

Industry Significant Structural Comments on DRAFT SLR GALL/SRP

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Public Meeting Discussion of Draft Guidance Documents for
Subsequent License Renewal - Day 2

2/19/16 • NRC Two White Flint North, Auditorium Level P2

GALL XI.S1: ASME Section XI, Subsection IWE

Newly “supplemented to require” – UT of Containment shell or liner surfaces inaccessible from one side regardless whether degraded or subject to degradation or not. Focused and Random Sampling plan also required.

- ▶ **No applicable OE cited/identified** warranting additional UT examinations. International OE mentioned not applicable based on unique containment design configuration, 1 instance (only Unit 2, not Unit 1), and inconclusive cause determination. **Very Significant Dose and Cost may result**
- ▶ **Not required by Code or 10 CFR 50.55a.** Code requires UT of areas requiring augmented examination when visual examination is not possible on the side requiring augmented examination; or when engineering evaluation of suspect areas specifies for supplemental evaluation. (IWE-2500(b)(2,3,and 4) and IWE-3200). (i.e. – where losses are visually detected)
- ▶ Recommendation: Remove supplemental requirement for UT examinations since beyond code and 10 CFR 50.55a recommendations and requirements, and also since no technical basis or relevant OE support exists for such added significant dose and cost of such examinations and sample plans.

XI.S1 (IWE – Continued)

Added – Liner Plate Bulge evaluation for corrosion, and acceptance of bulges based on quantitative criteria.

- ▶ **Bulges in steel liners (versus blisters in coatings) existed since construction, were expected, acceptable, and liner to concrete bond not required by design.** No IWE code or 10 CFR50.55a requirement exists for examination of bulges.
- ▶ **No applicable OE for corrosion concrete side of bulges.** Single International OE mentioned for corrosion potential due to voids not applicable – unique containment, at penetration (–poorly consolidated concrete/voids), no bulge, Unit 2 but not Unit 1, cause inconclusive.
- ▶ **Coating blisters/through wall corrosion–due to construction errors of organic material left in concrete** occurred at few plants. Corrosion was and would be visually manifested as coating blisters well before first PEO (SAND2010–8718). Coating blisters will be explored.
- ▶ Corrosion of concrete side of liner not expected absent organic material errors; Corrosion at liner bulges not an applicable aging mechanism for consideration.
- ▶ Detection and quantitative measurements of bulges – questionable/repeatability problems (temperature and other factors).
- ▶ Recommendation: Remove added requirements for liner bulges since no basis exists

XI.S1 (IWE – Continued)

Surface examination of SS material and dissimilar welds of penetration sleeves and penetration and vent line bellows now required regardless of cyclic loading, SCC, or whether CLB Fatigue analysis exists , – and, as before, for CS bellows with cyclic loading but no CLB fatigue analysis.

- ▶ Such **Surface examinations (dye–penetrant examinations) not required by IWE Code** or 10 CFR 50.55a. 1992 Code required surface exams of dissimilar metal welds only – but was eliminated from code prior to 1999 IWE implementation. NRC agreed to code requirement elimination based on lack of any (OE) for cracking with such welds and dose.
- ▶ **No additional applicable Operating Experience identified** or cited since then for penetration sleeves or for any of these components. Isolated instance of bellows cracking OE potentially due also to contamination.
- ▶ **Surface examinations not possible for major portion** of sleeves embedded in concrete and Type B testing not possible for most penetration sleeve configurations.
- ▶ **Recommendation:** Remove added requirements for such surface examinations since no basis exists. Recommend supplemental visual where corrosive environments are indicated, and any additional measures as determined by the RI.

GALL XI.S2: ASME Section XI, Subsection IWL

IWL Concrete Acceptance Criteria now specified to be per ACI 349.3R Chapter 5

- ▶ Per IWL Code and former GALL responsibility for determination of acceptance and/or acceptance criteria was purview of the Responsible Engineer.
- ▶ **Recommendation:** Should be worded similar to XI.S6 Element 6

IWL new Element 5 wording “Quantitative measurements are recorded and trended for **all** applicable parameters monitored or inspected, and the use of photographs or surveys is recommended”

- ▶ Unreasonable for every instance however miniscule and regardless of size.
- ▶ **Recommendation:** Delete word “all”. Probably unnecessary to specify recording, but we recommend recording and possibly photos only for more significant, indications greater than a certain size (such as ACI 349.3R Chapter 5 tier 2) – Comment also applicable to XI.S6

GALL XI.S3: ASME Section XI, Subsection IWF

Additional 5 % IWF piping supports for class I, II, and III required for examination

- ▶ Very Significant scope increase – Not required by code, no applicable OE basis for increase.
Significant dose and cost increase would result.

Exam of all bolts; and volumetric of ASTM A325, A490, F1852, and F2280 bolts > 1”

- ▶ Major scope increase – Examination all bolts not required by code sampling basis, and OE does not warrant. Significant dose and cost increase would result.
- ▶ Bolting inconsistency–subject “HS” bolting (A325, A490, etc.) specifically excluded from volumetric in XI.S6, but volumetric now specifically required XI.S3 – Comment previously made via NEI Letters dated 080614 and 060415, and also volumetric clearly not req’d per NUREG 1950.

Cracking of welds and cracking of concrete around anchor bolts parameters added.

- ▶ Concrete should not be in IWF scope, and no persuasive OE for adding cracking of IWF support welds

GALL XI.S5: Masonry Walls

New increased frequency requirement for inspection every 3 years for unbraced and unreinforced masonry walls

- ▶ Increased frequency not supported by OE
- ▶ Recommendation: Use 5 year frequency for all masonry walls

New requirement added in Acceptance Criteria Element: “Safety-related equipment near or adjacent to masonry walls should be inspected to ensure the affected masonry walls are being properly managed for aging.”

- ▶ Recommendation: Remove this statement as it is unclear as to purpose (Program elements 3, 4, and 6 do not address these equipment inspections); – appears to be unnecessary
- ▶ This appears to be a scoping issue which would be inappropriate to include in an aging management program

GALL XI.S6: Structures Monitoring

New requirement – through-wall leakage or groundwater infiltration quantification, chemistry analysis and implied evaluation is unnecessary, and of questionable feasibility, value and meaning.

- ▶ No correlation of water infiltration chemistry values to concrete physical condition has been established by OE, research, codes, or standards. Results in regulatory uncertainty.

Groundwater monitoring frequency change to now address potential seasonal variations (e.g. quarterly or semiannually) rather than every 5 years

- ▶ Overly prescriptive and of low or no value and should be deleted.

Specifying the use of concrete NDE

- ▶ Too prescriptive and will not result in an increase in safety given the current limited effectiveness and questionable results of most NDE methods and applications for concrete and reinforcing steel. Results in regulatory uncertainty.

GALL XI.S6: Structures Monitoring – Continued

See also IWL comment for recording/trending measurements for all parameters.

New requirement – To perform focused inspections of below grade inaccessible concrete exposed to aggressive groundwater/soil not to exceed 5 years frequency

- ▶ Opportunistic inspections currently required, and OE does not reflect the need for the new requirement to make inaccessible concrete accessible for inspection
- ▶ Overly prescriptive, removes needed flexibility for evaluations, alternate frequency, or alternatives such as examination of an accessible leading indicator or other possibilities.

GALL XI.S7: Inspection of Water Control Structures

Change of raw water and ground water chemistry sampling and evaluation to identify seasonal variation is frequency change from 5 years

- ▶ Unnecessarily prescriptive—see related comment GW for XI.S6.

New requirement for inspection of inaccessible concrete subject to aggressive GW/RW/Soil within each 5 years, and for submerged concrete subject to nonaggressive raw water within each 5 year interval or plant specific justification for acceptability

- ▶ Overly prescriptive and unnecessarily removes flexibility from the licensee, for evaluations, alternate frequency, or alternatives such as examination of an accessible leading indicator or other possibilities. Similar to XI.S6 comment.

See also related XI.S6 comment for GW through wall leakage or infiltration – comment applicable also for this AMP

SRP Chapter 3.5

Further Evaluation /Plant Specific AMP Cracking due to Reaction with Aggregates

- ▶ **No Significance Threshold** – FE Review Procedures 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) 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 related to leaching in SRP 3.5.3.2.1.9), then No Plant Specific AMP is required.
- ▶ Considering SLR plants are over 40 years and AAR, if potentially significant, would manifest significant concrete growth e.g. reduced seismic gaps, movement/changes at doors/penetrations, and any reactions should be nearly complete/complete – consider possible alternatives such as one time inspections/evaluations
- ▶ Recommend that, “an effective inspection program has been developed and implemented to ensure that this aging effect in inaccessible areas is adequately managed”, should be reworded clarifying that inspection of accessible areas is adequate for managing inaccessible areas. No OE warrants doing anything different or focused on inaccessible areas.

SRP Chapter 3.5

Further Evaluation /Plant Specific AMP– Irradiation of Concrete

- ▶ **Plant Specific Concrete Fluence calculations are not required as they have already been provided by EPRI; recommend allowing consideration of industry evaluations of this aging effect.**
- ▶ **Unlikely to impact BWRs, may only impact portion of PWR fleet based on EPRI and DOE research and recent presentations (See following slides). – BWR reactor shield or sacrificial shield concrete is based on shielding (not for strength, as concrete is encased in thick structural steel plates) and BWR reactor vessel pedestal structure concrete and the reactor cavity pool walls above containment (mentioned elsewhere) are located such that high fluence levels should not be a factor.**
- ▶ **Internal heating due to neutron or gamma radiation is a more immediate potential temperature effect and should not be an aging mechanism to be addressed since it is not a current CLB issue (see EPRI report TR 3002002676).**

GALL Chapter II and III

Line item changes

- ▶ Line items specifying Plant Specific (PS) AMPs only should also specify IWL or Structures Monitoring. Thresholds for PS from SRP should be referenced.
- ▶ As written, four (4) new Plant Specific AMPs required in 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–
- ▶ No OE justifies PS AMPs for inaccessible areas.
- ▶ Otherwise “E” and plant specific notes will result even with use of thresholds given in SRP Chapter 3.5.3... when a Plant Specific AMP is not required.
- ▶ Unclear on Acceptable Options for Plant Specific AMPs – results in Regulatory Uncertainty
- ▶ **Not all previously identified line item needs were addressed** –NEI letter dated 08/06/2014 requested addition of needed missing line items such as for: concrete exposed to raw water (applicable to intake structures/ultimate heat sinks, etc at all plants) and for SL 1 Coating exposed to treated water (applicable to containments) were not addressed or included.
- ▶ **Combining and simplifying/reducing number of line items requested via NEI letter 08/06/2014 not addressed.**

GALL Chapter X.S1 Concrete Containment Unbonded Tendon Prestress and SRP 4.5

Creation of a PLL line and comparison of the group trend lines to a PLL line is not required by code and the value of such a comparison is not readily apparent

- ▶ Majority prestress losses occur earlier in life of plant, crossing of PLL and regression analysis trending lines between 60–80 years seems much less important than the Code requirement for projecting the regression analysis trend line versus the MRV line. Related to previous comment in 060415 NEI Letter.
- ▶ Once in SLR rate of prestress loss will be very small and will be less than the ability to effectively measure the loss of prestress.

GALL Chapter XI.S4 10 CFR Part 50, Appendix J

- ▶ Requirement in Description /Scope sections to augment program to ensure that all containment pressure retaining components are managed for age related degradation and requiring an accounting by component for any other AMPs that manage aging is outside the scope of Appendix J test program – results in unnecessary reviews and evaluations. Example – containment isolation valves addressed in mechanical GALL Sections. Redundant listing of mechanical containment isolation component AMPs by the Appendix J AMP would be unnecessary. Related previous comment made per 060415 NEI Letter

Questions ? Discussion