

Draft Generic Aging Lessons Learned (GALL) Report and Standard Review Plan (SRP) for Subsequent License Renewal (SLR)

Structural Aging Management Programs (AMPs)

Office of Nuclear Reactor Regulation
Division of License Renewal

June 2, 2016

Agenda

Time	Topic
08:30AM - 08:45AM	Opening Remarks
08:45AM - 09:30AM	<ul style="list-style-type: none"> • Staff Responses to Industry Comments on Structures (Attachment 6)
09:30AM – 10:00AM	<ul style="list-style-type: none"> • Feedback from Public
10:00AM - 10:15AM	Break
10:15AM - 11:00AM	<ul style="list-style-type: none"> • Staff Responses to Industry Comments on Structures (Attachment 6)
11:00AM – 11:30AM	<ul style="list-style-type: none"> • Feedback from Public
11:30AM - 12:30PM	Lunch
12:30PM - 02:00PM	<ul style="list-style-type: none"> • Staff Responses to Industry Comments on Structures (Attachment 6) • Other Industry Structural Comments
02:00PM – 02:30PM	<ul style="list-style-type: none"> • Feedback from Public
02:30PM - 02:45PM	Break
02:45PM – 04:30PM	<ul style="list-style-type: none"> • Staff Responses to Industry Comments on Structures (Attachment 6) • Other Industry Structural Comments
04:30PM – 04:45PM	<ul style="list-style-type: none"> • Feedback from public
04:45PM – 05:00PM	<ul style="list-style-type: none"> • Closeout and adjourn

Public Comments and Source Code in NRC Technical Comments Database (TCD)



Commenter	Subject	Accession #	Regulations.gov ID	TCD Source ID #
NEI/Industry	Comments from NEI and Industry on GALL and SRP Rev 2	ML16056A621	N/A	001
NEI/Industry	06-04-15 NRC Submittal of Industry Comments to Structural Portions of the Draft SLR GALL Report	ML16056A622 ML16056A623	N/A	002
NEI/Industry	06-30-15 NRC Industry Feedback to Changes Proposed for Mechanical Portions of NRC Guidance for SLR	ML16056A616 ML16056A617	N/A	003
NEI/Industry	07-07-15 NRC Submittal of Industry Comments on Tables for SLR Guidance Documents	ML16056A619	N/A	004
NEI/Industry	06-30-15 Industry Feedback on Electrical AMPs	ML16056A618	N/A	005
J. Gavula and B. Fu emails	02-29-16 NRC Comments	N/A	N/A	007
B. Brady email on ACRS concern on XI.S7	02-29-16 ACRS Comments	N/A	N/A	008
Anonymous	X.E1	ML16015A326	NRC-2015-0251-0005	009
Jan Boudart	Palisades/Out of Scope (OOS)	ML16015A327	NRC-2015-0251-0006	010
Anonymous	XI.M31	ML16035A273	NRC-2015-0251-0007	011
Eric Jones	X.M2	ML16035A274	NRC-2015-0251-0008	012
Anonymous	TLAA 4.2/general SLR	ML16049A580	NRC-2015-0251-0009	013
NEI	311 pages in 7 attachments Attachment 1 - Summary list/various AMPs Attachment 2 - Non-AMP Mechanical Components Attachment 3 - Mech AMPs X.M1 - XI.M22 Attachment 4 - Mech AMPs XI.M23 - XI.M42 Attachment 5 - XI.M31 Attachment 6 - Structural Comments Attachment 7 - Electrical AMPs, Chp. VI, 3.6	ML16069A068	NRC-2015-0251-0019	014 015 016 017 018 019 020
Andrew Prinaris/NRC	XI.S1, S3, S6, S7	ML16068A056	NRC-2015-0251-0017	021
Tina Taylor/EPRI	XI.M7, M9, M11B, 16A, M31, E1, E2, E3A, B, C	ML16067A382	NRC-2015-0251-0013	025
Paul Frey	OOS	ML16068A029	NRC-2015-0251-0014	030
Wallace Taylor	OOS/general SLR	ML16068A067	NRC-2015-0251-0016	031
Michel Lee	OOS/general SLR	ML16068A070	NRC-2015-0251-0018	032
Jaime McCoy/Wolf Creek	NUREG-2191, Vol 2 - various AMPs	ML16068A049	NRC-2015-0251-0015	033
Donna Gilmore	OOS/general SLR	ML16063A105	NRC-2015-0251-0010	034
Meghan Belaski	OOS/general SLR	ML16063A107	NRC-2015-0251-0011	035
Marvin Lewis	OOS/general SLR	ML16063A108	NRC-2015-0251-0012	036
NEI Fuel Oil/Lube Oil (Jerud Hanson)	XI.M30, 32, 39	ML16082A277	NRC-2015-0251-0023	040

Industry Comments on Structures



Industry Submittals

6/4/15: NEI

ML16056A622 and ML16056A623
TCD Source Code: 2

2/29/16: NEI

ML16069A068
TCD Source Codes: 14, 17 and 19

2/29/16: Wolf Creek

ML16068A049
TCD Source Code: 33

Industry Comments on Structures



- Industry comments that were accepted in whole will not be discussed today
- Industry comments that were not accepted (in whole or in part) will be discussed
- Provide alignment between various industry submittals
- Final decisions will be documented in the TCD

Accepted Comments

2-001	2-002	2-003	2-012
2-017	2-025	14-015	14-016
14-017	17-002	17-003	17-004
17-005	19-027	19-028	19-035
19-040	19-048	19-050	19-051
19-053	19-057	19-058	19-059
19-063(b)	19-064(a)	19-064(b)	19-065
19-070	19-072	19-075	19-077
19-080	19-083	19-085	33-002(e)
33-002(f)	33-015		

Attachment 6
2/29/16 Submittal from NEI
TCD Source Code 19

Attachment 6, Table 3.5-1, Generic

Industry Comment

As written, four (4) new Plant Specific AMPs required in SLR GALL for freeze-thaw, leaching and carbonation, and reaction with aggregates mechanisms for inaccessible concrete, and increased temperatures for concrete. IWL and SMP AMPs are adequate for these aging effects

Staff Response – See Staff responses to Comments 19-002, 19-003, 19-004, and 19-005

Technical Basis

This issue covers four unique material-environment-aging effect-program (MEAP) combinations for concrete components which are all addressed in separate comments and responses. See specific aging effect comments (summarized below) for the Staff response.

Attachment 6, Table 3.5-1, Generic

Technical Basis, continued

In general, the Staff clarifies that while the “aging effect” noted in the comment may or may not be covered for accessible areas under the scope of an existing AMP, the existing AMP is not specifically called out in the AMR line items with recommended further evaluation because the existing GALL Report AMP will not identify the aging effect (e.g., reduction of strength and modulus due to elevated temperature) and/or does not completely or adequately address the MEAP combination for the component; and, therefore may need a plant-specific AMP based on the further evaluation. The term “plant-specific AMP” in the GALL-SLR Report and SRP-SLR is intended to mean a new plant-specific AMP or a plant-specific enhancement to the applicable existing AMP, as appropriate. From past LRA reviews, with some exceptions, applicants have typically developed plant-specific enhancements to applicable existing programs to address these AMR line items.

Attachment 6, Table 3.5-1, Generic

Technical Basis, continued

- Comment 19 – 002: Reduction of strength and modulus of elasticity of concrete due to elevated temperatures
- Comment 19 – 003: Loss of material and cracking due to freeze thaw in inaccessible concrete
- Comment 19 – 004: Cracking due to expansion from reaction with aggregates in inaccessible concrete
- Comment 19 – 005: Increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide and carbonation in inaccessible concrete

Summary of Staff Recommendations

Documented in TCD 19-001

Attachment 6, Table 3.5-1, Comment 1

Industry Comment

Revise the SRP Table 1's and GALL AMR line items to evaluate concrete for reduction of strength and modulus of elasticity due to elevated temperature with AMP XI.S2, "ASME Section XI, Subsection IWL," and/or AMP XI.S6, "Structures Monitoring" instead of a Plant Specific AMP

Staff Response – The Staff agrees with the comment in part

Technical Basis

The Staff did not intend applicants to be forced to create new plant-specific AMPs. The proposed change was intended to improve consistency across the guidance documents. A plant-specific AMP should be evaluated if the temperature limits are exceeded. SRP Further Evaluation section 3.5.2.2.1.2 clarifies that a plant-specific AMP is only necessary if the temperature limits are exceeded. Higher temperatures may be allowed without a plant-specific AMP if tests and/or calculations are provided to evaluate the reduction in strength and modulus of elasticity and these reductions are applied to the design calculations.

Attachment 6, Table 3.5-1, Comment 1

Summary of Staff Recommendations

The wording in SRP-SLR Table 3.5-1 will be revised to make it clear that further evaluation is needed to determine if a plant-specific AMP is necessary. The wording in the associated GALL-SLR line items will be revised to clearly note that a plant-specific AMP is to be evaluated.

Documented in TCD 19-002

Attachment 6, Table 3.5-1, Comment 2

Industry Comment

Revise the SRP Table 1's and GALL AMR line items to evaluate concrete for loss of material (spalling, scaling) and cracking due to freeze-thaw with AMP XI.S2, "ASME Section XI, Subsection IWL," and/or AMP XI.S6, "Structures Monitoring" instead of Plant Specific AMP

Staff Response – The Staff agrees with the comment in part.

Technical Basis

The Staff did not intend applicants to be forced to create plant-specific AMPs. The proposed change was intended to improve consistency across the guidance documents. The Staff does not agree that a plant-specific AMP should be completely removed and this aging effect should be addressed within the XI.S2 or XI.S6 AMP. A plant-specific AMP should be evaluated if plants are located in moderate to severe weathering conditions.

Attachment 6, Table 3.5-1, Comment 2

Technical Basis, continued

The Further Evaluation section 3.5.3.2.1.7 makes it clear that a plant-specific AMP is only necessary if plants in moderate to severe weathering conditions do not have acceptable concrete air content or accessible concrete areas show freeze-thaw degradations.

Summary of Staff Recommendations

The wording in SRP-SLR Table 3.5-1 will be revised to make it clear that further evaluation is needed to determine if a plant-specific AMP is necessary.

Documented in TCD 19-003

Attachment 6, Table 3.5-1, Comment 3

Industry Comment

Revise the SRP Table 1's and GALL AMR line items to evaluate concrete for cracking due to expansion from reaction with aggregates with AMP XI.S2, "ASME Section XI, Subsection IWL," and/or AMP XI.S6, "Structures Monitoring" instead of Plant Specific AMP

Staff Response – The Staff agrees with the comment in part.

Technical Basis

The Staff did not intend applicants to be forced to create plant-specific AMPs. The proposed change was intended to improve consistency across the guidance documents. The Staff does not agree that a plant-specific AMP should be completely removed and this aging effect should be addressed within the XI.S2 or XI.S6 AMP. Although it is likely most AAR would have occurred prior to SLR, it is not definite that it would have occurred, or been properly identified.

Attachment 6, Table 3.5-1, Comment 3

Technical Basis, continued

SRP-SLR Further Evaluation section 3.5.3.2.1.8 makes it clear that a plant-specific AMP is only necessary if applicants have plant-specific operating experience that indicates AAR degradation. Without this, no additional plant-specific AMP is necessary.

Summary of Staff Recommendations

The wording in SRP-SLR Table 3.5-1 will be revised to make it clear that further evaluation is needed to determine if a plant-specific AMP is necessary.

Documented in TCD 19-004

Attachment 6, Table 3.5-1, Comment 4

Industry Comment

Revise the SRP Table 1's and GALL AMR line items to evaluate concrete for increase in porosity and permeability; loss of strength due to leaching of calcium hydroxide and carbonation with AMP XI.S2, "ASME Section XI, Subsection IWL," and/or AMP XI.S6, "Structures Monitoring" instead of Plant Specific AMP

Staff Response – The Staff agrees with the comment in part

Technical Basis

The Staff did not intend applicants to be forced to create plant-specific AMPs. The proposed change was intended to improve consistency across the guidance documents. The Staff does not agree that a plant-specific AMP should be completely removed and this aging effect should be addressed within the XI.S2 or XI.S6 AMP. If significant leaching is observed, it is necessary to further evaluate the condition.

Attachment 6, Table 3.5-1, Comment 4

Technical Basis, continued

This is explained in the SRP-SLR Further Evaluation section 3.5.3.2.1.9, which notes that a plant-specific AMP may not be necessary if an evaluation determines that the observed leaching in accessible areas has no impact on the intended function of the structure.

Summary of Staff Recommendations

The wording in SRP-SLR Table 3.5-1 will be revised to make it clear that further evaluation is needed to determine if a plant-specific AMP is necessary.

Documented in TCD 19-005

Attachment 6, Table GALL Chapters II and III, Comment 1



Industry Comment

Not all previously identified line item needs were addressed i.e. concrete exposed to raw water, and SL 1 Coating exposed to treated water

Staff Response – The Staff agrees with this comment in part

Technical Basis

Although no line items exist for concrete exposed to raw water specifically, line items do exist in GALL-SLR Chapter III, Table A6 that address concrete in “any environment,” or includes flowing water in the possible environments. These items can be applied to concrete in raw water

The Staff agrees with this comment regarding Service Level 1 coatings. It is correct that service level 1 protective coatings may be exposed to treated water.

Attachment 6, Table GALL Chapters II and III, Comment 1



Summary of Staff Recommendations

The environment in several additional concrete line items has been updated to “any” to make it clear that these lines can be used for raw water.

Treated water will be added as an applicable environment to the existing protective coating line items

Documented in TCD 19-017

Attachment 6, Table GALL Chapters II and III, Comment 2



Industry Comment

Previously offered efficiency recommendations appear not to have been addressed. NEI letter attachment to NRC dated 08-06-14 recommended combining and simplifying/reducing the number of line items. It also recommended combining several programs such as Masonry Walls and RG 1.127 and Overhead Handling with the Structures Monitoring Program. In addition, the X.S1 AMP (...Tendon Prestress) could also logically be combined with the XI.S2 (IWL) AMP

Staff Response – The Staff does not agree with the comment.

Technical Basis

The Staff combined or deleted the line items it felt were appropriate. Multiple SRP-SLR Table 3.5-1 items have been combined or deleted.

Attachment 6, Table GALL Chapters II and III, Comment 2



Technical Basis, continued

For the suggested combination of AMPs X.S1 and X.S2, there are no apparent efficiencies gained during the review of the application. The applicant however is not denied the opportunity to combine AMPs X.S1 and XI.S2. The combination of the two AMPs by the applicant will be considered a plant specific AMP.

It was appropriate to maintain the AMPs as they were in the original guidance documents. However, guidance was added to XI.S6 that makes it clear XI.S5 and XI.S7 can be included within XI.S6 if all the attributes of those programs are captured. No changes were made as a result of this comment.

Documented in TCD 19-018

Attachment 6, Table GALL Chapter III, Comment 8



Industry Comment

Line item III.B1.1.TP-41 should contain the same exclusionary note regarding ASTM A325, F1852, and ASTM A490 bolts as line item III.A3.TP-300 and line item III.B2.TP-300

Staff Response - The staff does not agree with this comment.

Technical Basis

There is purposely no exclusion noted – this AMR includes ASME Code IWF supports and does not automatically exempt any high strength bolts (>150ksi and > 1-inch) from aging management

Documented in TBD 19-026

Attachment 6: IX.B - Use of Terms for Structures and Components



Industry Comment

The term and usage added to this document...for “Inaccessible Areas of Structural Components for non-ASME structural AMPs” should be deleted. It is new and not needed. There is no similar definition for ASME AMPs. This addition with the wording chosen in context of the sentence statement could lead to regulatory uncertainty and questions such as do coatings have to be removed, etc.

Staff Response – The Staff does not agree with the comment

Technical Basis

There is no similar definition for ASME AMPs because the associated ASME Code sections clearly identify what is considered inaccessible. This clarity did not previously exist for non-ASME AMPs. The new definition makes it clear what areas the Staff considers inaccessible.

Attachment 6: IX.B - Use of Terms for Structures and Components

Technical Basis, continued

The Staff does not agree that this definition introduces regulatory uncertainty in regards to protective coatings. Wording in each structural AMP makes it very clear what is expected in regards to inspecting structures with protective coatings.

Summary of Staff Recommendations

No change to the GALL or SRP

Documented in TCD 19-029

Attachment 6: IX.F - Use of Terms for Structures and Components



Industry Comment

Term and Usage in this document, page IX F-4: Please leave intact the Term “Deterioration of seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)”. The definition “Loss of sealing due to wear, damage, erosion, tear, surface cracks, other defects” is used throughout GALL-SLR, but lacks an associated Term. Furthermore, the term and its described usage are useful for the means of appropriately addressing aging of seals, gaskets, and moisture barriers.

Staff Response – The Staff does not agree with this comment

Technical Basis

The information captured in the original term is still provided for the aging effect term “loss of sealing: leakage through containment” in GALL-SRP Table IX.E.

Attachment 6: IX.F - Use of Terms for Structures and Components



Summary of Staff Recommendations

No change was made as a result of this comment

Documented in TCD 19-030

Attachment 6 : SRP 3.5.2.2.2.6, 3.5.3.2.2.6 (FE Irradiation of Concrete)



Industry Comment

The recommendation should not be as prescriptive. It is recommended that plant specific concrete fluence calculations should not necessarily be required for all plants since options including allowing consideration of industry (EPRI) evaluations of this aging effect, as well as, bounding screening evaluations such as for BWR's will be available. An EPRI research Report on this topic is scheduled to be published in 2016.

Internal concrete heating due to neutron or gamma radiation should not be included in the further evaluation for this aging effect

Staff Response – The Staff agrees with the comment in part.

Technical Basis

The Staff does not agree that it is appropriate to generically “screen out” particular plant designs based on ongoing industry research.

Attachment 6 : SRP 3.5.2.2.2.6, 3.5.3.2.2.6 (FE Irradiation of Concrete)



Technical Basis, continued

If a generic approach is warranted based on industry research, a topical report (or similar document) should be prepared and submitted to the NRC for review. Otherwise, this aging effect needs to be addressed on a plant-specific basis.

Reference to heating appears in 3.5.3.2.2.6 (Review Procedures) in the overall description of the irradiation mechanism. The rest of the discussion, on the thresholds that would trigger an evaluation, is on fluence and dose. The statement on heating is not incorrect (NUREG/CR-7171) and an evaluation, if needed, should address it and, if justified, dismiss it.

Summary of Staff Recommendations

The NRC did accept portions of the proposed revisions that provided additional guidance on what may be included in the evaluation.

Documented in TCD 19-031

Attachment 6: SRP 3.5.3.2.1.8, 3.5.3.2.2.1.2, 3.5.3.2.2.3.2 (FE Reaction with Aggregates)



Industry Comment

There is a need to add a significance threshold to the FE Review Procedures for Cracking due to Reaction with Aggregates (SRP 3.5.3.2.1.8, 3.5.3.2.2.1.2, and 3.5.3.2.2.3.2). These sections should have wording such as in 3.5.2.2.1.8, “is not significant if it is demonstrated that the in- place concrete can perform its intended function” or if it is determined that AAR “in accessible areas has no impact on the intended function of the concrete structure” (as per for leaching in SRP 3.5.3.2.1.9), then No Plant Specific evaluation or AMP is required

Staff Response – The Staff agrees with the comment in part

Technical Basis

The Staff does not agree that a significance threshold should be included. If the triggers in the FE are met then a further evaluation should be conducted. The Staff agrees that the evaluation may demonstrate that a plant-specific AMP is unnecessary.

Attachment 6: SRP 3.5.3.2.1.8, 3.5.3.2.2.1.2, 3.5.3.2.2.3.2 (FE Reaction with Aggregates)



Summary of Staff Recommendations

Clarify relevant sections to show that an adequate evaluation can show no plant-specific AMP is necessary

Documented in TCD 19-033

Attachment 6: SLR-SRP Table 3.0-1, FSAR Supplement, Comment 3



Industry Comment

- Delete the addition of 5% more supports to the scope of the program.
- Add a clarification that volumetric examination of A325 and A490 bolts for cracking is not required (XI.S3)

Staff Response – The Staff disagrees with these comments

Technical Basis

Modification to the wording of Table 3.0-1 is not applicable given the staff's disposition (does not agree) with the related comments – See discussion in TBD 19-054 and 19-086 slides

Documented in TBD 19-036

Attachment 6: SLR-SRP Table 3.0-1, FSAR Supplement, Comment 5



Industry Comment

Delete the phrase "for all applicable parameters monitored or inspected" (XI.S7)

Staff Response – The Staff agrees with this comment in part.

Technical Basis

The Staff understands that not all parameters lend themselves to quantitative measurements or trending. To acknowledge that, "applicable" was included in the original wording. To clarify this further, "all" was deleted in the final document. However, quantitative measurements exceeding the acceptance criteria should be recorded and trended for all parameters that lend themselves to quantitative measurements.

Summary of Staff Recommendations

FSAR Supplement in GALL and SRP edited to clarify this point

Documented in TCD 19-038

Attachment 6: SLR-SRP Table 3.0-1, FSAR Supplement, Comment 6



Industry Comment

Delete information referring to design purposes of Service Level 1 protective coatings (XI.S8)

Staff Response – The Staff does not agree with this comment

Technical Basis

- The Staff agrees that not all of the design functions of containment coatings are within the scope of license renewal aging management. However, we believe it is prudent to mention them, for completeness, in the program description.
- In addition, GALL Rev 2 just referred to “*RG 1.54 Rev 1, or latest revision,*” without providing this level of detail.
- The Staff chose to paraphrase the RG instead of referring to the revision level in the SLR GALL.

Attachment 6: SLR-SRP Table 3.0-1, FSAR Supplement, Comment 6



Summary of Staff Recommendations

No change is needed

Documented in TCD 19-039

Attachment 6: SLR-SRP Section 4.5, Comment 1

Industry Comment

Clarify the OE references to no longer indicate that all OE shows a loss of prestress higher than predicted and refer to IN 99-10 that provides the background for the OE reference.

The GALL description for the OE with respect to loss of tendon prestress in AMP X.S1, Element #10 should be used in order to be consistent

Staff Response – The Staff agrees with this comment in part.

Technical Basis

Applicants are reminded when setting goals and performing periodic evaluations consistent with 10 CFR 50.65 are required to consider industry-wide operating experience. OE should be reflective of past, present and anticipated future consequences of adverse environment and aging effects on tendon force prestress.

Attachment 6: SLR-SRP Section 4.5, Comment 1



Technical Basis, continued

Posttensioning systems are susceptible to the same degradation mechanisms as mild steel reinforcement plus loss of prestressing force, primarily due to tendon relaxation, and concrete creep and shrinkage. Identified degradation includes concrete cracking, concrete freezing and thawing damage, corrosion of steel reinforcement, corrosion of posttensioning tendon wires, anchor head failures due to stress-corrosion cracking or hydrogen embrittlement, leaching of tendon gallery concrete, and larger than anticipated loss of prestressing forces.

The inclusion of the of the word “may” adds clarity to Section 4.5.1, “Areas of Review.” The IN 99-10 is appropriately referenced.

Documented in TCD 19-041

Attachment 6: SLR GALL X.S1 Concrete Containment Unbonded Tendon Prestress



Industry Comment

Elements 5 and 6, pages X.S1-1 and X.S1-2: The new SLR GALL recommendation/requirement for creation of a group PLL line and comparison of the group trend lines to a PLL line is not required by code, not supported by operating experience, and the ability to effectively implement this concept is questionable, and the value of such a comparison is not readily apparent.

Staff Response – The Staff does not agree with this comment

Technical Basis

The Predicted Lower Limit (PLL) of tendon forces provides the marker of where the posttensioned state of the containment structure at any given time should be. The PLL tendon force lines are plant specific and evaluated consistent with RG 1.35.1. According to the RG, the PLL tendon force lines should address tendon losses from initial seating and periodically updated to the end of plant life.

Attachment 6: SLR GALL X.S1 Concrete Containment Unbonded Tendon Prestress



Technical Basis, continued

The RG also states “[t]olerance bands for groups and subgroups of tendons should be constructed and should be used for comparison of measured prestressing forces with the forces predicted for the time of inspection” When an applicant claims consistency of its AMP with that of the GALL-SLR Report, it should incorporate in the application the PLL lines so that “...measured values can be compared with its prescribed tolerance band.”

RG 1.35.1 aims to provide a high degree of confidence in the performance capability of the post-tensioning system, and the opportunity of timely corrective actions should the development of potentially adverse conditions be detected.

Summary of Staff Recommendations

No change was made as a result of this comment

Documented in TCD 19-042

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 1



Industry Comment

Emphasis on UT of Containment shell or liner surfaces inaccessible from one side and not subject to degradation – Recommend requiring no additional UT examinations beyond what is code required and per 10CFR50.55a for steel liners.

Staff Response – The Staff agreed with this comment in part.

Technical Basis

Driven by consideration of plant-specific OE, importance of safety function, future corrosion potential from aging processes like cracking, carbonation, chloride ingress, foreign objects & lack of inspection technique for large inaccessible areas. Provides verification that corrosion OE if observed in later part of service life is not a larger scale issue, and confirmation of AMP effectiveness on the issue for long term operations.

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 1



Summary of Staff Recommendations

AMP revised to recommend one-time statistical UT sample triggered by plant-specific OE since first renewed license.

**Documented in TCD 19-043 (Significant Issue in Attachment 1:
14-012)**

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 2



Industry Comment

New requirements for Bulges in Liner – Corrosion at liner bulges is not a relevant aging mechanism that requires consideration

Staff Response – The Staff agrees with the comment in part.

Technical Basis

Bulges are not caused by or in itself indicative of corrosion. Bulges result from initial inward curvature of liner from construction activities, and may grow due to additional compressive strains from concrete creep under prestress and dead loads, shrinkage, and temperature effects which are aging mechanisms. Liner & anchors have design basis code stress/strain requirements; bulges may be indicative of plastic strains and unbalanced anchor forces acceptable only to the extent accounted for in calculation-of-record, which demonstrates intended function will be accomplished. Noted case(s) with significant bulges but no clear technical evaluation or inspection acceptance criteria against design requirements.

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 2



Summary of Staff Recommendations

Deleted specifically monitoring bulges for corrosion potential. AMP recommends provisions so that bounding bulges with features beyond that accounted for in design calculation-of-record are identified and evaluated.

Documented in TCD 19-044

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 3



Industry Comment

New requirements for surface examination (dye-penetrant examinations) of SS and dissimilar welds of penetration sleeves apply regardless of whether subject to cyclic loading, or SCC, and regardless of whether CLB Fatigue analysis exists. The requirements refer to a superseded Code section that is inconsistent with the SLR GALL. The requirements appear to question the adequacy of the Appendix J CLB

Staff Response – The Staff agrees with the comment in part.

Technical Basis

Cumulative fatigue damage (cracking) is an applicable aging effect for Class MC pressure-retaining components, including containment metal shell/liners, and penetration components. For license renewal, this can be addressed either through a TLAA, or by supplemental aging management method for detection. The basis is, in principle, the same as collectively indicated in NUREG-1950 for GALL Rev 2, but lack of clarity and inconsistencies in AMP and among related AMR items are addressed. 44

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 3



Technical Basis, continued

Supplemental surface examinations to detect cracking is applicable only based on considerations of cyclic loading (fatigue) and whether CLB fatigue analysis exists, and further evaluation for SCC, including susceptibility; with the in-lieu option of performing *appropriate* leak test at least once per inspection interval.

AMP supplemental surface examination provision is intended to address detection of fatigue damage (cracking) for components in SRP-LR items 3.5-1, 27 & 40, which are collectively intended to be same as item 9 but for components with no CLB fatigue analysis (i.e., no TLAA 4.6 as for item 3.5-1, 9). For SCC, this is based on FE related to items 3.5-1, 10 and now also 38 & 39.

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 3



Summary of Staff Recommendations

AMP & related AMRs revised to recommend supplemental surface examination for steel, stainless steel and dissimilar metal components of pressure-retaining components subject to cyclic loads with no CLB fatigue analysis (i.e., items 3.5-1, 27 & 40) with appropriate leak test option. For SCC, revised FE in SRP-SLR Section 3.5.2.2.1.6 to also apply to items 3.5-1, 38 & 39.

**Documented in TCD 19-045 (Significant Issue in Attachment 1:
14-013)**

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 4



Industry Comment

Discussion of Mark I containment monitoring and trending implies that GL 87-05 required UTs at all drywells. However, if the Mark 1 containment design had a sealed sandbed, the GL and CLB did not require UTs to be performed

Staff Response – The Staff does not agree with the comment

Technical Basis

The language used in the AMP is consistent with that in LR-ISG-2006-001 that was incorporated into the XI.S1 AMP in Revision 2 of the GALL Report. Specific situations of Mark I containments should be addressed on a case-by-case basis. The Staff also notes from past LRA reviews that some licensees that did not perform UT in response to GL 87-05 for justified reasons, have performed UTs at a later date in support of their license renewal application or other reasons such as operating experience.

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 4



Summary of Staff Recommendations

Editorial change made to include consideration of plant-specific design and OE to the related program element for better clarity and consistency with LR-ISG-2006-001.

Documented in TCD 19-046

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 5



Industry Comment

ASME subsection IWE-1240 only addresses areas subject to accelerated corrosion, i.e., areas where corrosion has been identified, and does not mention areas susceptible to accelerated corrosion

Staff Response – The Staff agrees with comment in part.

Technical Basis

Subject wording is intended to be consistent with IWE-1240 of 2006 addenda and later editions of code. Staff further notes that there are situations that may require augmented examination where degradation may not have been identified yet but possible, such as that required by IWE-2313(2) or because of the environment the containment surface is subject to (e.g., moisture intrusion into containment shell/liner leak-chase channels).

Attachment 6: XI.S1 ASME Section XI, Subsection IWE, Comment 5



Summary of Staff Recommendations

Revised language to be consistent with IWE-1240.

Documented in TCD 19-047

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 2



Industry Comment

- Program Description- Delete newly added sentence that refers to randomly selected additional supports for each group of materials used and the environments to which they are exposed outside of the existing IWF sample population.
- Element 4- Delete newly added clause in the 2nd sentence and new 3rd sentence that refer to randomly selected additional supports
- Page # XI 01-47 and SRP Page # 3.0-47- Delete newly added sentence that refers to selected additional supports.

Staff Response – The Staff does not agree with these comments

Technical Basis

Clarification: The new provision is for an additional 5% of the number of supports currently inspected as the ASME IWF sample, for each support type, not an additional 5% of the total number of supports in the plant.

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 2



Technical Basis, continued

The population of supports that are currently inspected in accordance with 10 CFR 50.55a include the same supports each inspection interval and aging was not necessarily considered. This nominal increase allows that supports that have never been inspected can be verified to be representative of the entire population of supports, or could identify aging that is occurring in supports that have never been inspected during the life of the plant. Although other programs, walkdowns, or inspections could potentially identify age-related degradation of IWF supports, they may not, or issues may not be dispositioned appropriately to the IWF AMP.

Summary of Staff Recommendations

Will clarify wording in areas mentioned in the AMP

**Documented in TBD 19-054 (Significant Issue in Attachment 1:
14-014)**

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 3



Industry Comment

- Element 1- Restore the clause that limited the scope to supports not exempt from examination and delete the newly added last sentence of the section that addresses inaccessible supports.
- Element 4- Add clarification from Table IWF-2500-1 note regarding multiple components, other than piping, within a system of similar design, function, and service, that the supports of only one of the multiple components are required to be examined.

Staff Response – The Staff does not agree with these comments

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 3



Technical Basis

- Accessible areas could be leading indicators to trigger an investigation of similar inaccessible areas, as applicable on a plant-specific basis. The change was not intended to mean that applicants are expected to expand the scope of regular inspections to exempt components, but that there be an evaluation for inaccessible components if conditions indicate.
- This is expressly stated in ASME Code Section XI, Subsection IWF, as incorporated by reference in 10 CFR 50.55a, and therefore repeating the existing requirements is not necessary

Documented in TBD 19-055

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 4



Industry Comment

Delete the requirement for actual measured yield strengths and change to expected yield strengths

Staff Response – The Staff does not agree with this comment

Technical Basis

This can be considered on a plant-specific basis, as necessary, if actual strengths were not required to be submitted at the time of installation.

Documented in TCD 19-056

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 7



Industry Comment

- Element 3- Delete phrase referring to volumetric examination of A325 and A490 bolts. Add sentence from Structures Monitoring program that addresses OE for A325 and A490 bolts
- Element 4- Delete sentence referring to volumetric examination of A325 and A490 bolts

Staff Response – The Staff does not agree with this comment

Technical Basis

The staff did not intend for the exemption of certain high-strength bolting that exists in the SMP AMP to also apply to the bolting in the IWF AMP. Staff position is that for aging management, high strength bolts with the properties described above that are included in ASME IWF applications, volumetric examinations should be performed for a sample of the bolts to determine whether cracking due to SCC has occurred.

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 7



Technical Basis, continued

Note this is not a change from the previous recommendation, it is a clarification. Also note that volumetric examinations may be waived with adequate plant-specific justification. This plant-specific justification would need to consider the population of high-strength bolts in IWF supports and determine on a component basis whether SCC is a credible aging effect (including verification of a dry environment).

Documented in TBD 19-060

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 9



Industry Comment

Refer to NUREG-1950, comment # 906, when characterizing the aging of bolts

Staff Response – The Staff does not agree with this comment

Technical Basis

NUREG-1950 is not a technical OE document

Documented in TCD 19-061

Attachment 6: XI.S3 ASME Section XI, Subsection IWF, Comment 10



Industry Comment

Delete reference to IN 2009-04

Staff Response – The Staff does not agree with this comment

Technical Basis

The deletion is not necessary - if the OE does not apply to the plant, it is dispositioned in accordance with the process for consideration and application of Information Notices per the corrective action program.

Documented in TCD 19-062

Attachment 6: XI.S4 10 CFR Part 50, Appendix J, Comments 1, 2, and 3

Industry Comment

- Program Description, page XI.S4-1: Clarify that Type B tests are not performed on components for which Type C tests are applicable
- Program Description, page XI.S4-1: Delete sentence discussing Type C testing being performed under a different AMP
- Element 1, page XI.S4-2: Delete the requirement in AMP XI.S4 element 1 to identify other SLR AMPs for components that are not managed for aging by AMP XI.S4

Staff Response

- The Staff does not agree with the comment
- The Staff agrees with the comment in part
- The Staff agrees with the comment in part

Attachment 6: XI.S4 10 CFR Part 50, Appendix J, Comments 1, 2, and 3



Technical Basis

- The XI.S4 AMP language parallels that used in regulations. “Type B (containment penetration leak rate) tests detect local leaks and measure leakage across each pressure-containing or leakage-limiting boundary of containment penetrations,” of 10 CFR 50 Appendix J, II(G), clearly states what Type B tests do. There is no discussion of Type C testing in the referenced sentence of regulations
- Staff agreed with the comment for the deletion. See below for referencing other AMPs
- The insertion of Type B or C testing is accepted as it clarifies the type of excluded testing. For the suggested deletion, the Staff agrees there are a number of AMPs or TLAAs that could support the management of aging effects of the excluded pressure boundary components. However, it is important that the applicant identifies one or more of these for the Staff to evaluate their adequacy for reasonable assurance that the integrity of the containment pressure boundary is maintained.



Attachment 6: XI.S4 10 CFR Part 50, Appendix J, Comments 1, 2, and 3

Summary of Staff Recommendations

Changes have been made on the accepted comments in whole or in part

Documented in TCD 19-063

Attachment 6: XI.S5 Masonry Walls Comment 1(d)

Industry Comment

Elements 5 and 6, page XI.S5-2: See also generic comment under IWL regarding monitoring and trending... Measurement and recording dimensions and trending of visual indications however infinitesimal is not reasonable and provides no value...Trending is adequately performed by comparison to previous results, therefore the word trending can be replaced by the words comparison to previous results as also stated in these elements.

Staff Response – The Staff agrees in part with this comment

Technical Basis

The word “trending” is similar to the proposed words “comparing to the previous results.” The word “trending” is not replaced by the proposed words.

Also see staff’s response to 19-070 and 19-073

Documented as 19-064

Attachment 6: XI.S6 Structures Monitoring, Comment 2



Industry Comment

Program Description, page XI.S6-1 & Element 3, page XI.S6-2: Coatings should not be monitored and inspected as part of this program, except when specifically relied upon to manage specific aging effects for specific structures in the scope of license renewal

Staff Response – The Staff agrees with this comment in part.

Technical Basis

The Staff agrees that coatings are generally not within the scope of license renewal and do not serve an intended function. However, many structures within the scope of license renewal are coated and still require a visual inspection. The intent of the proposed wording was to make it clear that coated structures within the scope of license renewal require a visual inspection regardless of whether or not the coatings are within scope. The Staff did not intend for quantitative acceptance criteria to be developed for coatings, unless they have a license renewal intended function.

Attachment 6: XI.S6 Structures Monitoring, Comment 2



Summary of Staff Recommendations

To clarify that coatings themselves are not within the scope of this program, unless they have an intended function, discussion of coatings was removed from the Program Description and wording was added to Element 1. The wording in Element 3 was revised to make it clear the coating is only inspected for signs of distress in the underlying material.

Documented in TCD 19-066

Attachment 6: XI.S6 Structures Monitoring, Comment 3



Industry Comment

Elements 3 and 4, pages XI.S6-2, -3, and -4: Delete requirement to monitor all through-wall leakage of groundwater for volume and chemistry. We are not aware of any OE where groundwater in-leakage has resulted in age related degradation that has resulted in a loss of intended function

Staff Response – The Staff does not agree with this comment.

Technical Basis

Requiring monitoring of volume and chemistry is not overly prescriptive. There is significant operating experience from recent license renewal application reviews with licensees finding through-wall leakage acceptable as-is with little or no evaluation. The Staff does not consider through-wall leakage acceptable and expects some form of corrective action to be taken when leakage is identified. Furthermore, the Staff does not agree that monitoring the leakage is not feasible and that monitoring does not provide useful data.

Attachment 6: XI.S6 Structures Monitoring, Comment 3



Technical Basis, continued

Significant changes in the volume or chemistry data of the leakage could be a leading indicator of concrete or reinforcing steel degradation. The guidance allows licensees to determine the appropriate frequency of the monitoring and to determine what additional actions need to be taken based on the results.

Summary of Staff Recommendations

No change

**Documented in TCD 19-067 (Significant Issue in Attachment 1:
14-018)**

Attachment 6: XI.S6 Structures Monitoring, Comment 4



Industry Comment

Element 4, page XI.S6-3: Delete requirement for seasonal variations in groundwater sampling. The recommendation for seasonal quarterly or semi-annual evaluations of ground water is too prescriptive on a generic basis and would not be necessary or effective... The existing 5 year frequency from NUREG 1801 should be maintained in the SLR GALL.

Staff Response – The Staff agrees with this comment in part

Technical Basis

The Staff agrees that a five year frequency is appropriate to monitor groundwater. However, the Staff does not agree that seasonal variations should be accounted for on a plant-specific basis. All plants may experience seasonal variations in groundwater chemistry, and the sampling is used to identify the possible variation.

Attachment 6: XI.S6 Structures Monitoring, Comment 4



Summary of Staff Recommendations

The wording in Element 4 has been revised to make it clear that groundwater monitoring only has to be done every five years, but when done, the monitoring should account for seasonal variations.

**Documented in TCD 19-068 (Significant Issue in Attachment 1:
14-018)**

Attachment 6: XI.S6 Structures Monitoring, Comment 5



Industry Comment

Element 4, page XI.S6-4: Delete requirement for inspecting inaccessible concrete structural elements exposed to aggressive groundwater/soil on an interval not to exceed 5 years...OE does not reflect the need for the new requirement to make inaccessible concrete accessible for inspection when exposed to aggressive groundwater

Staff Response – The Staff agrees with this comment in part

Technical Basis

The Staff agrees that the recommendation may be overly prescriptive and burdensome. Licensees should be allowed the flexibility to decide the best method for managing their inaccessible concrete. However, the Staff believes the evaluation and any associated actions should occur every 5 years.

Attachment 6: XI.S6 Structures Monitoring, Comment 5



Summary of Staff Recommendations

The wording in Element 4 has been revised to allow more flexibility in the actions taken when concrete is exposed to aggressive groundwater.

**Documented in TCD 19-069 (Significant Issue in Attachment 1:
14-019)**

Attachment 6: XI.S6 Structures Monitoring, Comment 6



Industry Comment

Element 5, page XI.S6-4: Limit recording and trending to significant findings for applicable parameters monitored or inspected. Recording and trending may be unreasonable for minor degradations.

Staff Response – The Staff agrees with this comment.

Technical Basis

The Staff's intention was for monitoring and trending to occur for all significant findings, as described by the acceptance criteria outlined in Element 6.

Attachment 6: XI.S6 Structures Monitoring, Comment 6



Summary of Staff Recommendations

Element 5 was revised to clarify this expectation. Element 6 was also revised to indicate that indications that do not exceed the second-tier of ACI 349.3R are acceptable for concrete.

Documented in TCD 19-070

Attachment 6: XI.S6 Structures Monitoring, Comment 7



Industry Comment

Element 5, page XI.S6-4: Quantitative baseline inspection data should not need to be established prior to SLR... No relevant OE is cited as a basis to backfit this requirement for all plants for all parameters, components, and aging effects. This backfit is an undue burden... A need to develop baseline data prior to SLR could be verified during the RAI of the SLR process as a result of specific OE for specific plants, for specific parameters, components, and aging effects.

Provide the option of crediting existing baseline inspections that meet the GALL SLR criteria. Plants that can show documented baseline inspection results that meet the new criteria should not have to repeat the baseline inspection.

Staff Response – The Staff agrees with this comment in part

Attachment 6: XI.S6 Structures Monitoring, Comment 7



Technical Basis

The Staff does not agree that requiring a baseline inspection prior to the period of subsequent license renewal is a backfit or an undue burden. Quantitative inspection criteria are necessary to ensure all indications are identified and treated similarly regardless of the inspector or reviewer. At least one inspection should be completed with these criteria prior to entering SLR so licensees can properly monitor and trend inspection results throughout the SLR period.

The Staff agrees that existing inspection data can be credited for this baseline if the inspections were done with appropriate SLR acceptance criteria.

Summary of Staff Recommendations

Element 5 was revised to reflect this.

Documented in TCD 19-071

Attachment 6: XI.S6 Structures Monitoring, Comment 9



Industry Comment

Element 7, page XI.S6-4: The requirements should reflect the difference between conditions recorded as part of the Structures Monitoring program, which would not be in CAP, and conditions that require repair or replacement, and additional examinations, which would be entered into CAP

Staff Response – The Staff does not agree with this comment.

Technical Basis

The acceptance criteria should be properly set for the program (see response to Comment 19 – 070) so that significant indications are identified. Indications that are identified by the program should be entered into the CAP and at least receive a documented evaluation.

Attachment 6: XI.S6 Structures Monitoring, Comment 9



Summary of Staff Recommendations

No changes were made as a result of this comment.

Documented in TCD 19-073

Attachment 6: XI.S7 Inspection of Water-Control Structures, Comment 3



Industry Comment

Element 4, page XI.S7-3: Remove the requirement for frequency of raw water and ground water chemistry evaluation to identify seasonal variations. This constitutes a significant frequency change and is unnecessarily prescriptive...and provide little or no value and should remain at the 5-year interval

Staff Response – The Staff agrees with this comment in part

Technical Basis

The Staff agrees that a five year frequency is appropriate to monitor groundwater. However, the Staff does not agree that seasonal variations should be accounted for on a plant-specific basis. All plants may experience seasonal variations in groundwater chemistry, and the sampling is used to identify the possible variation.

Attachment 6: XI.S7 Inspection of Water-Control Structures, Comment 3



Summary of Staff Recommendations

The wording in Element 4 has been revised to make it clear that groundwater monitoring only has to be done every five years, but when done, the monitoring should account for seasonal variations

Documented in TCD 19-076

Attachment 6: XI.S7 Inspection of Water-Control Structures, Comment 5



Industry Comment

Element 4, pages XI.S7-3: The new requirements for inspection of submerged concrete subject to nonaggressive raw water or plant specific justification for acceptability of submerged concrete if inspections do not occur within the 5 year interval appears to be overly prescriptive and unnecessarily removes flexibility from the licensee. In addition, no OE has been identified that would require such examinations for all plants at that frequency

Staff Response – The Staff does not agree with this comment

Technical Basis

The Staff does not consider submerged concrete inaccessible, and therefore, should be inspected on the standard 5 year frequency. The Staff understands that this may not always be reasonable or that plants may need to extend the interval, which is why wording was included that allowed for an extended interval with plant-specific justification in the subsequent license renewal application (SLRA).

Attachment 6: XI.S7 Inspection of Water-Control Structures, Comment 5



Summary of Staff Recommendations

No change was made as a result of this comment.

Documented in TCD 19-078

Attachment 6: XI.S7 Inspection of Water-Control Structures, Comment 9



Industry Comment

Elements 1 and 3, Pages XI.S7-1 and 2.; Element 1 - Coatings should not be included in the scope of the XI.S7 Program

Element 3 – Specific coatings inspection parameters should be removed since it is the underlying material that is in scope and subject to evaluation.

Staff Response – The Staff agrees with this comment in part.

Technical Basis

The Staff agrees that coatings are generally not within the scope of license renewal and do not serve an intended function. However, many structures within the scope of license renewal are coated and still require a visual inspection. The intent of the proposed wording was to make it clear that coated structures within the scope of license renewal require a visual inspection regardless of whether or not the coatings are within scope.

Attachment 6: XI.S7 Inspection of Water-Control Structures, Comment 9



Summary of Staff Recommendations

To clarify that coatings themselves are not within the scope of this program, unless they have an intended function, wording was added to Element 1. The wording in Element 3 was revised to make it clear the coating is only inspected for signs of distress in the underlying material

Documented in TCD 19-082

Attachment 4: Mechanical AMPs

2/29/16 Submittal from NEI

AMP XI.M23

TCD Source Code 17

[The Staff agreed with all comments]

AMP XI.M23



Industry Comments

Delete SCC phrase from Element 1(c)

Revise Element 3 regarding special monitoring of high-strength bolts

Unnecessary NDE requirements added for structural bolting for cranes

Volumetric or surface examinations

Staff Response – Staff agrees with these comments

Documented in TCD 17-002 through 17-005

Attachment 1: Significant Issues
2/29/16 Submittal from NEI
TCD Source Code 14

**[All comments were accepted or addressed in
comment responses in Attachment 6]**

**June 4, 2015 Submittal from NEI
TCD Source Code 2**

**[All comments were addressed in
comment responses in Attachment 6]**

**Structural Comments: Wolf Creek
Submittal February 29, 2016
TCD Source Code 33**

**[All comments were duplicates of other
comments address in Attachment 6]**