling in Fast Breeder Reactor cladding. No swelling is expected, therefore, embrittlement due to 10% swelling is not possible. Industry programs to address the occurrence and significance of void swelling will be used as part of the Core Shroud Assembly aging management activity to establish the need for an inspection program.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-7	B3.3.1, B3.3.2	Modify the threshold value for loss of fracture toughness, or delete as a contributing mechanism.	Loss of fracture toughness due to neutron irradiation embrittlement in Combustion Engineering Core Support Barrels is not a credible aging degradation mechanism because the austenitic stainless steel used to construct the CSB will retain significant amounts of ductility through its service life. The fluence threshold of $1x10^{17}$ n/cm^2 is at least four orders of magnitude too low for loss of significant fracture toughness in austenitic stainless steel. There currently are industry programs underway to address the occurrence and significance of changes in strength and ductility due to neutron irradiation that can be used to determine the need to monitor loss of fracture toughness due to neutron irradiation embrittlement in CSBs.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB3-8	B3.4.1, B3.4.3	Delete Void Swelling as a contributing mechanism.	Void swelling in the Core Shroud Assembly will be addressed through an industry program on the occurrence and significance of void swelling. The likelihood of embrittlement due to swelling is remote because irradiation hardening is associated with over 10% swelling in Fast Breeder Reactor cladding. Swelling as great as 10% is not expected, therefore, embrittlement due to 10% swelling is not likely.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-9	B3.4.1, B3.4.3	Modify the threshold value for loss of fracture toughness, or delete as a contributing mechanism.	Loss of fracture toughness due to neutron irradiation embrittlement in Combustion Engineering Core Shroud Assemblies is not a credible aging degradation mechanism because the austenitic stainless steel used to construct the CSB will retain significant amounts of ductility through its service life. The fluence threshold of $1x10^{17}$ n/cm^2 is at least four orders of magnitude too low for loss of significant fracture toughness in austenitic stainless steel. There currently are industry programs underway to address the occurrence and significance of changes in strength and ductility due to neutron irradiation that can be used to determine the need to monitor loss of fracture toughness due to neutron irradiation embrittlement in Core Shroud Assemblies.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB3-10	B3.4.2	Delete IASCC as a contributing mechanism.	IASCC is not a likely aging mechanism because of the very low oxygen environment and the relatively low neutron fluence. SCC is the only likely mechanism. The likelihood of cracking such as was observed in stainless steel baffle bolts has no relevance to Combustion Engineering lower internals assemblies.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-11	B3.5.1 through B3.5.6	Delete IASCC as a contributing mechanism.	IASCC is not a likely aging mechanism because of the very low oxygen environment and the relatively low neutron fluence. SCC is the only likely mechanism. The likelihood of cracking such as was observed in stainless steel baffle bolts has no relevance to Combustion Engineering Core Shroud Assembly Bolts.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.
G-IVB3-12	B3.5.1 through B3.5.6	Delete Void Swelling as a contributing mechanism.	Void swelling is not a likely aging mechanism for the lower internals assembly because of the very low neutron fluence. The likelihood of embrittlement due to swelling is even less remote because irradiation hardening is associated with over 10% swelling in Fast Breeder Reactor cladding. No swelling is expected, therefore, embrittlement due to 10% swelling is not possible. Industry programs to address the occurrence and significance of void swelling will be used as part of the Core Shroud Assembly aging management activity to establish the need for an inspection program.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-13	B3.5.1 through B3.5.6	Modify the threshold value for loss of fracture toughness, or delete as a contributing mechanism.	Loss of fracture toughness due to neutron irradiation embrittlement in Combustion Engineering lower internals assemblies is not a credible aging degradation mechanism because the austenitic stainless steel used to construct the components will retain significant amounts of ductility through its service life. The fluence threshold of $1x10^{17}$ n/cm^2 is at least four orders of magnitude too low for loss of significant fracture toughness in austenitic stainless steel. There currently are industry programs underway to address the occurrence and significance of changes in strength and ductility due to neutron irradiation that can be used to determine the need to monitor loss of fracture toughness due to neutron irradiation embrittlement in lower internals assemblies.	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-14	IV.B3.1.1- IV.B3.1.3, IV.B3.2.1, IV.B3.2.2, IV.B3.3.1, IV.B3.3.2, IV.B3.4.1, IV.B3.4.2, IV.B3.4.3, IV.B3.5.1, IV.B3.5.1, IV.B3.5.3, IV.B3.5.4, IV.B3.5.5, IV.B3.5.6	Remove entry for IASCC.	IASCC is listed as an Aging Mechanism for the Upper Internals Assembly, CEA Shroud Assembly, Core Shroud Bolts, Core Support Barrel, Core Shroud/Tie Rod, and Lower Internals Assembly. The low levels of dissolved oxygen in a PWR environment and the low applied strain of the RV Internals components cause IASCC to be an unlikely Aging Mechanism for this device type. This position was accepted in NUREG-1705. This entry does not present conclusive evidence that this mechanism is plausible. This mechanism has been observed in BWRs where oxygen levels are considerably higher than in PWRs. A similar Aging Mechanism has also been observed in PWR CEDM tips where very high strain is applied at very low strain rate in a high fluence field. However, there is not conclusive evidence of IASCC for device types with the temperature, oxygen and radiation levels present for the RV Internals either in operating plants or in laboratory tests. Since there is not clear agreement on this Aging Existing AMP. Prior to year 40, if it is determined that IASCC is a significant issue in the renewal term, they would agree to develop a sufficient inspection program	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-14 (cont.)			(including the basis, methods, locations to be examined, timing frequency and acceptance criteria) for management of the issue based upon the results of the industry information. This agreement would not constitute consideration of this Aging Mechanism as requiring management and the agreement would not constitute a "credited program" at this time.	

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-15	IV.B3.1.1- IV.B3.1.3, IV.B3.2.1, IV.B3.2.2, IV.B3.3.1, IV.B3.3.2, IV.B3.4.1, IV.B3.4.2, IV.B3.4.3, IV.B3.5.1, IV.B3.5.2, IV.B3.5.3, IV.B3.5.4, IV.B3.5.5, IV.B3.5.6	Remove references to ISI in entry for SCC.	SCC is listed as an Aging Mechanism for the Upper Internals Assembly, CEA Shroud Assembly, Core Shroud Bolts, Core Support Barrel, Core Shroud/Tie Rods, and Lower Internals Assembly. SCC/IGSCC is not plausible for this device type due to non-susceptible material (Alloy Steel, Stainless Steel and/or Nickel Base Stainless Steel), lack of high tensile stresses and control of water chemistry. SCC is not a concern for SS components in treated borated water where chemistry controls maintain halides < 150 ppb or sulfates < 100 ppb (BAW-2270). Chemistry controls in accordance with industry guidelines assure this requirement is met. Therefore, for SCC, chemistry programs in accordance with industry guidelines alone should be credited. A similar position was accepted in NUREG-1705. This entry does not present conclusive evidence that this mechanism is plausible. The References, Existing AMP, Evaluation and Technical Basis, and Further Evaluation entries should be rewritten to correspond to the provided example.	The NEI comment is consistent with NUREG-1705; but this change is not consequential since “crack initiation and growth” due to IASCC remains as an aging effect that must be managed by applicants. There is also the need to have confirmation of the effectiveness of chemistry control with ISI. See NRC disposition of NEI comment G-IV-4 in this Appendix B, Section B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-16	IV.B3.2.2, IV.B3.4.2, IV.B3.4.3	Remove references to loose parts monitoring in entry for Stress Relaxation.	Loose parts monitoring will not discover degradation resulting from stress relaxation until after the intended function has failed. ISI is adequate for aging management; loose parts monitoring adds no value for aging management.	See NRC disposition to NEI comment G-IVB2-10 in this Appendix B. Section B.2.3. According to WCAP, it should be ISI and Neutron Noise or Loose Parts Monitoring. Loose parts monitoring could detect stress relaxation during power operation before the loss of the intended function. Since the bolts are redundant, loose parts monitoring might pick up degradation upon the first bolts degradation or failure. The inspection is required by ISI only once every 10 years during the shutdown period. This is similar to those identified in Westinghouse WCAP 14577 recommendations (from this point of view, Westinghouse is typical). GALL does not recommend any additional programs, other than existing requirements, for this aging effect. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB3-17	IV.B3.3.1, IV.B3.3.2, IV.B3.4.1, IV.B3.4.2, IV.B3.4.3, IV.B3.5.1, IV.B3.5.2, IV.B3.5.3, IV.B3.5.4, IV.B3.5.5, IV.B3.5.6	For Neutron Irradiation Embrittlement, include enhanced VT-1, with no further evaluation, as an option for aging management.	This program combination was accepted in NUREG-1705.	Recommend the use of enhanced VT-1 to detect tight cracks in non-bolted applications. No further evaluation is required for these components. This option was given for SCC/IASCC and neutron embrittlement and further evaluation was changed to “no.” For license renewal of Calvert Cliffs, enhanced VT-1 examination was accepted for management of IASCC and neutron embrittlement of the most susceptible RVI components. For non-bolted applications, this is an acceptable program. For bolted applications, this is not an acceptable AMP because the area(s) of interest are not accessible for visual examination. An UT examination is recommended for the bolting. A new program was developed in chapter XI to articulate this approach. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB4-1	B4.	Incore guide tube assembly items are missing. See BAW-2248A.	Missing internals items.	The pertinent component is the "incore guide tube spider castings," which are subject to loss of fracture toughness due to thermal aging embrittlement. The GALL report was revised to include these components as Item B4.6.11. The GALL report was revised to address this comment.
G-IVB4-2	All Items	Fatigue TLAA is applicable to replacement bolts (core barrel and thermal shield) only. TLAA not applicable to the majority of internals items. See BAW-2248A.	B&W internals designed prior to Section III rules for design of RV internals.	To account for plants built prior to Section III rules, the fatigue statement was revised as follows: For components for which a fatigue analysis has been performed for the 40 y period, fatigue is a time-limited aging analysis (TLAA) to be performed for the period of license renewal, and for Class 1 components, environmental effects on fatigue are to be addressed. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB4-3	B4.1.1-B4.1.3 Plenum cover and plenum cylinder and CSS B4.4.1-B4.4.5 and flow distributor and lower internals	SCC and IASCC are unlikely mechanisms for these items due to water chemistry and fluence. The B&WOG and NRC did not agree on thresholds; however, the NRC did agree that augmented inspections at limiting locations would be appropriate and bound other locations that may be susceptible to these mechanisms. AMP—the program description does not include provisions to identify limiting items and perform augmented inspections. The limiting items may not be associated with the plenum assembly and are most likely part of the core barrel assembly (e.g., baffle bolts).	See BAW-2248A—Applicant Action Items.	The following was added as a new item under "Aging Management Program" for these items: "An acceptable AMP consists of the following elements: identify the most susceptible or limiting items, develop appropriate inspection techniques to permit detection and characterizing of the features (cracks) of interest and demonstrate the effectiveness of the proposed techniques, and implement the inspections during the license renewal term." This statement was added for B4.1.1-B4.1.3, B4.4.1, B4.4.3, and B4.4.4 and items other than boltings in B4.6, B4.7, and B4.8. The GALL report was revised to address this comment.
G-IVB4-4	B4.1.1-B4.1.5, page IV B4-10 and all items	Void Swelling—See comment number 14 above. Void swelling of the plenum cover and plenum cylinder unlikely owing to low fluence.	BAW-2248A	See NRC disposition of NEI comment G-IV-4 in this Appendix B, Table B.2.3. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVB4-5	B4.2.1-B4.2.5, page IV B4-12	Loss of Fracture Toughness—AMP should include provisions to ID limiting items and perform augmented inspections at those locations.	BAW-2248A	The following statement was added in "Aging Management Program" column for these items: "An acceptable AMP consists of the following elements: identify the most susceptible or limiting items, develop appropriate inspection techniques to permit detection and characterizing of the features (cracks) of interest and demonstrate the effectiveness of the proposed techniques, and implement the inspections during the license renewal term." This statement was added to B4.4.2, B4.4.4-B 4.4.8. The GALL report was revised to address this comment.
G-IVB4-6	B4.3.2, page IV B4-16 and all subsequent items where loss of fracture toughness is listed	Delete fluence threshold of 1.0E17.	No justification is provided for the fluence threshold and calculation of fluence at the spacer castings is very difficult (i.e., large uncertainties).	A statement was added to Chapter X1.M2, "Thermal Aging and Neutron Embrittlement of Cast Austenitic Stainless Steel (CASS)," about participation in industry program to determine fluence threshold for irradiation embrittlement of CASS components. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVC1-1	IV-C1.1.5 through C1.11, C1.1.13	Delete the last sentence under the "Preventive Action" statement. If the staff insists on retaining a statement, revise the last sentence to read: "Also, hydrogen addition may be used to enhance the inhibition of IGSCC."	Use of HWC is an option an owner may want to use. However, control of water chemistry by implementing TR-103515 is sufficient.	The GALL report was revised appropriately. VIP-62 reference has been added to the GALL report for plants using hydrogen water chemistry. Both VIP-62 and VIP-75 were added as references. (VIP-75 refers to revised inspection program for piping.) The GALL report was revised to address this comment.
G-IVC1-2	IV-C1.1.5 through C1.11	Revise the "Parameters Monitored/Inspected" to read: "Inspection and flaw evaluation are to be performed in accordance with GL 88-01 or the referenced BWRVIP guideline as approved by the NRC staff."	The GL 88-01 reference is appropriate.	The BWRVIP guideline was included in GALL as suggested by the comment. The GALL report was revised to address this comment.
G-IVC1-3	IV-C1.1.5 through C1.11, C1.1.13, C1.2.1, C1.3.1, C1.3.2, C1.4.1 through C1.4.4	In every location where the GALL refers to BWRVIP-29 (TR-103515), replace the reference with "EPRI TR-103515, Rev. 2 (BWRVIP-79) or later approved version of TR103515.	The EPRI document referred to has been updated as of March 2000. The latest issue is TR-103515, Rev.2. NRC staff in EMCB has the document. This document is updated periodically to identify the latest enhancements to the water chemistry programs. As such, the GALL ought to recognize such.	See NRC disposition of NEI comment G-IVA1-1 in this Appendix B, Table B.2.3. The GALL report was not revised to address this comment.
G-IVC2-1	Page IVC2-11 through IVC2-19	Multiple entries with "same as…" are not in italics. Convert all "same as…" to italics.	Need to be consistent with general format.	The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVC2-2	C2.1.1-C2.1.4, page IV C2-4	Add crack growth due to service (cyclic) loadings as a mechanism. SCC of carbon steel pipe is unlikely. The AMP discusses Exam. Category B-J but is silent with regard to risk-informed ISI.	EPRI- NP-1406-SR discusses the mechanism.	SCC was removed as an aging mechanism for carbon steel pipe. The GALL report was revised to address this comment.
G-IVC2-3	C2.1.5	Unanticipated thermal and mechanical loading is not a valid aging mechanism - Delete.	If a mechanism is not anticipated, then it cannot be managed in anticipation. This is not an aging mechanism, it is a design issue.	A global change was made deleting the words “not anticipated” or “unanticipated” as related to thermal and mechanical loading. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVC2-4	C2.1.5	Program parameters monitored should be modified to allow the use of industry experience as inspections of small bore piping are done instead of requiring a plant-specific inspection.	As experience is gained with these inspections, if the same material / environment combination exists, a plant-specific inspection may not be necessary.	Operating experience demonstrates that small-bore piping has an aging effect that requires managing in the extended term. GALL recommends that a plant-specific destructive examination or a nondestructive examination (NDE) that permit inspection of the inside surfaces of the piping needs to be conducted. For Class 1 piping with a diameter smaller than nominal pipe size (NPS) 4 inch, GALL recommends the one-time inspection be performed to confirm whether crack initiation and growth due to stress corrosion cracking (SCC) or cyclic loading is occurring or not. This one-time inspection can also verify the effectiveness of the chemistry program. The GALL report was not revised to address this comment.
G-IVC2-5	C2.1.5	Small-bore piping is either stainless steel, Alloy 600, or stainless steel clad carbon steel. In addition, loose or displaced thermal sleeves in HPI (2 ½-inch NPS) connections are not addressed. AMP requires augmented inspection of thermal sleeves per GL 85-20.	There is no small bore CS.	Carbon steel was deleted as a material for small-bore piping. The GALL report was revised to address this comment

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVC2-6	C2.3.1	RCP Casing – Thermal Embrittlement. The AMP and Technical Basis text refer to thermal aging for valve body. Change to RCP casing.	Correct topic is RCP casing.	The AMP and Technical basis text correctly refers to thermal aging of RCP casing. The GALL report was not revised to address this comment.
G-IVC2-7	C2.4.3	Valve closure bolting is either HSLAS or SS. Aging effect is loss of closure integrity by cracking and loss of preload.	BAW-2243A	Add SS to “Materials” column and cracking and loss of preload to “Aging Mechanism” column. The GALL report was revised to address this comment.
G-IVC2-8	C2.5.8	Manway and Flange—aging effect of loss of material on external surface of the manway was omitted.	BAW-2244A	Add aging effect of loss of material on external surface of the manway. The GALL report was revised to address this comment.
G-IVC2-9	C2.5.12	Cracking at weld that connects the pressurizer support plate to the shell was omitted.	BAW-2244A	Add cracking at weld that connects the pressurizer support plate to the shell. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVD1-1	D.1.1.3, D1.1.4	Evaluation of Technical Basis – Discussion of NRC IN 90-04 should be deleted regarding general corrosion and pitting of the SG shell. The conclusion that additional inspection may be required that are associated with the IN discussion should also be deleted.	IN 90-04 Cracking of Upper shell to Transition Girth Welds does not discuss cracking of SG shell remote from welds. The problems discussed in this IN were in –W-model 44 and 51 SGs and were discovered during ISI weld inspections.	NRC IN 90-04 does refer to general corrosion and pitting of inside surface of SG shell girth weld. IN 90-04 states: “However, if general corrosion pitting of the SG shell is known to exist, the requirements of Section XI of the ASME Code may not be sufficient to differentiate isolated cracks from inherent geometric conditions” (see IN 90-04, 3rd page, 2nd paragraph). Pitting has been reported at the PWR steam generator girth welds (NUREG/CR 4868). ASME Section XI requires only volumetric inspections of the girth welds to detect cracks. But additional examinations (i.e., visual and surface examinations) are required to detect pitting and general corrosion. IN 90-04 also states: “The flaw indications can be detected with enhanced UT procedures that are performed by experienced nondestructive examination personnel. The upper shell-to-transition cone weld is located at a gross structural discontinuity. The weld is relatively wide and typically has an irregular crown. These inherent geometric features commonly result in innocuous reflectors. In addition, subsurface flaw indications are known to exist near the inside diameter surface of SGs at several

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVD1-1 (cont.)				plant sites. In order to distinguish innocuous reflectors from cracks, the following processes may be necessary: scanning at a high gain, the use of multiple transducers with optimum angles, careful plotting of reflector locations, and examination by experienced personnel." The rules of Section XI of the ASME Code require a volumetric examination of one upper shell-to-transition cone weld during each 10-year inspection interval. The required examinations may be limited to one SG or may be distributed among all the SGs. However, if general corrosion pitting of the SG shell is known to exist, the requirements of Section XI of the ASME Code may not be sufficient to differentiate isolated cracks from inherent geometric conditions. In lieu of volumetric examinations, visual and MT examinations of the interior circumference of the girth weld were used by the licensee of Indian Point Unit 2 to detect the surface-connected flaws. The GALL report was not revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVD1-2	D1.1.9	Evaluation of technical basis – delete discussion about potential cracking in cladding remote from welds.	There is no justification provided to show that existing ASME inspections are not sufficient. The operation experience cited deal primarily with alloy 600 issues (IN 90-10 and 90-30). In 84-18 provides general information on SCC with a focus on systems, which generally are in standby or where contaminants have been introduced into the system.	D1.1.9 was made consistent with Items A2.4.1 to A2.4.3 and required the following changes: Deleting discussion about potential cracking in cladding remote from welds and (2) Changing Further Evaluation column from “yes” to “no.” The GALL report was revised to address this comment.
G-IVD1-3	D1.2.1	Fatigue of SG tubes is treated “same as” fatigue of top head, steam nozzle and safe end. Add the following. “For plants where analyses were completed in response to Bulletin 88-02, “Rapidly Propagating Cracks in SG Tubes,” the results of those analyses have to reconfirmed for the period of life extension.	The type of fatigue analysis is different for certain tube locations.	The analysis for 88-02 was made a part of the denting AMP; fatigue was left alone. Environmental effects were also considered. The GALL report was revised to address this comment.
G-IVD1-4	D1.2.1	SG Tubes – Fretting and Wear – under Technical Basis (2) The program provides no guidance or recommendations…. Change to “NEI 97-06 includes foreign material exclusion as a means to inhibit fretting and wear degradation.	Incorporate available guidance from existing program.	The revised AMP “Steam Generator Tube Integrity” (XI.M19) was revised to incorporate the gist of the NEI comment and to reference NEI 97-06 as suggested. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVD1-5	D1.2.1	Technical Basis (5), change the referenced inspection interval for PWSCC to be consistent with the recommendation under Secondary Side visual inspection in NEI 97-06.	Incorporate available guidance from existing program.	The revised AMP "Steam Generator Tube Integrity" (XI.M19) was revised to incorporate the gist of the NEI comment and to reference NEI 97-06 as suggested. The GALL report was revised to address this comment.
G-IVD1-5 (cont.)		Technical Basis (6) incorrectly discusses PWSCC. Replace with "Loose parts or foreign objects that are found should be removed from the steam generators unless it can be shown by evaluation that these objects do not cause unacceptable tube damage. The evaluation will define an acceptable operating interval."	Incorporate available guidance from existing program.	The revised AMP "Steam Generator Tube Integrity" (XI.M19) was revised to incorporate the gist of the NEI comment and to reference NEI 97-06 as suggested. The GALL report was revised to address this comment.
G-IVD1-6	D1.2.1	For Aging Mechanism = General Pitting and Corrosion, under Technical Basis (6), add the performance criteria identified in NEI 97-06.	Incorporate available guidance from existing program.	The revised AMP "Steam Generator Tube Integrity" (XI.M19) was revised to incorporate the gist of the NEI comment and to reference NEI 97-06 as suggested. The GALL report was revised to address this comment.
G-IVD1-7	D1.2.1	For "denting due to corrosion of tube support plates" change aging mechanism to specify carbon steel tube support plates.	Denting has not been experienced with stainless steel support plates.	Add "corrosion of carbon steel tube support" in "Aging Mechanism" column. This was also UCS report review finding. The GALL report was revised to address this comment.

Table B.2.3: Disposition of NEI Comments on Chapter IV of GALL Report (continued)

Comment Number	Item Number	Comment/Proposed Change	Basis for Comment	NRC Disposition
G-IVD1-8	D1.2.1	Tube support lattice bars / FAC… Consider adding Carbon Steel Tube Support Plates as separate item. Effect = ligament cracking, mechanism = corrosion. AMP = Program in accordance with NEI 97-06.	Corrosion of carbon steel support plates has a detrimental effect on SG tubes where they pass through the support plate. Denting of tubes is a secondary effect.	Add additional item to address corrosion of carbon steel tube support plate (Item D1.2.4). Aging effect is ligament cracking. The AMP was in accordance with NEI 97-06. The GALL report was revised to address this comment.
G-IVD2-1	D2.1.3	Primary OTSG inlet and outlet nozzles do not have SS safe ends. Loss of material due to boric acid corrosion on external nozzles was omitted.	NUREG-1723	Delete SS safe ends and add loss of material due to boric acid corrosion on external surface of nozzles. The GALL report was revised to address this comment.
G-IVD2-2	D21.8, page D2-12	Secondary side nozzles are susceptible to SCC and not PWSCC.		Secondary side nozzles are susceptible to SCC and not PWSCC. The GALL report was revised to address this comment.

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