POTENTIAL TOPICS FOR SLR-RELATED ISGs

ITEM NUMBER	GALL-SLR or SRP-SLR Section	ACTION
1	Containment Structures	Add specific corrective actions for minor leaks in containment where flow and pressure would be met; however, containment isolation could be challenged.
2	Structures and Component Supports	• FE 3.5.2.2.2.6 – Revise concrete irradiation effects • Add new FE for Reactor Pressure Vessel (RPV) steel supports and associated new SRP-SLR Table 3.5.1 and GALL-SLR AMR line items to address loss of fracture toughness and shift in change in NDT due to irradiation embrittlement • Add the Wooden Poles aging management recommendations to the Structures Monitoring AMP, and add the new SRP-SLR Table 3.5.1 and GALL-SLR AMR line item to address the associated aging effects under the SMP
3	Reactor Vessel, Internals, and RCS	• Further Evaluation (FE) Section 3.1.2.2.9 – Reference latest NRC staff-approved EPRI inspection and evaluation guidelines • FE 3.1.2.2.11 – Provide better direction on SG divider plate • Long-term loss of material for 3.1 systems – Reactor coolant only has Table 1 items for BWR plants – potential that a PWR might have steel piping exposed to treated water without corrosion inhibitors • Revise 3.1.1-119 to cite AMP XI.M16A, “PWR Vessel Internals,” instead of a plant-specific program • 3.1.2.2.4 Item 2 (Isolation condensers) – only two operating plants with isolation condensers – could determine which “water chemistry” program is used for the isolation condensers and eliminate the ambiguity associated with the use of the term, “augmented program.” – the applicant and technical reviewer can cite consistency via an enhancement to that program. • 3.1.2.2.6 Item 1 – Stress Corrosion Cracking (SCC) in stainless steel bottom-mounted instrument guide tubes – Is there consistency amongst the applicants on the AMP they used for this component MEAP? – Is a plant-specific program needed? • 3.1.2.2.6 Item 2 – SCC in Class 1 CASS – Can a GALL AMP be cited? – Could eliminate need for a plant-specific AMP • Revise/supplement applicable sections of SRP-SLR and GALL-SLR to address loss of fracture toughness due to irradiation embrittlement for reactor vessel steel supports. Specific updates to AMR line items, FE, and/or TLAA guidance to be determined

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		• Revise the line items for PWR internals in GALL-SLR Report, Table IV.B2 (Westinghouse PWR Internals), Table IV.B3 (Combustion Engineering PWR Internals), and Table IV.B4 (Babcock & Wilcox PWR Internals) such that they are more consistent with components, materials, and aging effects/mechanisms underlying MRP-227, Revision 1 • Consider revisions to line items for PWR Internals in SRP-SLR Report Table 3.1-1 such that they align with the revised GALL-SLR line items and the latest inspection categorization in MRP-227, Revision 1 • Revise SRP-SLR Table 3.1-1 Line Items Nos. 118 & 119 (currently citing "plant-specific AMP") and associated Line Item Nos. 423 & 424 in the GALL-SLR Tables IV.B2, IV.B3, IV.B4, such that they cite GALL-SLR AMP XI.M16A instead of "plant-specific AMP." • FE Section 3.1.2.2.10.2 – CRDM Nozzle Thermal Sleeve Wear – clarify that the flange location wear is also included in the FE scope as well as the wear at the location the thermal sleeve exits from CRDM nozzle – add recent OpE and related references regarding thermal sleeve wear at the flange location – Based on the recent OpE, the industry is updating the MRP-227 program to address this aging effect. In the change to SLR guidance, the updates and related information may need to be considered, too. • New FE Section – Thermal Fatigue – address cracking due to thermal fatigue in reactor coolant pressure boundary – include applicable industry guidelines and risk-informed program activities – applicant should identify its program to manage cracking due to thermal fatigue – Recent OpE (such as Diablo Canyon) supports the need to add the new FE section.
	Engineered Safety Features	• Recurring Internal Corrosion • Revise the current criteria to require reviewing plant-specific operating experience for both a 5-year and 10-year period; rather than allowing either one of the two periods to be acceptable – Revise the information to be provided in the SLRA to include a breakdown of instances where the RIC criteria have been exceeded – May apply to other system groups • Aluminum T6063-T6 – Add to the list of aluminum material specs that are not susceptible to cracking – May apply to other system groups • Steel and Stainless Steel exposed to concrete – Cites groundwater intrusion as criteria for use of periodic AMP – Consider other water environments – IGALL comment – May apply to other system groups • Possibly revise the wide-spread citing of crevice corrosion as an aging mechanism for steel piping – Crevice corrosion is only applicable where the metal is in an environment that promotes a passive film.

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4	Electrical Components	• Clarify 2.5.2.1.1, "Components Within the Scope of SBO (10 CFR 50.63)," to specifically address alternate AC source and any cross-ties that may be stipulated for recovery from SBO • Clarify some of Table 1 electrical items in SRP section 3.6 and GALL-SLR Table 2 in chapter VI (e.g. transmission conductors, cable bus) • SRP section 3.6.2.2.3 and Table 1 – Expand on definition of wind-induced abrasion (sand or other particles impacting transmission conductors and causing loss of material)
5	Auxiliary Systems	• Develop a new further evaluation section to address flow blockage due to fouling in treated water systems and loss of material for steel piping in closed-cycle cooling water systems without corrosion inhibitors • High Density Polyethylene (HDPE) • No aging mechanism cited for AP-175, A-406, AP-239, A-739, and A-648 • Incorporate recommendations for managing aging effects of carbon fiber wrap material installed on the inside diameter and outside diameter of components • Update the EPRI Closed Cooling Water Chemistry Guideline from Revision 1 (EPRI 1007820) to Revision 2 (EPRI 3002000590) * • Revise drain down recommendations for fire water hydrants to provide flexibility in relation to frost line and other risk-informed enhancements • Expand the number of AMR items and clarify aging effects for copper alloy greater than 15 percent zinc exposed to air or condensation. Reflect that "more than trace amounts of ammonia" are needed to cause cracking.
6	Notes F-J	• Generic Note G – Use of XI.M30 (Fuel Oil Chemistry) to manage LOM in Ni alloy strainer elements exposed to fuel oil (externally) • Generic Note H – Manage wall thinning/erosion in carbon steel insulated piping and piping components exposed to closed cycle cooling water (internally) with the Flow-Accelerated Corrosion AMP – Loss of material for carbon steel in a sodium pentaborate environment – reduction of heat transfer for heat exchanger exposed to fuel oil
7	GALL Chapter 9: Use of Terms	• Reevaluate the Chapter IX description of the term "groundwater/soil"
8	Aging Management Programs	• XI.E1, Electrical Insulation for Cables and Connections not subject to EQ – Clarify for inspections and aging management of cables that are coated with fire retardant material. – Clarify to specifically include mechanical components associated with electrical equipment (gaskets, seals, O rings, etc.) that are in the scope of the AMP. • XI.E6, Electrical Cable Connections Not Subject to EQ – Clarify to caution against "re-torquing" connections as part of inspections and testing. • XI.E7, High-Voltage Insulators

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		– Clarify for aging management of polymer high-voltage insulators. – Clarify to include medium-voltage insulators that are on SBO recovery path • Review latest version of IEEE standards for update in the AMPs • XI.M2 – Water Chemistry * – Update EPRI document references • XI.M3 – RV Head Closure Stud Bolting – New language (“for newly installed studs”) to replace “for existing studs” • XI.M4 – BWR Vessel ID Attachment Welds – Revise based on the NRC review status of later revisions to the applicable BWRVIP topical reports • XI.M8 – BWR Penetrations – Revise based on the NRC review status of later revisions to the applicable BWRVIP topical reports • XI.M9 – BWR Vessel Internals – Revise based on the NRC review status of later revisions to the applicable BWRVIP topical reports • XI.M10 – Boric Acid Corrosion – Clarify use of WCAP • XI.M12 – Thermal Aging Embrittlement of CASS – Add NUREG/CR-4513, Rev 2 – Add Code Case N-838 as acceptable flaw tolerance evaluation method – Revise the acceptance criteria program element • The current element indicates the ASME Code does not contain evaluation procedures for CASS with ferrite content ≥ 20 percent. The 2019 Edition of the code is expected to provide additional provisions and increase the ferrite content limit up to 25 percent. • XI.M16A – PWR Vessel and Internals * – Incorporate MRP-227 Rev 1A • XI.M17 – Flow Accelerated Corrosion – Clarify scope expansion requirements – Clarify use of CHECWORKS erosion module • AMP XI.M32, “One-Time Inspection,” – Inspections of stainless steel and aluminum support structures should be inspected for cracking using VT-1 or surface examination – Incorporate an incubation period for repairs or replacements that are used to correct a condition adverse to quality related to adverse plant-specific operating experience • XI.M33 – Selective Leaching – Conduct inspection sample size to support reduced inspections • XI.M38 – Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components – Inspections where piping and tanks are exposed to an air-water interface

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		– May apply to other AMPs • XI.M41 – Buried and Underground Piping and Tanks – Use of 100 mV polarization acceptance criterion – Clarify plant-specific OpE for buried components – Revise Category F inspection recommendations – Revise Preventive Actions element – EPRI document on soil corrosivity • XI.S3 – IWF – Enhance program elements to manage the effects of aging on RPV steel support structure due to radiation, if applicable • XI.S4 – Appendix J – Update the revision level tor NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J" – Update FSAR Supplement • XI.S6 – Structures Monitoring – Add the Wooden Poles aging management recommendations to the Structures Monitoring AMP, and add the new SRP-SLR Table 3.5.1 and GALL SLR AMR line item to address the associated aging effects under the SMP
9	Time-Limited Aging Analyses	• TLAA 4.2 – RPV Neutron Embrittlement Analyses • Update the TLAA guidance for the BWR RPV welds (SRP-SLR Sections 4.2.2.1.5, 4.2.3.1.5, 4.2.3.1.6, and 4.2.2.1.6) • TLAA 4.7 – Other Plant-Specific47 TLAAs – Add guidance for • Flaw tolerance evaluation for PWR CASS pump casings (Code Case N-481) • Leak-before break (including guidance for evaluation of thermal aging, fatigue and PWSCC) – Recent SLRAs include these plant-specific TLAAs. Currently, SLR-SLR does not include specific guidance for reviews of these TLAAs
10	Minor Changes	RP-49 incorrectly cites FAC. The actual mechanism should be loss of material due to erosion. In addition, AMP XI.M2, "Water Chemistry," should only be associated with loss of material due to general, pitting, and crevice, similar to RP-161 & RP-162. AMP XI.M2 would not be effective at managing loss of material due to erosion. Add AMR items to address tanks less than 100,000 gallons not within the scope of AMP XI.M29, "Outdoor and Large Atmospheric Storage Tanks." These new AMR items would address large steel tanks that are located directly on concrete where plant-specific OE identifies routine wetted floors (e.g., in leakage through walls from ground water). Add new AMR items to state that there are no aging effects associated with aluminum components that are not susceptible to cracking if plant-operating experience does not reveal issues related to loss of material due to pitting or

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		crevice corrosion. This will require reconsideration of the SRP-SLR further evaluation sections associated with loss of material for aluminum components. Clarify the information that needs to be supplied in the SLRA if the applicant elects to conduct a one-time sprinkler test for sprinklers potentially exposed to corrosive water by revising footnote 7 in SLRA Table XI.M27-1. "Fire Water System Inspection and Testing Recommendations." Revise AMP XI.M42 to recommend that the UFSAR supplement for alternative AMPs in addition to AMP XI.M42 cite that loss of coating integrity will be managed by the alternative AMP.
11	Editorial Changes	AMP XI.M38: "Internal visual inspections used to assess loss of material ~~are~~ should be capable of detecting surface irregularities that could be indicative of an unexpected level of degradation due to corrosion and corrosion product deposition." AMP XI.M41 – acceptance criteria associated with -750 and -650 does not have mV units AMP XI.M32, second page, Flaking ~~or~~ of oxide coating AMP XI.M2: The revision level of the EPRI pressurized water reactor Primary Water Chemistry Guidelines document was revised 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. 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. AMP XI.M26; detection of aging effects and monitoring and trending: 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. Add a footnote to AMP XI.M42 to describe the staff's intent regarding the use of the term "each," as follows. AMP XI.M42; detection of aging effects: "length of each coating/lining material and environment combination…" Draft footnote: As stated in NUREG-2221, Table 2-29, "ALL-SLR Differences from Chapter XI, Mechanical Aging Management Programs, GALL Report Revision 2 and Their Technical Bases," for AMP XI.M42, 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. 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. 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. 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.

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		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. Update the EPRI Closed Cooling Water Chemistry Guideline from Revision 1 (EPRI 1007820) to Revision 2 (EPRI 3002000590). *