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Sent: Thursday, July 01, 2010 6:42 PM
To: NRCREP Resource
Subject: Response from "Comment on NRC Documents"

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Below is the result of your feedback form. It was submitted by

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Document_Title: Generic Aging Lessons Learned (GALL) Report, NUREG-1801, Revision 2, April 2010 Draft

Comments: Comment 1: Typographical. Table IV B2, Item IV.B2.RP-272, Column 6. Move the first semi-colon (after the word "toughness") to the location after the word "embrittlement." See Item IV.B2.RP-354, Item IV.B2.RP-274, and other items with the same series of Degradation Effects/Mechanisms.

Comment 2: Typographical. Table IV B2, Item IV.B2.RP-301, Column 2. Change "V.B2-40 (R-112)" to "IV.B2-40 (R-112)."

Comment 3: Technical. Table IV B2, Items IV.B2.RP-301, IV.B2.RP-299, IV.B2.RP-284, IV.B2.RP-355, IV.B2.RP-356, IV.B2.RP-285, IV.B2.RP-289, IV.B2.RP-288, and IV.B2.RP-346, Column 7. Eliminate the reference to "no Expansion components" since there are never any Expansion Components associated with Existing Program Components.

Comment 4: Technical. Table IV B2, Item IV.B2.RP-300, Column 6. Write the Mechanism/Effect as simply "Loss of preload."

Comment 5: Technical. Table IV B2, Items IV.B2.RP-301 and IV.B2.RP-299. We recommend that Item IV.B2.RP-301 be eliminated, with only Item IV.B2.RP-299 retained. Although Table 3-3 (Page 3-24) of MRP-227 shows an "X" for both SCC and wear, Table 4-9 (Page 4-69) of MRP-227 shows only "Loss of material (Wear)" as the Effect (Mechanism) for which the Existing Section XI visual examination program is credited.

Comment 6: Technical. Table IV B2, Items IV.B2.RP-272, IV.B2.RP-274, and IV.B2.RP-287. We recommend that these three items be eliminated, with only Items IV.B2.RP271, IV.B2.RP-273, and IV.B2.RP286 retained. Although Table 3-3 (Page 3-23) of MRP-227 also shows "P" for IE, VS, and ISR/IC, Table 4-3 (Page 4-25) of MRP-227 shows only Cracking (IASCC and Fatigue), and the examination requirements only apply to those two Effects (Mechanisms).

Comment 7: Typographical. Table IV B2, Items IV.B2.RP-275 and IV.B2.RP-354, Column 3. Change "Baffle-to-former assembly: barrel-edge bolts (all plants with baffle-edge bolts)" to "Baffle-to-former assembly: baffle-edge bolts (all plants with baffle-edge bolts)" for both items.

Comment 8: Technical. Table IV B2, Item IV.B2.RP-354. We recommend that this item be eliminated with only Item IV.B2.RP-275 retained. Although Table 3-3 (Page 3-23) of MRP-227 also shows "P" for IE, VS, and ISR/IC, Table 4-3 (Page 4-25) of MRP-227 shows only Cracking (IASCC and Fatigue), and the examination requirements only apply to those two Effects (Mechanisms).

Comment 9: Technical. Table IV B2, Items IV.B2.RP-298, IV.B2.RP-297, IV.B2.RP-291, IV.B2.RP-293, IV.B2.RP-290, and IV.B2.RP-292.

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First, in Columns 2 and 3 for Items IV.B2.RP-298 and IV.B2.RP-297, change “weld” to “welds” and “Cast austenitic stainless steel” to “Stainless steel,” since the concern is all of the CRGT lower flange welds and Table 3-3 (Page 3-23) of MRP-227 erroneously lists the items as “Lower Flanges” made of CF8, rather than 304 SS Lower Flange Welds.

Second, we recommend that Item IV.B2.RP-297 be eliminated, retaining only Item IV.B2.RP-298. Although Table 3-3 (Page 3-23) of MRP-227 also shows “P” for TE and IE, Table 4-3 (Page 4-24) of MRP-227 shows only Cracking (SCC and Fatigue), and the examination requirements only apply to those two Effects (Mechanisms).

Third, we recommend that Item IV.B2.RP-290 be eliminated, retaining only Item IV.B2.RP-291. Although Table 3-3 (Page 3-24) of MRP-227 shows “E” for both IASCC and IE, Table 4-6 (Page 4-34) of MRP-227 shows only IASCC, and the examination requirements only apply to this Effect (Mechanism).

Fourth, we recommend that Item IV.B2.RP-292 be eliminated, retaining only Item IV.B2.RP-293. Although Table 3-3 (Page 3-23) of MRP-227 shows “E” for both Fatigue and IE, Table 4-6 (Page 4-34) of MRP-227 shows only Cracking (Fatigue), and the examination requirements only apply to this Effect (Mechanism).

Comment 10: Typographical. Table IV B2, Item IV.B2.RP-355, Column 7. Change “Existngn” to “Existing.”

Comment 11: Technical. Table IV B2, Items IV.B2.RP-276, IV.B2.RP-278, IV.B2.RP-280, IV.B2.RP-281, IV.B2.RP-282, IV.B2.RP-294, and IV.B2.RP-295.

First, we recommend that IV.B2.RP-276 be identified only with SCC, as shown in Table 4-3 (Page 4-24) of MRP-227, since Table 3-3 (Page 3-24) of MRP-227 shows a “P” for SCC and a “E” for IASCC and the “P” classification governs. However, the EVT-1 inspection does not distinguish between cracking mechanisms.

Second, there is no problem with Item IV.B2.RP-278. However, there is a discrepancy between Table 3-3 (Page 3-24) of MRP-227 and Table 4-6 (Page 4-33) of MRP-227 with respect to the Expansion Components for the upper core barrel flange weld (IV.B2.RP-276). The item listed as “Core Barrel Axial Welds” in Table 3-3 should be listed as “Lower Core Barrel Flange Weld.” Then, Items IV.B2.RP-280 and IV.B2.RP-281 should be eliminated. Item IV.B2.RP-282 takes their place, except that Column 6 should read “Cracking due to stress corrosion cracking and fatigue.”

Third, Item IV.B2.RP-345 is correct, in that loss of material due to wear is being managed for the core barrel flange by Existing Program elements. However, we recommend that a new item be added – perhaps IV.B2.RP-280 – that identifies the Core Barrel Assembly core barrel flange as an Expansion Component (see Table 4-6 on Page 4-33 of MRP-227) that shows cracking due to SCC and fatigue as an Expansion Component linked to Item IV.B2.RP-276, similar to Item IV.B2.RP-278 and the corrected Item IV.B2.RP-282.

Fourth, we recommend that Item IV.B2.RP-295 be eliminated, retaining only Item IV.B2.RP-294. Although Table 3-3 (Page 3-24) of MRP-227 shows “E” for both IASCC and IE, Table 4-6 (Page 4-33) of MRP-227 shows only Cracking (IASCC), and the examination requirements only apply to this Effect (Mechanism).

Comment 12: Typographical. Table IV B2. Occasionally in Column 3, “Lower internals assembly” is spelled incorrectly as “Lower internal assembly.”

Comment 13: Technical. Table IV B2, Items IV.B2.RP-289 and IV.B2.RP-288. Item IV.B2.RP-289 is correct. However, Column 6 of Item IV.B2.RP-288 should not mention IE, since the Existing Program elements will be unable to detect the degradation, even though IE is cited as “X” in Table 3-3 (Page 3-24) of MRP-227.

Comment 14: Technical.

First, Section IV.B.2, first sentence. The RCCAs were not in the scope of the Westinghouse reactor internals study. Any reference to rod control cluster assemblies should be removed.

Also, following the first paragraph of Section IV.B.2, we recommend that this new paragraph be added:

"Aging related degradation in the reactor internals is managed through an integrated program. Specific inspection requirements are listed in this section. Degradation due to changes in material properties (e.g., loss of fracture toughness) were considered in the determination of inspection recommendations and are managed by the requirement to use appropriately degraded properties in the evaluation of identified defects. These requirements are detailed in the aging management programs."

Note that this recommendation is accompanied by the suggested removal of multiple entries from the following table that do not directly correspond to the suggested recommendations in the MRP-227 tables.

Second, Section IV.B.3, first sentence. Only the CEA shrouds were in the scope of the CE reactor internals study. The section "control element assembly (CEA) shroud assemblies" should read "control element assembly (CEA) shrouds." It is not clear what the reference to "shroud assembly" means.

Also, following the first paragraph of Section IV.B.3, we recommend that this new paragraph be added:

"Aging related degradation in the reactor internals is managed through an integrated program. Specific inspection requirements are listed in this section. Degradation due to changes in material properties (e.g., loss of fracture toughness) were considered in the determination of inspection recommendations and are managed by the requirement to use appropriately degraded properties in the evaluation of identified defects. These requirements are detailed in the aging management programs."

Note that this recommendation is accompanied by the suggested removal of multiple entries from the following table that do not directly correspond to the suggested recommendations in the MRP-227 tables.

Comment 15: Technical. Table IV B3, Items IV.B3.RP-314, IV.B3.RP-315, IV.B3.RP-316, IV.B3.RP-317, IV.B3.RP-320, IV.B3.RP-321, IV.B3.RP-330, IV.B3.RP-331, and IV.B3.RP-358.

First, we recommend that Item IV.B3.RP-315 be eliminated, with Item IV.B3.RP-314 retained. Although Table 3-2 (Page 3-22) of MRP-227 shows "P" for IE, VS, and ISR/IC, in addition to the "P" for IASCC, Table 4-2 (Page 4-20) of MRP-227 identifies only the two cracking mechanisms (IASCC and Fatigue), and the examination requirements apply only to those two Effects (Mechanisms).

Second, we recommend that Item IV.B3.RP-317 be eliminated with Item IV.B3.RP-316 retained. However, the information in Column 3 of Item IV.B3.RP-317 should be moved to Column 3 of Item IV.B3.RP-316 (so that the > 3 dpa exposures apply to IASCC), and "and fatigue" needs to be added to Column 6 of Item IV.B3.RP-316.

Third, Items IV.B3.RP-320 and IV.B3.RP-321 are not Expansion components and instead are Existing Program components.

Fourth, we recommend that Item IV.B3.RP-331 be eliminated, retaining only Item IV.B3.RP-330. Although Table 3-2 (Page 3-23) of MRP-227 shows "E" for IE, in addition to the "E" for IASCC and Fatigue, Table 4-5 (Page 4-31) of MRP-227 identifies only the two cracking mechanisms (IASCC and Fatigue), and the examination requirements apply only to those two Effects (Mechanisms).

Fifth, we recommend that Item IV.B3.RP-358 be eliminated. Although Table 3-2 (Page 3-22) of MRP-227 shows "E" for IASCC, in addition to "P" for IE and VS, the latter two designations control, and Item IV.B3.RP-318 provides the aging management requirements.

Comment 16: Technical. Table IV B3, Item IV.B3.RP-319. Column 7 should be changed so that the words "Primary components (identified in the Structure and Components column) existing program" is replaced by the words "Existing program components (identified in the Structure and Components column). Also, eliminate the reference to "no Expansion components" since there are never any Expansion Components associated with Existing Program Components.

Comment 17: Technical. Table IV B3, Item IV.B3.RP-318. We recommend that loss of fracture toughness due to IE be eliminated from Column 6, since the aging management program elements are intended only to detect the effects of void swelling.

Comment 18: Technical. Table IV B3, Item IV.B3.RP-359. We recommend that loss of fracture toughness due to IE be eliminated from Column 6, since the aging management program elements are intended only to detect the effects of void swelling.

Comment 19: Typographical. Table IV B3, Items IV.B3.RP-342 and IV.B3.RP-366. Change "Core shroud assemblies" in Column 3 to "Lower Support Structure" and change "stee" in Column 4 to "steel"

Comment 20: Technical. Table IV B3, Items IV.B3.RP-342 and IV.B3.RP-366. Eliminate the reference to SCC and IASCC in Column 6 for Item IV.B3.RP-342 and eliminate Item IV.B3.RP-366 entirely. Although Table 3-2 (Page 3-21) of MRP-227 shows "X" for SCC and IASCC, and "P" for Fatigue and IE, Table 4-2 (Page 4-23) of MRP-227 lists only cracking from fatigue. However, the EVT-1 inspection does not distinguish between cracking mechanisms.

Comment 21: Typographical. Table IV B3, Item IV.B3.RP-322. Identify in Column 3 that the component of interest is the "core shroud plate-former plate weld" and correct the last part of Column 3 to read "...within six inches of central flange and horizontal stiffeners."

Comment 22: Technical. Table IV B3, Items IV.B3.RP-324, IV.B3.RP-360, and Item IV.B3.RP-361. We recommend the elimination of Item IV.B3.RP-360, retaining only Item IV.B3.RP-324. Although Table 3-2 (Page 3-22) of MRP-227 shows "P" for both IASCC and IE, Table 4-2 (Page 4-20) of MRP-227 lists only cracking from IASCC, and the aging management program elements are applicable only to that effect. For the same reason, we recommend that Item IV.B3.RP-361 be eliminated.

Comment 23: Technical. Table IV B3, Items IV.B3.RP-327, IV.B3.RP-328, IV.B3.RP-329, IV.B3.RP-335, IV.B3.RP-362, IV.B3.RP-363, and IV.B3.RP-364.

First, Although Table 3-2 (Page 3-21) of MRP-227 shows "P" for Fatigue and "E" for SCC, the lower core barrel flange weld is a Primary Component. Table 4-2 (Page 4-22) only designates cracking due to fatigue. Therefore, Column 7 should be changed from "Existing" to "Primary" and Column 6 should only reference "Cracking due to fatigue."

Second, Column 3 of Item IV.B3.RP-335 should identify applicability to all plants except those assembled with full-height shroud plates.

Third, we recommend that Item IV.B3.RP-362 be eliminated, since those welds are already included in Item IV.B3.RP-329, and only SCC is included in Table 4-5 (Page 4-30) of MRP-227.

Fourth, we recommend that Items IV.B3.RP-363 and IV.B3.RP-364 be eliminated. The welds are not subject to TE, although the core support columns are listed in Table 3-2 (Page 3-21) of MRP-227 as cast austenitic stainless steel, and the examination methods specified in Table 4-5 (Page 4-31) of MRP-227 are not applicable to IE.

Comment 24: Typographical. Table IV B3, Items IV.B3.RP-357, IV.B3.RP-336, and IV.B3.RP-334. Eliminate the reference to "no Expansion components" since there are never any Expansion Components associated with Existing Program Components.

Comment 25. Technical. Table IV B3, Item IV.B3.RP-336. In Column 6, eliminate reference to IE or VS. Even though Table 3-2 (Page 3-21) of MRP-227 shows "X" for IE and ISR/IC, in addition to the "X" for IASCC and Fatigue, Table 4-8 (Page 4-68) of MRP-227 identifies only the three cracking mechanisms (SCC, IASCC and Fatigue), and the examination requirements apply only to those three effects (mechanisms).

Comment 26: Technical. Table IV B3, Item IV.B3.RP-337. We recommend that this entry be deleted, since it appears to be a repeat of IV.B3.RP-342 and IV.B3.RP-366.

Comment 27: Table IV B4.

First, NUREG-1801, Revision 1 (2005) lists the following requirement under aging management program in Table IV B4:

"Upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan for reactor internals to the NRC for review and approval."

However, the NUREG-1801, Revision 2, draft has removed this submittal of an inspection plan requirement. Please clarify whether this requirement will be withdrawn for all PWR plants that have previously made this commitment in their license renewal applications and/or FSAR. In other words, if these PWR plants fulfill the implementation requirements listed in the current MRP-227 Revision 0, Section 7, no inspection plan or aging management program will be required to be submitted to NRC.

Second, the NUREG-1801, Revision 2 draft has removed "XI.M13 THERMAL AGING AND NEUTRON IRRADIATION EMBRITTLEMENT OF CAST AUSTENITIC STAINLESS STEEL (CASS)" that was in NUREG-1801, Revision 1 (2005). The current draft has added the following statement under Section XI.M12 "THERMAL AGING EMBRITTLEMENT OF CAST AUSTENITIC STAINLESS STEEL (CASS)":

"Aging management of CASS reactor internal components of pressurized water reactors (PWRs) are discussed in AMP XI.M16 and for boiling water reactor (BWR) CASS reactor internal components in AMP XI.M9."

By removing Section XI.M13 from the Rev. 2 draft, NRC has also removed the following alternative disposition method afforded in GALL Rev. 1 (2005) Section XI.M13, under "4. Detection of Aging Effects:" for reactor vessel internal CASS components that have a neutron fluence of greater than 1017 n/cm² (E>1 MeV) or are determined to be susceptible to thermal embrittlement:

- Alternatively, the applicant may perform a component-specific evaluation, including a mechanical loading assessment to determine the maximum tensile loading on the component during ASME Code Level A, B, C, and D conditions. If the loading is compressive or low enough (<5 ksi) to preclude fracture, then supplemental inspection of the component is not required. Failure to meet this criterion requires continued use of the supplemental inspection program.

The above alternative disposition method is not listed in GALL Rev. 2 draft Section XI.M16. Can PWR plants continue to use the above alternative disposition method in GALL Rev. 1 Section M.13 for the CASS components in the reactor internals?

We understand the purpose of including Items IV.B3.RP-339, IV.B3.RP-340, IV.B3.RP-309, IV.B3.RP-311, IV.B3.RP-306, and IV.B3.RP-307 for completeness.

Comment 28: Typographical. Table IV B4, Item IV.B4.RP-245. Add "IV.B4.RP-248" in the AMP column.

Comment 29: Typographical. Table IV B4, IV.B4.RP-241. Delete "(c)..." in the Structure & Component column and delete "SCC" in the Aging Effect column.

Comment 30: Typographical. Table IV B4, Item IV.B4.RP-240. Delete "(c)..." in the Structure & Component column.

Comment 31: Typographical. Table IV B4, Item IV.B4.RP-244. Delete "SCC" in the Aging Effect column.

Comment 32: Typographical. Table IV B4, Item IV.B4.RP-248. Add "IV.B4.RP-247" to the AMP column.

Comment 33: Typographical. Table IV B4, Item IV.B4.RP-252. Delete "nickel alloy" in the Material column.

Comment 34: Typographical. Table IV B4, Item IV.B4.RP-251. Delete "nickel alloy" in the Material column.

Comment 35: Typographical. Table IV B4, Item IV.B4.RP-256. Add "IV.B4.RP-248" to the AMP column.

Comment 36: Typographical. Table IV B4, Item IV.B4.RP-258. Delete "IV.B4.RP-260" in the AMP column.

Comment 37: Typographical. Table IV B4, Item IV.B4.RP-254. Add "IV.B4.RP-248" to the AMP column.

Comment 38: Typographical. Table IV B4, Item IV.B4.RP-246. Add "IV.B4.RP-248" to the AMP column.

Comment 39: Typographical. Table IV B4, Item IV.B4.RP-260. Delete "IV.B4.RP-258" in the AMP column.

Comment 40: Typographical. Table IV B4, Item IV.B4.RP-262. Delete "Stainless-Steel" in the Material column.

Comment 41: Typographical. Table IV B4, Item IV.B4.RP-240. Delete "(c)..." in the Structure & Component column.

Comment 42: Typographical. Table IV B4, Item IV.B4.RP-241. Delete "(c)..." in the Structure & Component column and delete "SCC" in the Aging Effect column.

Comment 43: Typographical. Table IV B4, Item IV.B4.RP-245. Add "IV.B4.RP-248" to the AMP column.

Comment 44: Technical. Table IV B4, Item IV.B4.RP-53. Add "Ductility, reduction in fracture toughness" to the Mechanism column and AMP column. This is a TLAA from BAW-2248A, Section 2.4, along with fatigue.

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