SLR GUIDANCE REVISION FOCUSED TECHNICAL SESSIONS

SEPTEMBER 8TH, 2022 EMMANUEL SAYOC, CAROL MOYER, & JESSICA HAMMOCK



AGENDA DAY 2 OF 2





2 – UPDATES AT A GLANCE GALL-SLR AND SRP-SLR



3 – TECHNICAL SESSIONS BURIED AND UNDERGROUND PIPING AND TANKS, NEW AMP ON HDPE & CFRP, & OPEN DISCUSSION



4 – COMMENTS AND QUESTIONS STAFF AND PUBLIC



PROJECT OVERVIEW PURPOSE

GALL-SLR, NUREG-2191

Revise Generic Aging Lessons Learned for Subsequent License Renewal (SLR) that was published May 2017

SRP-SLR, NUREG-2192

Revise Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants that was published May 2017

Technical Basis Document, NUREG-2221

Supplement Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192 that was published Dec 2017

PROJECT OVERVIEW SCOPE

Revised and New Guidance

Industry guidance, codes and standards, plant operating experience, results from research reports, and technical revisions (lessons learned) identified from previous SLR reviews

Substantive Corrections & ISGs

Incorporate necessary corrections and all completed SLR-ISGs that have been issued since the initial GALL-SLR documents

NRC Staff and Public Inputs

Changes recommended by NRC Staff and members of the public and industry during multiple public meetings and the formal public comment period

Beginning of Project & Kick Off Public Meeting

PROJECT MILESTONES



Items in aqua italics are opportunities for public engagement Staff Adjudicates Public Comments Into Draft Guidance Documents

May 2024

ACRS Full **Committee Meeting**

July 2024



Completion of Project & Staff Issues Final Update **Guidance Documents**

SCHEDULE SEPTEMBER 7TH

TIME	TOPIC
0900-0930	Introductions and Public Meeting Admin.
0930-1030	Fire Protection
1030-1045	Break
1045-1145	Aging Management of Wooden Poles
1145-1245	Lunch
1245-1345	Fire Water System
1345-1400	Break
1400-1515	Reactor Vessel Steel Supports, Loss of Fracture Toughness
1515-1600	Open Topic Discussion, Public Comments, Daily Summary



SPEAKER

NRC PM

James Gavula, Leslie Terry, NRC PM

Bryce Lehman, NRC PM

James Gavula, Leslie Terry, NRC PM

David Dijamco, NRC PM

NRC Staff, Industry, Public

SCHEDULE SEPTEMBER 8TH

TIME	TOPIC
0900-0915	Introductions and Public Meeting Admin.
0915-1015	Buried and Underground Piping and Tanks
1015-1030	Break
1030-1145	New AMP on High-density Polyethylene (HDPE) and Carbon Fiber Reinforced Polymer (CFRP) Piping Systems
1145-1245	Lunch
1245-1345	Open Technical Session
1345-1430	Public Comments, Meeting Summary/Close out



SPEAKER

NRC PM

Brian Allik, James Gavula, NRC PM

Eric Reichelt, NRC PM

NRC Staff, Industry NRC Staff, Industry, Public

COMMENTS & QUESTIONS



BURIED AND UNDERGROUND PIPING AND TANKS SMES: BRIAN ALLIK & JAMES GAVULA



BURIED AND UNDERGROUND PIPING AND TANKS

Revise AMP XI.M41, "Buried and Underground Piping and Tanks," to:

- clarify that when the 100 mV criterion is utilized to protect copper alloy or aluminum alloy components, applicants must explain in the application why the effects of mixed potentials are minimal and why the most anodic metal in the system is adequately protected,
- clarify that evaluation of plant-specific operating experience (OE) includes out-of- \bullet scope buried components if they are representative of in-scope buried components,
- clarify that Preventive Action Category F inspection is for in-scope buried piping that has a cathodic protection system installed, which is not meeting the performance criteria defined in Preventive Action Category C,
- revise the "preventive actions" program element to recommend external coatings for underground cementitious piping, and
- include EPRI Report 3002005294, "Soil Sampling and Testing Methods to Evaluate the Corrosivity of the Environment for Buried Piping and Tanks at Nuclear Power Plants," Table 9-4, "Soil Corrosivity Index from BPWORKS," as an additional approach to determine soil corrosivity



BURIED AND UNDERGROUND PIPING AND TANKS

Revise Aging Management Program (AMP) XI.M33 "Selective Leaching" as follows:

- Eliminate the conditional exclusion of buried components with external coatings from inspection.
- Include malleable iron as a material susceptible to selective leaching.
- Clarify that a technical justification for using the extent of inspections in the AMP should be provided for gray cast iron piping exposed to soil.
- Clarify that 1-foot pipe samples should be taken from multiple locations to ensure that a representative sample is examined.
- Revise recommendations to include soil parameter consistency when providing a basis for reducing the total number of inspections at multiunit sites for buried components.
- Revise the last sentence of the "acceptance criteria" program element to cite criterion (d) instead of criterion (c) to correct an error.
- Include recent operating experience

llows:



BURIED AND UNDERGROUND PIPING AND TANKS

Revise SLR Technical Bases to add technical basis for implementation schedule for the XI.M27 "Fire Water System," and other associated AMPs, in accordance with GALL-SLR Table XI-01, "FSAR Supplement Summaries for GALL-SLR Report Chapter XI Aging Management Programs," and SLRA App A1, Unit 1 UFSAR Table 19-3 Implementation Schedule.

This will help explain why there is a contrast in the implementation schedules for all other AMPs, which state that the program is implemented 6 months prior to Subsequent Period of Extended Operation.





NEW AMP FOR HDPE & CFRP SME: ERIC REICHELT



XI.M 43 High Density Polyethylene (HDPE) And Carbon Fiber 1. Reinforced Polymer (CFRP) Piping is a new proposed aging management program (AMP) that manages the aging of HDPE and carbon fiber reinforced polymer CFRP piping. This program manages aging through preventive, mitigative, inspection, and in some cases, performance monitoring activities. It manages applicable aging effects such as loss of material and cracking.

This program applies to HDPE and CFRP piping material that meet 2. the requirements of ASME Code, Section III, Mandatory Appendix XXVI, "Rules for Construction of Class 3 Buried Polyethylene Piping", or as approved by the NRC. It also applies to piping where CFRP is applied to insulate the interior surface.

Depending on the material, preventive and mitigative techniques may 3. include external coatings, cathodic protection (in accordance with NACE SP0169-2007 or NACE RP0285-2002), and the quality of backfill (in accordance with NACE SP0169-2007 Section 5.2.3 or NACE RP0285-2002, Section 3.6). Alternatives to the preventive actions are provided in the new AMP.

Depending on the material, inspection activities may include 4. electrochemical verification of the effectiveness of cathodic protection, nondestructive evaluation of pipe wall thicknesses, pressure testing of the pipe, volumetric inspections, and visual inspections of the pipe from the exterior and/or interior.

5. Monitoring of the external and/or internal surface condition is conducted to detect aging effects such as loss of material, cracking, disbondment, damage, and leakage.

Volumetric examination may be utilized to measure wall thickness 6. and detect delamination and/or disbondment in the CFRP piping. Volumetric examination of the CFRP piping may be performed using acoustic tap, ultrasonic, electrical, magnetic, thermal, microwave, or other applicable nondestructive methods.

7. For HDPE piping visual inspections can be used for external and/or internal surface conditions of the HDPE. For CFRP piping visual inspections can be used for internal surface conditions of the CFRP.

For Detection of Aging Effects, inspections of HDPE and CFRP piping 8. guidelines and quantities are provided for a single unit plant, for two-unit sites, and for a three-unit site. Inspection quantities increase with increasing units, and for multi-unit sites, the inspections are distributed evenly among the units. Inspection quantities are provided in percentage of the length of pipe run or number of pipe segment.

9. Baseline inspections of HDPE and CFRP piping are conducted during each 10-year period, commencing 10 years prior to the subsequent period of extended operation. Opportunistic inspections can be conducted for in-scope HDPE and CFRP piping whenever they become accessible. Visual inspections are supplemented with surface and/or volumetric nondestructive testing if evidence of wall loss beyond minor surface scale is observed. Exceptions to inspection quantities and alternatives to visual examination are considered in the new AMP.

10. Piping inspection locations are selected based on risk (i.e., susceptibility to degradation and consequences of failure). Characteristics such as coating type (i.e., material type), coating condition, cathodic protection efficacy, backfill characteristics, soil resistivity, pipe contents, and pipe function are considered.

11. For monitoring and trending piping protected by cathodic protection systems, potential difference and current measurements are trended to identify changes in the effectiveness of the systems and/or coatings. Likewise, if leak rate testing is conducted, leak rates are trended. Where wall thickness measurements are conducted for the CFRP pipe, the results are trended when follow up examinations are conducted.

For CFRP acceptance criteria associated with this AMP generally 12. include no evidence of coating degradation, cracking, loss of material, leakage, delamination, tearing, debonding, and voids.

For HDPE acceptance criteria associated with this AMP generally 13. include absence of cracking; blisters, gouges, or wear are within acceptable tolerance; acceptability of backfill; pressure tests within tolerance; and no visible indications of leakage.

14. For Corrective Actions, results that do not meet the acceptance criteria are addressed in the applicant's corrective action program under those specific portions of the quality assurance program. Degraded conditions are repaired, or the affected piping is replaced. In addition, the extent of degradation of the base metal that could have resulted in a loss of pressure boundary function when the loss of material is extrapolated to the end of the subsequent period of extended operation, and the inspection sample size is expanded.

15. Operating experience shows that pipes with CFRP could be degraded. It is necessary for the applicant to evaluate both plant-specific and nuclear industry OE and to modify its AMP accordingly. Examples of industry experience are provided.

16. Revisions to aging management review line items, the Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants (NUREG-2192), Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192 (NUREG-2221) and are forthcoming.

LUNCH BREAK MEETING TO RESUME AT 12:45 PM EST



OPEN TECHNICAL SESSION



PUBLIC COMMENTS, MEETING SUMMARY & CLOSE

