



**Subsequent License Renewal (SLR)  
Draft Generic Aging Lessons Learned Report &  
Standard Review Plan Guidance Documents  
Public Meeting**

Office of Nuclear Reactor Regulation  
Division of License Renewal

**January 21, 2016**

# Agenda



- License Renewal Background
- SLR Background
- Basis for Changes
- Summary of Significant Changes:
  - Mechanical Aging Management Programs (AMPs)
  - Reactor Pressure Vessel AMPs
  - Other SRP Changes

# License Renewal Principles

- Regulatory process ensures that the current licensing basis provides and maintains an acceptable level of safety
- Each plant's licensing basis must be maintained
- Additional focus on aging management effects is achieved through the verification of AMPs implementation

# License Renewal Status

- **Status of license renewal activities:**
  - 81 units have been relicensed
  - 13 units currently under review
  - 6 upcoming units between 2016 and 2021
- **Age of current plants:**
  - By the end of 2015, 39 units have more than 40 years of operation
  - Older plants will reach the end of 60 years in 2029

# Subsequent License Renewal

- The principles of license renewal would continue to be effective to ensure safety for operations beyond 60 years
- Staff assessment of the current regulatory framework is ongoing
- Technical reviews ensure effective aging management

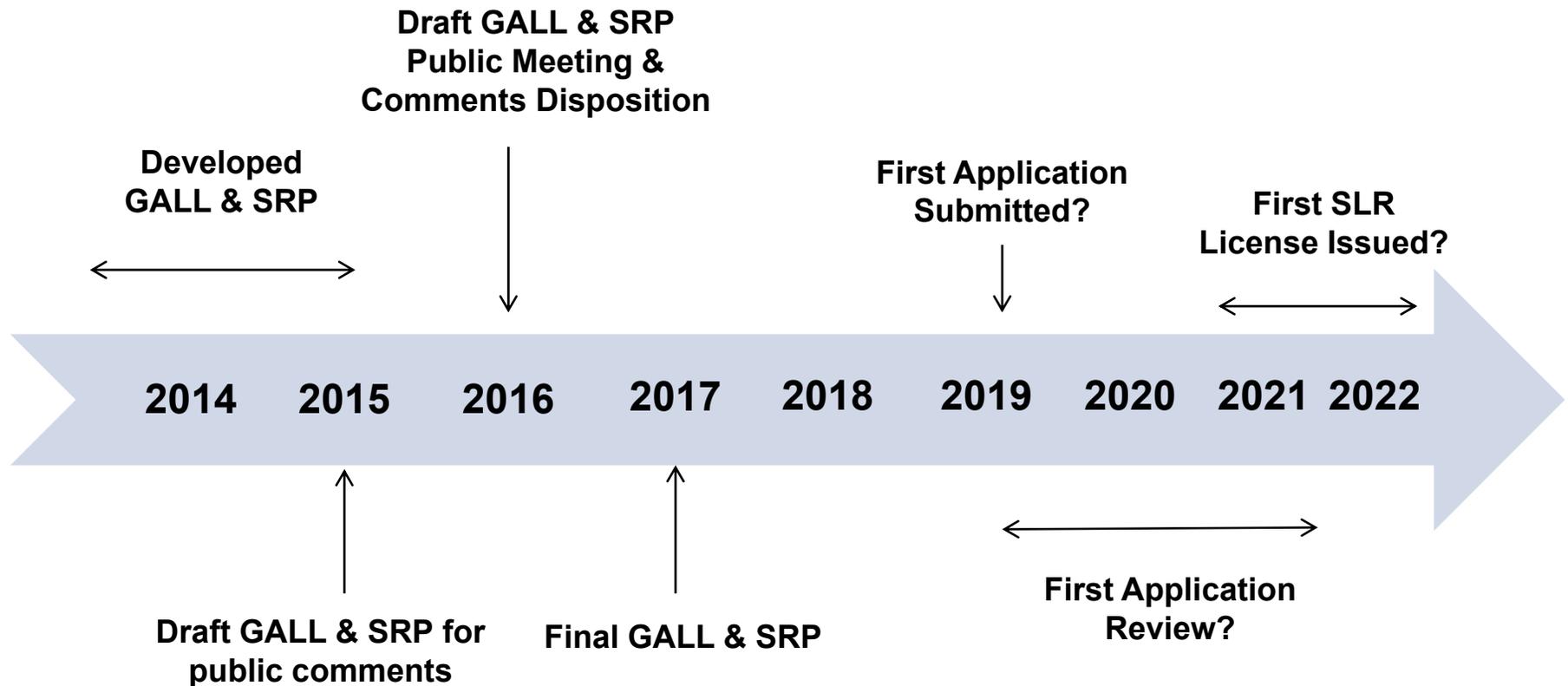
# Subsequent License Renewal

- Major technical issues for operation beyond 60 years:
  - Neutron embrittlement of the reactor pressure vessel at high fluence
  - Stress corrosion cracking of primary system components
  - Concrete and containment degradation
  - Electrical cable qualification and condition assessment

# Subsequent License Renewal

- Technical sources for consideration in the guidance update:
  - Expanded Materials Degradation Assessment
  - AMP Effectiveness Audits at plants in the period of extended operation
  - Relevant domestic and international operating experience
  - Industry and staff comments

# SLR Timeline



# Next Steps

<b>Timeframe</b>	<b>Description</b>
February 17, 2016	ACRS Sub-Committee Meeting
February 19, 2016	Public meeting on draft SLR GALL Report and SRP
February 23, 2016	Public meeting on draft SLR GALL Report and SRP
February 29, 2016	Public comment period ends
March 8-10, 2016	Regulatory Information Conference Sessions
March 2017	ACRS Full-Committee Meeting
Mid-2017	Issuance of final SLR GALL Report, SRP and Technical Basis NUREGs
2019	First SLR Application

# SLR Guidance

- **Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report (NUREG-2191)**
  - Provides generic evaluation of existing AMPs
  - Acceptable methods to manage aging effects; plant-specific alternatives may be proposed
- **Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants (SRP-SLR) (NUREG-2192)**
  - Provides guidance to NRC staff reviewers to perform safety reviews of SLR applications

# Basis for Changes

- Expected aging differences for operations beyond 60 years
- Implementation of GALL Report and SRP Revision 2 in license renewal applications
- Improve efficiency and effectiveness in applications and NRC review
- New operating experience since GALL Report and SRP Revision 2
- Gaps and errors in GALL Report and SRP Revision 2

# Overview of Changes

- Standard language for Corrective Actions, Confirmation Process, and Administrative Controls elements for each AMP
- Added detailed Final Safety Analysis Report Supplement summary descriptions in GALL-SLR Report and SRP-SLR
- New GALL-SLR AMPs:
  - X.M2: Fluence Monitoring
  - XI.M42: Internal Coatings/Linings for in Scope Piping, Piping Components, Heat Exchangers, and Tanks
  - XI.E7: High Voltage Insulators
- New SRP-SLR Chapter 5: Technical Specifications Changes

# Overview of Changes

- Renamed GALL Chapters IX and X
- Expanded AMP XI.E3 to three new AMPs to address aspects related to potentially submerged cables
- Deleted AMPs XI.M6 and XI.M16A and replaced them with new further evaluation items
- New further evaluation/plant specific sections and aging management review (AMR) items
- Tables in GALL-SLR and SRP-SLR:
  - Added over 500 new items to GALL-SLR tables
  - “Clean-up” of AMR items
  - Added column for new, modified, and deleted items
  - Added a link between SRP and GALL items in SLR Master spreadsheet

# Public Comments on Draft Guidance Documents

- Draft GALL-SLR Report (NUREG-2191):
  - Volume I: ADAMS Accession No. ML15352A074
  - Volume II: ADAMS Accession No. ML15352A084
- Draft SRP-SLR (NUREG-2192):
  - ADAMS Accession No. ML15352A086
- NRC Webpage link:  
<http://www.nrc.gov/reactors/operating/licensing/renewal/slr/guidance.html>
- Submit written comments to [www.regulations.gov](http://www.regulations.gov), using Docket ID **NRC-2015-0251**
- Mail comments to: Cindy Bladey, Office of Administration, Mail Stop: OWFN-12-H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001
- Comments accepted through February 29, 2016

# **GALL Chapter XI.M17: Flow-Accelerated Corrosion**

- Updated to use latest version of NSAC-202L Rev. 4, “Recommendations for an Effective Flow-Accelerated Corrosion Program” (which introduces new evaluation methods and expands exclusion of components with chromium down to 0.1% (previously was 1.25%))
- Added recommendation to reassess piping systems that have been excluded due to limited operation (< 2 % of operating time as allowed by NSAC-202L) to ensure adequate bases exist to justify this exclusion after 60 years

# **GALL Chapter XI.M20: Open-Cycle Cooling Water System**

- Revised to reflect the aging management aspects of Generic Letter (GL) 89-13 because GL 89-13 was not specifically developed as an AMP
- Included cracking based on historical problems with certain copper alloy materials
- Included new consideration for determining friction factors based on monitored portions of the system in order to calculate flow rates in unmonitored portions of the system

# Questions

# **GALL Chapter XI.M3:**

## **Reactor Head Closure Stud Bolting**

- No significant changes were made to this AMP as operating experience (OE) demonstrates that the program is effective in the detection of the applicable aging effects

# **GALL Chapter XI.M7: Boiling Water Reactor (BWR) Stress Corrosion Cracking**

- An aging management review item (IV.A1.R-412) was added to indicate that this program manages stress corrosion cracking of control rod drive (CRD) return line cap and associated welds
- OE demonstrates that the program has been effective to manage stress corrosion cracking in BWR piping and welds

# **GALL Chapter XI.M11B: Cracking of Nickel-Alloy Components**

- **Program scope update to include:**
  - Nickel alloy components and welds identified in the American Society of Mechanical Engineers (ASME) Code Cases N-770, N-729, and N-722, as incorporated by reference in 10 CFR 50.55a
  - All nickel alloy components and welds which are identified at the plant in accordance with the guidance in Electric Power Research Institute Materials Reliability Program: Generic Guidance for Alloy 600 Management (MRP-126)

# **GALL Chapter XI.M11B: Cracking of Nickel-Alloy Components**

- Added that baseline inspection provisions for branch line connections and associated welds that are fabricated with nickel alloys susceptible to primary water stress corrosion cracking (PWSCC)
- Added a baseline inspection of all susceptible nickel alloy bottom-mounted instrumentation nozzles performed using a volumetric method prior to the subsequent period of extended operation; alternatively, applicant-proposed and staff-approved mitigation methods may be used to manage PWSCC

# **GALL Chapter XI.M35A: ASME Code Class 1 Small-Bore Piping**

- Added a table to summarize sampling guidance
- Added sampling guidance for periodic inspections of plants where age-related cracking has been identified and periodic inspections are warranted
- No other significant changes were made to this AMP as OE demonstrates that the program is effective in the detection of the applicable aging effects

# Questions

# **GALL Chapter XI.M40: Monitoring of Neutron-Absorbing Materials other than Boraflex**

- Expanded program description to give examples of neutron-absorbing materials (NAMs) other than Boraflex and to discuss recent OE for Carborundum and Boral
- Expanded detection of aging effects program element to include 5 years as the maximum interval for inspection of polymer based NAMs other than Boraflex

# Questions

# **GALL Chapter XI.M26: Fire Protection**

- Expanded program description to include a discussion on fire protection regulations, supporting guidelines, and licensing basis, including option to use risk-informed, performance-based compliance via 10 CFR 50.48(c) through National Fire Protection Association Standard 805 (2001 Edition)
  - Added “fire damper housings” to list of program element “Scope of Program,” requiring aging management

# GALL Chapter XI.M27: Fire Water System

- Revised “wall loss to below nominal pipe wall thickness” as a criterion for conducting follow-up wall thickness measurements to “unexpected level of degradation due to corrosion and corrosion product deposition”
- Removing the statement “When fouling is identified, deposits are removed to determine if loss of material has occurred and to prevent further degradation in the system” [**SLR Supplement Related**]
- Changed the periodicity of the water fixed spray strainer inspections – from refueling outage interval to when actuated
- Revised to include recommended options for sprinkler testing where the sprinklers are exposed to corrosive water supplies

# **GALL Chapter XI.M27: Fire Water System**

- Revised criteria for conducting tank internals augmented tests and inspections
- Revised to reflect alternative deluge valve testing interval criteria
- Revised to include recommendations associated with qualifications to conduct inspections and examples of applicable inspection parameters
- Revised to provide an alternative to inspecting fire water system piping where its only intended function is leakage boundary (spatial) or structural integrity (attached) as defined in SRP-License Renewal Table 2.1-4(b)

# GALL Chapter XI.M27: Fire Water System

- Revised to state that rates of degradation are trended in order to confirm that the timing of the next inspection will occur before a loss of intended function of an in-scope component
  - Flushing results
  - Thickness measurements
  - Flow testing
- Added “acceptance criteria” – fouling that could result in flow blockage in sprinklers is not acceptable
- Revised “corrective actions” to state an evaluation is conducted to determine if deposits need to be removed to determine if loss of material has occurred [**SLR Supplement Related**]

# Questions

# GALL Chapter XI.M29: Outdoor and Large Atmospheric Storage Tanks

- New title [**SLR Supplement Related**]
- Revised Table XI.M29-1, to include recommended inspections for [**SLR Supplement Related**]:
  - Aluminum (Al) & Stainless Steel (SS) – Stress Corrosion Cracking (SCC)
  - Al & SS - loss of material
  - Aging effects excluded if demonstrated not applicable
  - All air environments, condensation
- Revised to include partially-encased stainless steel tanks addressed
- Added detail - physical manipulation of elastomers (non-pliable, cracked, or missing)

# GALL Chapter XI.M32: One-Time Inspection

- Stated that program is not used for aging effects:
  - That have not met acceptance criteria based on one-time inspections (OTI) conducted during the prior operating period or,
  - Based on the review of plant-specific or industry OE
- Added long-term loss of material [**SLR Supplement Related**]
- Added OTI for SLR (inspection quantity is unit-based)
- Removed galvanic corrosion as an example of an aging effect requiring management

# GALL Chapter XI.M32: One-Time Inspection

- Addressed Al alloys with relatively lower corrosion resistance (i.e., 2xxx and 7xxx series)
- Revised “monitoring and trending” to address comparison to prior OTI results
- Added new acceptance criteria for individual and compiled results
- Revised to include expanded scope of inspections when acceptance criteria is not met

# GALL Chapter XI.M33: Selective Leaching

- Recommends OTI for closed-cycle or treated water if past plant-specific OE is acceptable (3%, maximum of 10)
- Recommends opportunistic and periodic inspections for raw water, waste water, ground water, and soil (3%, maximum of 10, with 2 destructive examinations)
- Added ductile iron [**SLR Supplement Related**]
- Additional destructive examinations allow for reduced visual/mechanical inspections
- Revised to permit exclusion of certain susceptible components based on preventive actions associated with the component
- Revised to allow reduced number of inspections of buried components based on the efficacy of the coating system

# GALL Chapter XI.M33: Selective Leaching

- Revised to address a potential reduction on the total number of inspections for a multi-unit site
- Revised to allow combination of environments
- Included recommendations associated with qualifications to conduct inspections and examples of applicable inspection parameters
- Revised acceptance criteria
- Revised to include expanded scope of inspections when acceptance criteria is not met
- Recommends that a process to evaluate difficult-to-access surfaces (e.g., inside surface of heat exchanger shell) is available if unacceptable findings occur

# **GALL Chapter XI.M36: External Surfaces Monitoring of Mechanical Components**

- Added one-time and potentially periodic inspections for cracking of stainless steel and aluminum component external surfaces
- Added reduction of heat transfer due to fouling on the external surface of heat exchanger tubes in air-side heat exchangers
- Included recommendations associated with qualifications to conduct inspections and examples of applicable inspection parameters
- Revised acceptance criteria

# **GALL Chapter XI.M38:**

## **Inspection of Internal Surfaces**

- Revised to state that aging effects associated with elastomers are managed by XI.M38 in lieu of AMPs XI.M20, XI.M21A, and XI.M27
- Revised to address one-time and potentially periodic inspections for cracking of stainless steel and aluminum component external surfaces
- Replaced term “failure” with “loss of intended function”
- Revised to address a potential reduction on the total number of inspections for a multi-unit site (19 for 2 unit, 17 for 3 unit)
- Included recommendations associated with qualifications to conduct inspections and examples of applicable inspection parameters
- Revised acceptance criteria

# **GALL Chapter XI.M41: Buried and Underground Piping and Tanks**

- See License Renewal Interim Staff Guidance (LR-ISG), LR-ISG-2015-01: “Changes to Buried and Underground Piping and Tank Recommendations”

# **GALL Chapter XI.M42: Internal Coatings**

- Expanded options for Inspection Category B
- Revised wording related to re-inspection locations to not include repaired/replaced/removed coatings
- Revised to address a potential reduction on the total number of inspections for a multi-unit site (55/19 for 2 units, 49/17 for 3 units)
- Added pull-off testing and knife adhesion testing methods as options
- Revised “corrective actions” to clarify that physical testing is conducted when physically possible

# Questions

# SRP-SLR Sections 3.2, 3.3, 3.4 & GALL-SLR Chapters V, VII, VIII

- Addressed many Material, Environment, Aging Effect and Program (MEAP) combinations that previously cited generic notes F – J, 58 new or modified Table 1 items
- Eliminated the term “piping element” from MEAPs that are not glass, 55 Table 1 items currently shown as modified
- Miscellaneous non-technical changes, 10 table items currently shown as modified:
  - Detailed further evaluations (FEs) information removed from tables
  - Renumbered FEs
  - Clarifying “and” “or” aging effects
- Address items exposed to raw water that do not have a GL 89-13 function
- Address new FEs
- Added long-term loss of material

# SRP-SLR Sections 3.2, 3.3, 3.4

## Common Changes

- Loss of material for SS and aluminum alloys and cracking for SS components [**SLR Supplement Related**]:
  - Any air environments
  - Plant-specific OE search
  - OTI
  - Can credit coatings program as an alternative
  - Potential exclusion for internal surfaces – OE and results of external inspections.
  - SRP-SLR Section 3.1 – SS loss of material only
- Cracking of aluminum alloys:
  - Any air environments
  - Material composition and environment focused.

# SRP-SLR Sections 3.2, 3.3, 3.4

## Common Changes

- New FE sections to address SCC and intergranular SCC in BWR SS and nickel alloy CRD return line modifications, managed by XI.M2 and XI.M7 [**SLR Supplement Related**]:
  - Engineered safety features and auxiliary systems
  - Could be exacerbated in dead legs and stagnant flow locations
- New FE sections to address loss of material and SCC in concrete environment – concrete attributes, plant-specific OE, and potential for ground water exposure
- New FE section to address loss of material in components exposed to treated water, treated borated water or sodium pentaborate solution:
  - XI.M2 and periodic or OTI based on temperature, oxygen levels and pH

# Questions

# **GALL Chapter V & SRP Chapter 3.2: Engineered Safety Features**

- Revised Section 3.2.2.2.4 (old “5”) to address flow blockage due to fouling in addition to loss of material for spray nozzles in drywell and suppression chamber spray systems

## **GALL Chapter VII & SRP Chapter 3.3: Auxiliary Systems**

- Deleted FEs section associated with potential cladding breach for pressurized water reactor steel charging pumps
- Added FE section for polyvinyl chloride (PVC) piping exposed to sunlight – reduction in impact strength

# **GALL Chapter VIII & SRP Chapter 3.4: Steam & Power Conversion System**

- No FE changes specific to this section

# Questions

# **GALL Chapter XI.M6: BWR Control Rod Drive Return Line Nozzle**

- AMP in GALL Report Rev. 2 used to manage cracking in boiling water reactor (BWR) control rod drive (CRD) return lines induced by fatigue
- Previously renewed BWRs (e.g., Nine Mile Point, Unit 2 and Oyster Creek) established procedures to perform ultrasonic testing examinations of the CRD return lines

# **GALL Chapter XI.M6: BWR Control Rod Drive Return Line Nozzle**

- Aging in all other BWRs managed by other AMPs
- AMP XI.M6 is no longer needed to manage cracking in the CRD return lines because cracking can be addressed using other AMPs
- Appropriate aging management review (AMR) line items and SRP-SLR further evaluation sections have been added or modified to account for the revised basis

# **GALL Chapter XI.M9: BWR Vessel Internals**

- **Scope of Program:**
  - Added: Loss of preload due to thermal or irradiation-enhanced stress relaxation (for core plate rim holddown bolts and jet pump assembly holddown beam bolts)
  - Clarified: Cracking due to cyclic loading includes cracking due to flow-induced vibration (for steam dryers)

# **GALL Chapter XI.M9: BWR Vessel Internals**

- **Detection of Aging Effects:**
  - Added evaluations to determine need for supplemental inspections
  - BWR Vessel and Internals Project (BWRVIP) report references were updated [only for BWR internal components whose AMRs are managing cracking due to irradiation-assisted stress corrosion cracking (IASCC) or loss of fracture toughness due to neutron embrittlement]
  - The SLR term increases neutron fluence levels and operational periods, which can promote (a) loss of fracture toughness due to neutron irradiation or thermal aging embrittlement and (b) cracking due to IASCC in nickel alloy and stainless steel internal components

# **GALL Chapter XI.M9: BWR Vessel Internals**

- **Detection of Aging Effects:**
  - Applicants should evaluate the need for supplemental inspections in addition to the existing BWRVIP examination guidelines
  - Evaluations should consider neutron fluence, cracking susceptibility (i.e., applied stress, operating temperature, and environmental conditions), thermal aging susceptibility, and fracture toughness
  - Supplemental inspections based on evaluations
  - Further evaluation sections added to SRP-SLR

# **GALL Chapter XI.M16A: Pressurized Water Reactor (PWR) Vessel Internals**

- The AMP was eliminated and a new AMR further evaluation section was developed to request a plant-specific AMP for PWR reactor vessel internals (RVIs)
- Meetings with the industry reaffirmed that Materials Reliability Program (MRP)-227-A (upon which AMP XI.M16A was based) would be revised in 2015 but would not be revised to cover the operational period for 60 to 80 years until 2020
- The staff determined that it would not be acceptable to use a generic AMP without an update of an augmented inspection basis from the industry that would cover the 80 years assessment period

# GALL Chapter IV: Reactor Vessel, Internals, and Reactor Coolant System

- AMR Items related to management of cumulative fatigue damage by time-limited aging analyses (TLAA) administratively edited to be consistent with one another
- AMR items for reactor vessel neutron embrittlement TLAAs reduced down to only one AMR item entry for each of the tables on reactor vessel components (Tables IV.A1 and IV.A2)
- Similarly, AMR items for managing loss of fracture toughness in reactor vessel beltline components using reactor vessel AMPs reduced down to only one AMR item entry for each of the tables on reactor vessel components - the AMR items continue to cite “Yes” for further evaluation but were modified to cite both use of AMP XI.M31 and the new X.M2 AMP (fluence monitoring)

# GALL Chapter IV: Reactor Vessel, Internals, and Reactor Coolant System

- AMR items for PWR reactor internal components in Table IV.B2, IV.B3, and IV.B4 reduced down only to a few generic lines items - Per SRP-SLR 3.1.2.2.9, propose plant-specific AMP for PWR reactor internals
- Further evaluation criteria for AMR items that manage radiation-induced effects in BWR reactor internals changed from “No” to “Yes” (See SRP-SLR 3.1.2.2.12)
- Other AMR items added, carried over, or modified based on previous ISG positions or long term (80 years) aging concerns – e.g., longer term loss of material or aging in insulation

# Questions

# **GALL Chapter XI.M12: Thermal Aging Embrittlement of Cast Austenitic Stainless Steel**

- Pump casings are no longer exempt from AMP requirements:
  - Formerly exempted pump casings assuming licensees implemented Code Case N-481 alternative
  - N-481 has been withdrawn, and not all provisions have been incorporated into the American Society of Mechanical Engineers Code, Section XI
  - Therefore, pump casings will now be subject to screening, and augmented inspection or flaw tolerance evaluation if not screened out

# **GALL Chapter XI.M12: Thermal Aging Embrittlement of Cast Austenitic Stainless Steel**

- Code Case N-824 now referenced for detection of aging effects for piping  $\leq 1.6$  inches in thickness
  - N-824 provides a method for ultrasonic testing inspection (detection and flaw sizing) for cast austenitic stainless steel (CASS) piping
  - To be incorporated in forthcoming 10 CFR 50.55a rulemaking with conditions
- Program description now clarifies AMP XI.M12 does not cover CASS in reactor vessel internals

# Questions

# **GALL Chapter X.M2: Neutron Fluence Monitoring**

- **Detection of Aging Effects and Monitoring and Trending Element Clarifications:**
  - Monitoring methods for components in reactor vessel beltline to be consistent with Regulatory Guide (RG) 1.190
  - Methodology for monitoring RVI components or reactor vessel components away from the beltline may need additional justification, on a plant-specific basis
  - Monitoring to be performed in comparison to the neutron fluence methods, assumptions, and results used in the TLAAAs or aging management assessments

# **GALL Chapter X.M2: Neutron Fluence Monitoring**

- **Acceptance Criteria and Corrective Action Elements:**
  - When monitoring is applied to components assessed in NRC approved analyses, regulatory requirements for updating the analyses and for submitting the analyses to the NRC must be adhered to, as defined in the applicable regulations or Technical Specifications (TSs) requirements

# **GALL Chapter X.M2: Neutron Fluence Monitoring**

- **Program Description and Scope of Program:**
  - Added to provide a method for accepting reactor pressure vessel neutron embrittlement TLAAAs in accordance with 10 CFR 54.21(c)(1)(iii)
  - May be used for other non-TLAA assessments
  - AMP to be used in conjunction with GALL-SLR Report AMP XI.M31 (See slide on updates of SRP-SLR Sections 3.1.2.2.3.2 and 3.1.3.2.3.2)
  - Use of X.M2 is analogous to use of AMP X.M1 for fatigue TLAAAs

# **GALL Chapter XI.M31: Reactor Vessel Material Surveillance**

- **Program Description:**
  - Based on requirements in 10 CFR Part 50, Appendix H
  - Adjusted to provide adequate reactor vessel surveillance program criteria to cover plant operations through a 80-years period of licensed operation
  - Updated to differentiate between plant-specific reactor vessel material surveillance programs and reactor vessel material integrated surveillance programs (ISPs)

# **GALL Chapter XI.M31: Reactor Vessel Material Surveillance**

- **Scope of Program, Detection of Aging Effects, and Monitoring and Trending:**
  - Improved element criteria defined for implementation of both plant-specific reactor vessel material surveillance programs and reactor vessel material ISPs
- **Parameters Monitored:**
  - Updated capsule removal schedule and RG 1.190 conformance criteria

# **GALL Chapter XI.M31: Reactor Vessel Material Surveillance**

- **Detection of Aging Effects and Monitoring and Trending Elements:**
  - Withdrawal and testing of additional capsule during the subsequent period of extended operation that achieves a capsule fluence that is between 1 and 1.25 times the maximum ID fluence that is projected for the reactor vessel through 80 years of licensed operation
  - Program element criteria includes alternative management activities if no surveillance capsules are available for withdrawal and testing during a SLR period

# SRP Chapter 3.1: Reactor Vessel, Internals, Coolant System

- Section 3.1 Updated to provide guidance on how AMRs and AMPs/TLAAs relate to one another – similar to the Nuclear Energy Institute (NEI) discussions in NEI 95-10, Revision 6
- Major changes to subsections in Section 3.1.2.2 (further evaluation [FE] acceptance criteria) and Section 3.1.3.2 (FE review procedures):
  - Expanded list of cyclical loading TLAAs in 3.1.2.2.1 and 3.1.3.2.1
  - 3.1.2.2.3.2/3.1.3.2.3.2 expanded to cite use of AMP XI.M31 and AMP X.M2
  - 3.1.2.2.9/3.1.3.2.9 – New FE for managing aging in PWR reactor internals – propose plant-specific AMP for 80 years aging

# SRP Chapter 3.1: Reactor Vessel, Internals, Coolant System

- **Changes to 3.1.2.2 and 3.1.3.2:**
  - 3.1.2.2.10/3.1.3.2.10 – New FE for managing loss of material due to wear in PWR CRD nozzles and nozzle thermal sleeves – based on a past processed license renewal application(LRA) and operating experience for that LRA
  - 3.1.2.2.12/3.1.3.2.12 and 3.1.2.2.13/3.1.3.2.13 - New FEs for managing radiation-induced effects in BWR internals – evaluate need to modify BWRVIP criteria
  - 3.1.2.2.14/3.1.3.2.14 – New FE for managing loss of preload in BWRs with core plate rim hold-down bolts – justification of AMP or TLAA used to manage loss of preload in the bolt
  - 3.1.2.2.15/3.1.3.2.15 – New FE for managing loss of material/boric acid corrosion in steel steam generator channel heads clad with stainless steel or nickel alloy

# SRP Chapter 3.1: Reactor Vessel, Internals, Coolant System

- **Changes to 3.1.2.2 and 3.1.3.2:**
  - 3.1.2.2.16/3.1.3.2.16 (and subsections) and 3.1.2.2.17/3.1.3.2.17 – New FE sections associated with cracking in CRD return line nozzles (including nozzle caps) or return line piping components
  - 3.1.2.2.18/3.1.3.2.18 – New FE proposing need for further evaluation of Section IV.E “none-none” AMR items for steel or stainless steel piping components embedded in concrete
  - 3.1.2.2.19/3.1.3.2.19 – New FEs for managing loss of material due to pitting and crevice corrosion, and microbiologically influenced corrosion

# SRP Chapter 4.2: Neutron Irradiation Embrittlement

- Added “acceptance criteria” and “review procedure” criteria for neutron fluence methodology TLAAAs
- Pressurized thermal shock TLAAAs for SLR may be based on either 10 CFR 50.61 or 10 CFR 50.61a (depending on CLB)
- AMP X.M2 when used in conjunction with AMP XI.M31, provides one way to accept under 10 CFR 54.21(c)(1)(iii)
- BWR reactor vessel girth and axial weld probability of failure analyses for SLR to be reviewed on a case-by-case basis

# Questions

# **GALL Chapter X.M1: Cyclic Load Monitoring**

- Program Description, Scope of Program, Detection of Aging Effects, and Monitoring and Trending:
  - Elements renamed and amended to clarify that AMP X.M1 is a “condition monitoring” program
- May be used to accept cycle-based TLAAAs in accordance with 10 CFR 54.21(c)(1)(iii)
- Includes all types of cycle-related TLAAAs in SRP-SLR 4.3

# **GALL Chapter X.M1: Cyclic Load Monitoring**

- Monitoring to cover number of cycles and severity of design transient occurrences
- States in the program description and detection of aging effects that TSs requirements may apply
- Acceptance Criteria:
  - Appropriate thresholds to be established for each type of fatigue analysis monitored by the AMP

## SRP Chapter 4.3: Metal Fatigue

- Expanded to include all cycle-based TLAAAs in previous LRAs
- Prior environmentally-assisted fatigue analyses will be TLAAAs for SLR
- Subsections regrouped by those for: (a) environmentally-assisted fatigue analyses, and (b) other types of cycle-based analyses

# SRP Chapter 4.3: Metal Fatigue

- Additional clarifications for accepting TLAAAs per 10 CFR 54.21(c)(1)(iii):
  - AMP X.M1, Cyclic Load Monitoring, a way to accept under (iii)
  - Other bases for (iii) to be reviewed on a case-by-case basis
  - If an inspection-based AMP is used for (iii), AMP must inspect the specific components during the subsequent period of extended operation

# SRP Chapter 3.0: Integrated Plant Assessments and Aging Management Reviews

- Introduction updated to clarify that guidance criteria for are discussed in SRP-SLR Chapter 4
- Section 3.0.1 was updated for improved guidance of the:
  - Contents of Chapters 3.1 – 3.6
  - Format of AMR items in 3.X-1 tables
  - Relationship of scoping criteria and AMRs
  - Relationships of the AMR items in the SRP-SLR and those in the GALL-SLR Report
  - AMR and AMP relationships and when plant-specific AMRs may be needed and
  - How “consistent-with GALL” AMPs are reviewed versus those with exceptions or enhancements

## **SRP Chapter 3.0: : Integrated Plant Assessments and Aging Management Reviews**

- Section 3.0.2: Simplified discussion for SLR applications (SLRA) regarding extended power uprates relationships
- New Section 3.0.3 developed for AMPs that rely on implementation of methodologies in NRC-approved industry reports
- Table 3.0-1: Updated the Final Safety Analysis Report Supplement summary description examples for GALL-based AMPs

# SRP Chapter 5.0: Technical Specification Changes

- 10 CFR 54.22 requires a license renewal applicant/SLRA to identify any new TSs or TSs modifications that are needed to manage the effects of aging
- Previous version of SRP for license renewal did not include any guidance criteria for complying with these requirements
- Staff developed Chapter 5 to define NRC's guidance criteria for complying with 10 CFR 54.22 requirements
- Provides examples of TS requirements that may relate to AMPs or TLAAs (e.g., fuel oil programs, pressure-temperature limit TLAAs)

# SRP Appendix A.1:

## Generic Review Template

- Added AMPs that monitor changes in a component's material condition as an additional type of condition monitoring program (i.e., in addition to inspection-based programs)
- Added criteria for plant-specific AMPs that rely on aging management activities in NRC-endorsed Topical or Technical Reports
- Updated program element criteria, including those for corrective actions, confirmation processes, and administrative controls

# Questions

# Public Comments on Draft Guidance Documents

- Draft GALL-SLR Report (NUREG-2191):
  - Volume I: ADAMS Accession No. ML15352A074
  - Volume II: ADAMS Accession No. ML15352A084
- Draft SRP-SLR (NUREG-2192):
  - ADAMS Accession No. ML15352A086
- NRC Webpage link:  
<http://www.nrc.gov/reactors/operating/licensing/renewal/slr/guidance.html>
- Submit written comments to [www.regulations.gov](http://www.regulations.gov), using Docket ID **NRC-2015-0251**
- Mail comments to: Cindy Bladey, Office of Administration, Mail Stop: OWFN-12-H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001
- Comments accepted through February 29, 2016