

Industry Significant Structural Issues with DRAFT SLR GALL/SRP

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Public Meeting Discussion of Draft Guidance Documents for
Subsequent License Renewal

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SRP Chapter 3.5

Further Evaluation /Plant Specific AMP– for Irradiation of Concrete per written comments provided 2/29/16

- ▶ Recommend wording such that Plant Specific Concrete Fluence calculations are required unless it can be shown that an industry technical report (e.g. EPRI) bounds the plants particular design.
- ▶ 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).

SRP Chapter 3.5

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

- ▶ SRP section 3.5.2 and 3.5.3 wording should be consistent and we believe 3.5.2 wording should be adopted for 3.5.3.
- ▶ We agree with the clarification that an adequate evaluation can show no plant-specific AMP is required. Considering SLR plants are over 40 years and AAR, if potentially significant, would manifest significant concrete volume changes– e.g. reduced seismic gaps, movement/changes at doors/penetrations
- ▶ Also SMP includes periodically monitoring growth/movements of building components and active cracks beyond ACI 349.3R.
- ▶ Recommend clarifying that inspection of accessible areas is adequate for managing inaccessible areas. No OE warrants doing anything different or focused on inaccessible areas.

GALL XI.S1: ASME Section XI, Subsection IWE

(One Time) statistical random UT examination sampling of Containment shell or liner surfaces if plant specific OE (since first renewed license) warrants such examination

- ▶ No applicable technical/code or industry OE basis cited/identified. Concerns and considerations for plant-specific OE mentioned such as concrete cracking, carbonation, and chloride ingress are surface or near surface concrete conditions which will not affect the liner given the thickness of containment concrete (3' to 6' thick concrete- lack of significant outer rebar corrosion should be one of a number of possible leading indicators for not requiring random UTs).
- ▶ Recommend separating concrete/environment vs liner OE (See below)
- ▶ Foreign Objects - Isolated, visually detected (not UT detected) through wall corrosion OE exists due to construction errors (not aging) for **corrosion due to embedded organic debris** against liner, at only a few plants. Recent UT sampling plan results at plant with debris driven corrosion have not found significant corrosion. Visual examinations are adequate considering that corrosion due to organic debris would be self manifesting via coating blisters/through wall corrosion, before 1st PEO (See NRC Containment Liner Corrosion research paper by Dunn, Pulvirenti, and Hiser - 2011 (also SAND2010-8718). Therefore, no need to do UT for remote possibility of corrosion on concrete side of liner.
- ▶ The liner is examined by IWE and also periodically verified by Appendix J program. Additionally separate coatings inspections periodically examine condition of the coated liner. The concrete side of liner is a protected environment, shielding side of shells is likewise protected in an isolated area.

XI.S1 (IWE – Continued)

Recommendation remove Addition of Liner Plate Bulge evaluation and acceptance of bulges to be based on quantitative criteria.

- ▶ As noted Bulges in steel liners (versus blisters in coatings) existed since construction, were expected, acceptable, and liner to concrete bond not required by design.
- ▶ IWE Bulge inspections are not code required or typically performed and bulge acceptance criteria does not typically exist. Detection and quantitative measurements of bulges – would be questionable, with repeatability problems (due to temperature and other factors).
- ▶ Creep and Shrinkage of concrete happen mostly during early plant life.
- ▶ Past evaluations done at certain plants have found liner bulges to be irrelevant. No industry OE for liner/anchor failures exists.
- ▶ Augmenting IWE to periodically perform such inspections is not supported/warranted by any technical, or OE, or code basis, no additional safety benefit is expected. No basis for code changes to address bulges exists. The liner is a leak tight membrane, which is examined by IWE and also periodically verified by Appendix J program testing. Additionally separate coatings inspections periodically examine condition of the coated liner.

XI.S1 (IWE – Continued)

Recommendation: Remove all added requirements for Surface examination of SS material and dissimilar welds of penetration sleeves and penetration and vent line bellows .

We recommend supplemental visual exams only where corrosive environments are indicated, and any additional measures as determined by the RI.

- ▶ 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 cracking of such containment 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.
- ▶ The penetrations and associated subcomponents are examined by IWE and also periodically tested by the Appendix J program.

GALL XI.S3: ASME Section XI, Subsection IWF

Periodic examination of additional 5 % of the sampled number of IWF supports for class I, II, and III is not warranted by a technical basis or OE

Dose and cost increase would result with no apparent safety benefit.

Note: ASME Code and CAP provisions exist for expanding scope and determining extent of condition when deficiencies are identified. Existing industry OE does not warrant any sampling increase beyond the code requirement.

Volumetric testing of ASTM A325, A490, F1852, and F2280 bolts > 1”

- ▶ **Bolting inconsistency**—subject “HS” bolting (A325, A490, etc.) specifically excluded from volumetric in XI.S6, but volumetric now specifically required XI.S3 for same material, environment, component, and intended function – Comment previously made via NEI Letters dated 080614 and 060415, and also volumetric clearly not req’d per NUREG 1950 (which was based on AISC reports and other technical basis previously cited by industry). Note also that A325 bolts will not meet GALL def. For HS (>150 KSI actual yield), so therefore, A325 and F1852 bolts should be excluded on that basis alone. AISC/ASTM designation of HS is not the same as GALL definition of HS. We agree with def. of GALL of HS > 150 ksi actual yield based on OE which does not extend to A490 bolts.

GALL XI.S6: Structures Monitoring

Recommendation: Remove or Revise New requirement for through-wall leakage groundwater infiltration quantification, chemistry analysis and implied evaluation.

- ▶ When leakage is identified it is entered into the Corrective Action Program and appropriate evaluation/actions are taken.
- ▶ Indications of ground water leakage should be evaluated to determine the need for corrective actions. While volume may be measured where feasible and chemistry testing may be called for by licensee at their option, there is no established correlation of water infiltration chemistry values to concrete/rebar physical condition of which we are aware. No regulatory recommendation to do this is necessary.
- ▶ If this requirement remains please add statement from technical basis in slide 70 to the GALL for clarification.
- ▶ We believe the current SMP program, consistent with the GALL, is adequate to identify concrete degradation.

GALL XI.S7: Inspection of Water Control Structures

Recommendation: Remove for submerged concrete subject to non-aggressive raw water within each 5 year interval or plant specific justification for acceptability

- ▶ Note above reqt. differs from RG 1.127 R2 which classes below-grade and submerged concrete as inaccessible and recommends inspections only if aggressive environment. For aggressive environments, alternatives such as examination of an accessible leading indicator, evaluations, or other possibilities should be licensee determined options.
- ▶ Note: ACI 349.3R Chapter 5 eval. criteria is not appropriate for submerged concrete, owner should determine alternate criteria. Inspections at (above and just below) water line are appropriate to identify concrete aging effect.

Questions ? Discussion