

Changes to the Subsequent License Renewal Documents Between May and July 2017

In May 2017, the staff issued a draft copy of NUREG-2191 Volume 1 and 2, “Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report, and NUREG-2192, “Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants,” prior to the final administrative reviews. The documents were subsequently issued as final in July 2017. Between May and July, the staff incorporated changes to address minor errors or clarifications. In addition, subsequent to the issuance of these documents, changes were incorporated into the to-be-issued NUREG-XXXX, “Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192,” and NUREG-XXXX, “Disposition of Public Comments on the Draft Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192,” to provide clarification of the staff’s intent for changes in the SLR documents from the corresponding license renewal documents issued in December 2010.

Changes are either annotated in underline and cross-out with accompanying highlighting or described.

Changes of Some Significance to NUREG-2191 and NUREG-2192

1. All AMPs; “operating experience” program element: removed the term “**relevant**” in association with the term “research and development;” however, the term “relevant” was not removed from GALL-SLR Appendix B, “Operating Experience for Aging Management Programs:”

Relevant research and development information should be reviewed to determine whether it might involve age-related degradation or impacts to aging management activities. **Relevant foreign and domestic research and development** would generally be subject to a consensus process, and would have used materials and test conditions typical of operating power reactors, including actual operating and environmental conditions. Examples of **relevant research and development** sources are: (a) industry consensus standards development organizations (e.g., ASME, IEEE, ACI, API, NACE, International Organization for Standardization); (b) Electric Power Research Institute (EPRI); (c) generic communications issued by the staff based on research conducted by national labs used by the NRC; and (d) nuclear steam supply system vendor and owner’s groups.

2. AMP XI.M29; “scope of program” program element: (c) other indoor **metallic** tanks that sit on, or are embedded in concrete where plant-specific operating experience reveals that the tank bottom (or sides for embedded tanks) to concrete interface is periodically exposed to moisture.
3. AMP XI.M30; “corrective actions” program element: In addition, when the presence of biological activity is confirmed, or if there is evidence of **corrosion MIC**, a biocide is added to fuel oil.
4. AMP XI.M30: Updated Regulatory Guide 1.137, “Fuel-Oil Systems for Standby Diesel Generators,” to the current revision. In addition, updated the RG 1.137 cited ASTM references to the versions cited in Revision 2:
 - Regulatory Guide 1.137, Revision 2
 - ASTM D 0975-13, “Standard Specification for Diesel Fuel Oils”

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- ASTM D 1796-11, “Standard Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method”
 - ASTM D 4057-06 (Reapproved 2011), “Standard Practice for Manual Sampling of Petroleum and Petroleum Products”
 - ASTM D 6217-11, “Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration”
5. AMP XI.M32; “detection of aging effects” program element: In addition, when using this AMP to conduct inspections of stainless steel (SS), **nickel alloy**, and aluminum components exposed to any air environment or condensation to detect loss of material or stress corrosion cracking, the internal surfaces of these components do not need to be inspected...
6. GALL-SLR Report Table XI-01, “FSAR Supplement Summaries for GALL-SLR Report Chapter XI Aging Management Programs,” AMP XI.M32:

The program is a condition monitoring program consisting of a one-time inspection of selected components to verify: (a) the system-wide effectiveness of an AMP that is designed to prevent or minimize aging to the extent that it will not cause the loss of intended function during the subsequent period of extended operation; (b) the insignificance of an aging effect; and (c) that long-term loss of materials will not cause a loss of intended function for steel components exposed to environments that do not include corrosion inhibitors as a preventive action, **and where periodic wall thickness measurements on a representative sample of each environment are not conducted every 5 years up to at least 10 years prior to the subsequent period of extended operation. This program provides inspections that verify that unacceptable degradation is not occurring. It also may trigger additional actions so that the intended functions of affected components are maintained during the subsequent period of extended operation.**

The elements of the program include: (a) determination of the sample size of components to be inspected based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience, (b) identification of the inspection locations in the system or component based on the potential for the aging effect to occur, (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined, and (d) an evaluation of the need for follow-up examinations to monitor the progression of aging if age-related degradation is found that could jeopardize an intended function before the end of the subsequent period of extended operation.

Periodic inspections instead of this program are ~~This program is not~~ used for structures or components with known age-related degradation mechanisms or when the environment in the subsequent period of extended operation is not expected to be equivalent to that in the prior operating periods. **Periodic inspections are conducted in these cases.** Inspections not conducted in accordance with ASME Code Section XI requirements are conducted in accordance with plant-specific procedures including inspection parameters such as lighting, distance, offset, and surface conditions.

7. AMP XI.M41; “parameters monitored or inspected” program element: 3.b.vi. cracking, or blistering, **change in color** due to water absorption for high-density polyethylene and fiberglass components.
- AMR items were revised to not cite change in color.

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8. SRP-SLR; Further Evaluation sections for loss of material in aluminum alloys; 3.2.2.2.10, 3.3.2.2.10, and 3.4.2.2.9:
 - Moisture level and halide concentration should **generally** be considered high enough to facilitate pitting and/or crevice corrosion of aluminum alloys in atmospheric and uncontrolled air, unless demonstrated otherwise.
 - Halide concentrations should **generally** be considered high enough to facilitate loss of material of aluminum alloys in untreated aqueous solutions, unless demonstrated otherwise.

Editorial Changes of Some Significance that were Corrected in NUREG-2191 and NUREG-2192

1. AMP XI.M41; “detection of aging effects” program element; Section 4.3.iii: they [alternative internal wall thickness measurements for buried components] are conducted at an interval not to exceed 10 **years**.
2. AMP XI.M18, M20, M21A, M27, M29, M32, M33, M36, M38, M27 UFSAR, Plant-Specific AMP UFSAR: Inspections follow site procedures that include inspection parameters such as lighting, distance, offset, surface coverage, presence of protective coatings, and cleaning processes.
3. Appendix B, “Operating Experience for Aging Management Programs:” An example summary program description of the **QA OE** program for the FSAR supplement is shown in Table B-01 below.

Technical Basis and Disposition of Public Comments Documents Insights

1. AMP XI.M2: When the GALL-SLR Report was issued, the revision level of the EPRI document, EPRI 1014986, “PWR Primary Water Chemistry Guidelines,” was updated from Revision 6 to Revision 7; however, the EPRI document number was not revised. The staff’s intent is that EPRI 3002000505, “Pressurized Water Reactor Primary Water Chemistry Guidelines,” Revision 7 is the correct reference.
2. AMP XI.M2: Subsequent to the issuance of the GALL SLR Report, the staff noted that the revision level of BWRVIP-190 had not been raised to the current revision level. Consistent with the staff’s evaluation of an exception documented in NUREG–2205, “Safety Evaluation Report Related to the License Renewal of LaSalle County Station, Units 1 and 2,” September 2016, Section 3.0.3.2.1, “Water Chemistry,” the staff finds BWRVIP-190, Revision 1, “BWR Vessel and Internals Project, Volume 1 BWR Water Chemistry Guidelines – Mandatory, Needed, and Good Practice Guidance,” EPRI 3002002623, dated April 24, 2014, acceptable to cite without exception.
3. AMP XI.M26; “detection of aging effects” and “monitoring and trending” program elements: testing of Halon/CO2 systems was inadvertently deleted from the “detection of aging effects” and “monitoring and trending” program elements during the intended deletion of a recommendation to conduct the testing every 6 months. It was retained in the Program Description.
4. AMP XI.M42; “detection of aging effects” program element: “length of **each** coating/lining material and environment combination...”

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NUREG-XXXX [Basis Document], Table 2-29: The use of the term “each” is related to the type of material or lining (e.g., acrylic, urethane, epoxy, polyester, cementitious, rubber materials). It is not related to a specific manufacturer of a coating. The staff recognizes that for the same material, manufacturers will employ unique manufacturing processes. However, in regard to the extent of inspections, the staff has concluded that when installed using manufacturer recommendations, each coating or lining should be subject to the same degradation mechanisms.

5. AMR Items A-797a, E-477a, and S-483a should not have cited flow blockage due to fouling because it is not an applicable AERM for the external environment of polymeric components. The response to comment 017-039 as well as the basis document entries reflect this statement.
6. AMR Items A-405a and S-402a: the term “steel only” should have appeared after “loss of material.” As written, it could appear that copper alloy (>15% Zn or >8% Al) is subject to loss of material when exposed to air or condensation. The basis document entries reflect this statement.
7. Copper alloy piping and piping components exposed to condensation are addressed in revised item AP-144, which states that there are no aging affects requiring management. There are no comparable AMR items for other components (e.g., heat exchanger components). The response to comment 045-062 states that the staff’s intent is that citing AP-144 would be acceptable for heat exchanger components and tanks because, the basis as cited in the change to AP-144 is equally applicable to piping, piping components, heat exchanger components and tanks.
8. E-475, A-767, A-795a, A-795b, S-482: Titanium (ASTM Grades 3, 4, or 5) exposed to raw water cites cracking due to SCC; however not flow blockage due to fouling. AMR items associated with the general term “titanium” cite cracking due to SCC and flow blockage. The basis document states: “Subsequent to issuance of the GALL-SLR Report, the staff recognized that to be consistent with other GALL-SLR Report items associated with heat exchanger tubes, E/A/S-NNN should have also cited reduction of heat transfer due to fouling.”

Minor Editorial Changes to SLR Documents

Location	Description
GALL-SLR Report Chapter IX.D Underground	Deleted the space between “ground” and “water.”
All SRP-SLR FEs associated with SS, aluminum, and nickel alloy	atmospheric air

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Location	Description
SRP-SLR Section A.1.2.3.4	The following text was shown twice. The first was deleted. “Provisions for expanding the sample size when degradation is detected in the initial sample are included.”
Response to comment 045-052	Managing loss of material for stainless steel tanks within the scope of AMP XI.M29, "Outdoor and Large Atmospheric Metallic Storage Tanks" exposed to air or condensation was relocated to a new GALL-SLR Report item, E-449 (3.2-1, 106). Subsequent to issuance of the GALL-SLR Report, the staff noted that there is no corresponding item in Chapter V for stainless steel tanks exposed to soil or concrete. However, Chapter VII (A-758, 3.3-1, 229) and Chapter VIII (S-447, 3.4-1, 099) include items addressing this MEAP.
GALL-SLR Report AMP XI.M18	Detection of aging effects program element: A representative sample includes The inspection of includes a representative sample of 20 percent of the population of bolt heads and threads....
SRP-SLR Section A.1.2.3.7	6. For one-time based programs, when an aging effect identified during an inspection does not meet acceptance criteria or projected results of the inspections of a material, environment, an-and aging effect combination does not meet acceptance criteria; a periodic inspection program is developed for the specific combination(s) of material, environment, and aging effect
GALL-SLR Report AMP XI.S6	Preventive Action: The Structures Monitoring program is primarily a condition monitoring program; however, the program includes preventive actions to provide reasonable assurance that structural bolting integrity is maintained , as discussed in Electric Power Research Institute (EPRI) documents (such as EPRI NP-5067 and TR-104213), American Society for Testing and Materials (ASTM) standards, and AISC specifications, as applicable. The...

To Be Addressed in the Future

GALL-SLR Report E-442	SRP-SLR Item 3.2.1-099, as well as GALL-SLR Report items E-442 b, c, and d cite the environment as air, condensation. Item E-442a cites any air environment, condensation air – outdoor. Although they all should have cited air, condensation, there is not technical gap between the items given that air is an all-encompassing term.
GALL-SLR Report TP-219	TP-219 (3.5-1, 079) was not revised to cite “groundwater/soil.” The staff’s intent is that there is no difference between “soil, groundwater” and “groundwater/soil.”