UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 10, 2013

LICENSEE: Tennessee Valley Authority

FACILITY: Sequoyah Nuclear Plant, Units 1 and 2

SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON AUGUST 1, 2013, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND TENNESSEE VALLEY AUTHORITY, CONCERNING REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC. NOS. MF0481 AND MF0482)

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of Tennessee Valley Authority held a telephone conference call on August 1, 2013, to discuss and clarify the staff's requests for additional information (RAIs) concerning the Sequoyah Nuclear Plant, Units 1 and 2, license renewal application. The telephone conference call was useful in clarifying the intent of the staff's RAIs.

Enclosure 1 provides a listing of the participants and Enclosure 2 contains a listing of the RAIs discussed with the applicant, including a brief description on the status of the items.

The applicant had an opportunity to comment on this summary.

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Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosures:
1. List of Participants
2. List of Requests for Additional Information

cc w/encls: Listserv

TELEPHONE CONFERENCE CALL
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION

LIST OF PARTICIPANTS
AUGUST 1, 2013

PARTICIPANTS	**AFFILIATIONS**
Richard Plasse	U.S. Nuclear Regulatory Commission (NRC)
Emmanuel Sayoc	NRC
William Holston	NRC
Seung Min	NRC
Henry Lee	Tennessee Valley Authority (TVA)
Dennis Lundy	TVA
Andrew Taylor	TVA
Alan Cox	Entergy/Enercon
David Lach	Entergy/Enercon
Jacque Lingenfelter	Entergy/Enercon

REQUESTS FOR ADDITIONAL INFORMATION DISCUSSED
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
AUGUST 1, 2013

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of Tennessee Valley Authority held a telephone conference call on August 1, 2013, to discuss and clarify the following requests for additional information (RAIs) concerning the license renewal application (LRA).

The Sequoyah Nuclear Plant, Units 1 and 2 (SQN) RAIs of set 10 (ML13204A257) were discussed and a mutually agreeable date for the response was set at 90 days for RAI 3.0.3-1, and 30 days for all other RAIs in the set from the date of the letter on August 2, 2013.

RAI 3.0.3-1 - changes were made as marked up below, and a mutual understanding was reached by the staff and the applicant.

Background:

Recent industry operating experience (OE) and questions raised during the staff's review of several license renewal applications (LRAs) has resulted in the staff concluding that several aging management programs (AMP) and aging management review (AMR) items in the LRA may not or do not account for this OE.

These issues are related to the following, as described in detail below:

1. Recurring internal aging effects
2. A representative minimum sample size for periodic inspections for the Generic Aging Lessons Learned (GALL) Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Program"
3. Loss of coating integrity for Service Level III and other coatings
4. Managing aging effects of fire water system components
5. Scope and inspection recommendations of GALL Report AMP XI.M29, "Aboveground Metallic Tanks"
6. Corrosion under insulation

Issue:

1. Recurring internal ~~aging effects~~corrosion

   When the staff reviewed recent LRAs and industry OE, it was evident that some plants have experienced repeated instances of internal aging in piping systems that should result in the aging effect to be considered recurring. In each of these instances, the applicant had to augment LRA AMPs and AMR items to fully address the aging effect during the period of extended operation (PEO). To date, examples of these aging effects have involved microbiologically-influenced corrosion (MIC).

   Potential augmented aging management activities include: alternative examination methods (e.g., volumetric versus external visual), augmented inspections (e.g., a greater number of locations, additional locations based on risk insights based on susceptibility to aging effect and consequences of failure, a greater frequency of inspections), and additional trending parameters and decision points where increased inspections would be implemented.

Recurring internal aging effects are identified by both the number of occurrences of internal aging effects with similar aging mechanisms and the extent of degradation at each localized site.

a. The term "recurring internal ~~aging effects~~corrosion is" is not intended to address aging effects that occur infrequently or occurred frequently in the past but have been subsequently corrected. An aging effect should be considered recurring from a frequency perspective if the search of plant-specific OE reveals repetitive occurrences (e.g., one per refueling outage cycle) of aging effects with the same aging mechanisms in the same material environment that have occurred over three or more sequential or non-sequential cycles.
b. The staff recognizes that not all aging effects are significant enough to warrant augmented aging management requirements. As a plant ages there can be numerous examples of inconsequential aging effects. This request for additional information (RAI) is focused on recurring internal ~~aging effects~~corrosion in which the component's degree of degradation is significant such that it either does not meet plant-specific acceptance criteria (e.g., component had to be repaired or replaced, component was declared inoperable), or the degradation exceeds wall penetration greater than 50 percent, regardless of the minimum wall thickness.

   The staff also recognizes that in many instances a component would be capable of performing its intended function even if the degradation met this threshold. For example, localized 50 percent deep pits in typical service water systems do not challenge the pressure boundary function of a component. Nevertheless, the staff has established this threshold for further evaluation as a conservative way of identifying cases that could warrant consideration of augmented aging management actions.

Based on the industry OE, only components in the Engineered Safety Features Systems (LRA Section 3.2), Auxiliary Systems (LRA Section 3.3), and Steam and Power Conversion Systems (LRA Section 3.4) need to be addressed.

2. A representative minimum sample size for periodic inspections for the GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Program" GALL Report AMP XI.M38 recommends that inspections be performed during periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection. As stated in program element 4, "detection of aging effects," "[v]isual and mechanical inspections conducted under this program are opportunistic in nature; they are conducted whenever piping or ducting is opened for any reason." It is possible that opportunistic inspections may not be available for one or more material, environment, and aging effect combinations presented in the AMR line items where GALL Report AMP XI.M38 is referenced. With the exception of a few GALL Report AMR items where preventive actions alone are considered sufficient to manage aging effects, it is the staff's position that, to credit a GALL Report AMP for aging management, some assurance that a representative sample of all material, environment, and aging effect combinations will be inspected is necessary. The Periodic Surveillance and Preventive Maintenance Program provides for a periodic

representative sample, whereas, the Internal Surfaces in Miscellaneous Piping and Ducting Components Program does not.

3. Loss of coating integrity for Service Level III and Other coatings

   Industry OE indicates that degraded coatings have resulted in unanticipated or accelerated corrosion of the base metal and degraded performance of downstream equipment (e.g., reduction in flow, drop in pressure, reduction in heat transfer) due to flow blockage. Based on these industry OE examples, the staff has questions related to how the aging effect, loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage, would be managed for Service Level III and other coatings.

   For purposes of this RAI:

   a. Service Level III coatings are those installed on the interior of in-scope piping, heat exchanges, and tanks which support functions identified under 10 CFR 54.4(a)(1) and (a)(2).

   b. "Other coatings," include coatings installed on the interior of in-scope piping, heat exchangers, and tanks whose failure could prevent satisfactory accomplishment of any of the functions identified under 10 CFR 54.4(a)(3).

   c. The term "coating" includes inorganic (e.g., zinc-based) or organic (e.g., elastomeric or polymeric) coatings, linings (e.g., rubber, cementitious), and concrete surfacers that are designed to adhere to a component to protect its surface.

   d. The terms "paint" and "linings" should be considered as coatings.

   The staff does not consider a coating to be a component. A coating becomes an integral part of an in-scope component, providing it protection from corrosion, just as the addition of chromium to steel mitigates corrosion. Just as stainless steel introduces a new aging effect, cracking due to stress corrosion cracking (SCC), to which carbon steel is generally not susceptible, the addition of a coating to a component introduces the potential for unanticipated or accelerated corrosion of the base metal and degraded performance of downstream equipment due to flow blockage. If coatings are installed, loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage must be ~~age-~~ managed regardless of whether the coatings are credited for aging.

4. Managing aging effects of fire water system components

   Industry OE has indicated that flow blockages have occurred in dry sprinkler piping that would have resulted in failure of the sprinklers to deliver the required flow to combat a fire. This OE is described in NRC Information Notice (IN) 2013-06, Corrosion in Fire Protection Piping Due to Air and Water Interaction." The common cause is air and water interactions leading to accelerated corrosion that occurred in normally dry fire water piping that had been subject to inadvertent flow or flow tested, and which may not have been properly drained. As stated in IN 2013-06, had inspections been conducted to National Fire Protection Association (NFPA) 25 2011 Edition, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," the obstructions may have been detected. As such, in regard to the recommendations in GALL Report AMP XI.M27, "Fire Water System," and GALL Report AMP XI.M29, the staff position is as follows:

a. The tests and inspections listed in Table 4a, "Fire Water System Inspection and Testing Recommendations," of this RAI should be conducted.

b. Wall thickness evaluations used as an alternative instead of flow tests or internal visual examinations for managing flow blockage should not be credited for aging management because external wall thickness measurements may not be capable of identifying when sufficient general corrosion has occurred such that the corrosion products cause flow blockage. The first enhancement associated with the "detection of aging effects" program element of the Fire Water System Program states that, "[w]all thickness evaluations of fire protection piping using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material will be performed prior to the period of extended operation and periodically thereafter. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function." It is not clear to the staff whether these volumetric examinations are in addition to periodic flow tests or internal examinations, or would replace this testing.

c. If internal visual inspections detect surface irregularities because of corrosion, follow-up volumetric examinations are to be performed. These follow-up exams are necessary to ensure that there is sufficient wall thickness in the vicinity of the irregularity.

d. For portions of water-based fire protection system components that are periodically subjected to flow but designed to be normally dry, such as dry-pipe or preaction sprinkler system piping and valves, augmented inspections should be performed in the portions of this piping that are not configured to completely drain. The augmented inspections should consist of internal visual examination or full flow testing of the entire portion that is not configured to completely drain. Given the potential for accelerated corrosion in the portions of this piping that are not configured to completely drain, periodic wall thickness measurements should be conducted.

e. The inspection requirements in NFPA 25 Chapter 9, "Water Storage Tanks," are different than the recommendations in GALL Report AMP XI.M29. For example, NFPA 25 states that external inspections are conducted quarterly and interior inspections are conducted on a 3-year interval if the tank does not have internal corrosion protection; otherwise, the inspections are conducted on a 5-year interval. In contrast, GALL Report AMP XI.M29 recommends that external inspections occur on a refueling outage interval and internal inspections are conducted every 10 years. Fire water storage tanks should be inspected to the requirements of NFPA 25.

5. Scope and inspection recommendations of GALL Report AMP XI.M29, "Aboveground Metallic Tanks"

There have been several instances of OE related to age-related degradation of tanks. Tanks with defects variously described as wall thinning, pinhole leaks, cracks, and through-wall flaws have been identified by detecting external leakage rather than through internal inspections. None of the leaks or degraded coatings has resulted in a loss of intended function; however, the number of identified conditions adverse to quality and the continued aging of the tanks indicate a need to ensure that internal tank inspections are conducted throughout the PEO. In addition, the staff identified an indoor tank with external SCC that, except for its location, would normally be in the scope of GALL Report AMP XI.M29. As such, in regard to the recommendations in GALL Report XI.M29, the staff position is as follows:

a. Most water-filled indoor tanks are currently managed by GALL Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components," and GALL Report AMP XI.M38. Neither of these AMPs has a recommendation to conduct periodic volumetric examinations of the bottom of the tank or internal inspections. Based on industry OE, the staff believes that some indoor tanks should have internal inspections. These include indoor welded storage tanks that meet all of the following criteria:

    i. have a large volume (i.e., greater than 100,000 gallons)
    ii. are designed to near-atmospheric internal pressures
    iii. sit on concrete or soil
    iv. are exposed internally to water

b. Based on industry OE related to cracking due to SCC and fatigue, stainless steel and aluminum tanks should be inspected using surface examination techniques.

c. Based on the tank's material and environment, the attached Table 5a, "Tank Inspection Recommendations," contains the types of aging effects requiring management (AERM), inspection type, and frequency of inspections that should be conducted to provide reasonable assurance that the intended functions of the tank will be maintained consistent with the current licensing basis (CLB) for the PEO.

6. Corrosion under insulation

During a recent license renewal AMP audit, the staff observed extensive general corrosion (i.e., extent of corrosion from a surface area but not depth of penetration perspective) underneath the insulation removed from an auxiliary feedwater (AFW) suction line. The process fluid temperature was below the dew point for sufficient duration to accumulate condensation on the external pipe surface. NACE, International (NACE), formerly known as National Association of Corrosion Engineers, Standard SP0198-2010, "Control of Corrosion under Thermal Insulation and Fireproofing Materials – A Systems Approach," categorizes this as corrosion under insulation (CUI). In addition, during AMP audits the staff has identified gaps in the proposed aging management methods for insulated outdoor tanks and piping surfaces. To date, these gaps have been associated with insufficient proposed examination of the surfaces under insulation.

The staff recommends periodic representative inspections of in-scope insulated components where the process fluid temperature is below the dew point ~~and~~ or where the component is located outdoors. The timing, frequency, and extent of inspections should be as follows:

a. Periodic inspections should be conducted during each 10-year period beginning 5 years before the PEO.

b. For ~~all~~ a representative sample of outdoor components, except tanks, and any indoor components operated below the dew point, remove the insulation and inspect a minimum of 20 percent of the in-scope piping length for each material type (i.e., steel, stainless steel, copper alloy, aluminum), or for components where its configuration does not conform to a 1-foot axial length determination (e.g., valve, accumulator), 20 percent of the surface area. Alternatively, remove the insulation and inspect any combination of a minimum of 25 1-foot axial length sections and components for each material type. Inspections are conducted in each air environment (e.g., air-outdoor, moist air) where condensation or moisture on the surfaces of the component could occur routinely or seasonally. In some instances, although indoor air is conditioned, significant moisture can accumulate under insulation during high humidity seasons.

c. For a representative sample of~~each~~ outdoor tanks and indoor tanks operated below the dew point, remove the insulation from either 25 1-square-foot sections or 20 percent of the surface area and inspect the exterior surface of the tank. Distribute the sample inspection points such that inspections occur on the tank dome, sides, near the bottom, at points where structural supports or instrument nozzles penetrate the insulation, and where water collects such as on top of stiffening rings.

d. Inspection locations should be based on the likelihood of CUI occurring (e.g., alternate wetting and drying in environments where trace contaminants could be present, length of time the system operates below the dewpoint).

e. Removal of tightly adhering insulation that is impermeable to moisture is not required unless there is evidence of damage to the moisture barrier. Given that the likelihood of CUI is low for tightly adhering insulation, a minimal number of inspections of the external moisture barrier of this type of insulation, although not zero, should be credited toward the sample population.

f. Subsequent inspections may consist of examination of the exterior surface of the insulation for indications of damage to the jacketing or protective outer layer of the insulation when the following conditions are verified in the initial inspection:

   i. No loss of material due to general, pitting or crevice corrosion, beyond that which could have been present during initial construction.
   ii. No evidence of SCC.
   iii. No evidence of fatigue cracks.

If the external visual inspections of the insulation reveal damage to the exterior surface of the insulation or there is evidence of water intrusion through the insulation (e.g., water seepage through insulation seams/joints), periodic inspections under the insulation should continue as described above.

Request:

1. Recurring internal ~~aging effects~~corrosion

   a. Based on the results of a review of the past 10 years of plant-specific OE, state whether recurring internal ~~aging effects have~~corrosion has occurred, as described above.

   b. If recurring internal aging corrosion has~~effects have~~ occurred, describe each aging effect and ~~its related acceptance criterion for~~for the reason for being considered as recurring internal corrosion.

c. If recurring internal ~~aging effects~~effects corrosion has ~~have~~ occurred, state the following:

    i. Why the applicable program's examination methods will be sufficient to detect the recurring aging mechanism before affecting the ability of a component to perform its intended function.
    ii. The basis for the adequacy of augmented or lack of augmented inspections.
    iii. What parameters will be trended as well as the decision points where increased inspections would be implemented (e.g., extent of degradation at individual corrosion sites, rate of degradation change).
    iv. The basis for parameter testing frequency and how it will be conducted.
    v. How inspections of not easily accessed components (i.e., buried, underground) will be conducted.
    vi. If buried components are involved, how leaks will be identified.
    vii. The program(s) that will be augmented to include the above requirements.

2. A representative minimum sample size for periodic inspections in GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components"

    a. State how LRA Sections A.1.19 and B.1.19 will be revised to ensure that the Internal Surfaces in Miscellaneous Piping and Ducting Components Program conducts periodic inspections on a representative sample of in-scope components. Alternatively, state why no changes to the program are necessary to ensure that each applicable material, environment, and aging effect will be appropriately managed during the period of extended operation.

3. Loss of coating integrity for Service Level III and Other coatings

    a. State whether any in-scope components have internal Service Level III or Other coatings.

    b. If coatings have been installed on the internal surfaces of in-scope components (i.e., piping, piping subcomponents, heat exchangers, and tanks), state how loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage will be age-managed, including:

        i. For each installed coating application, whether installation records, if available, used to apply the coating included material manufacturer installation specifications.
        ii. The inspection method.
        iii. The parameters to be inspected.
        iv. When inspections will commence and the frequency of subsequent inspections. Consider such factors as whether coatings can be verified to have been installed to manufacturer specifications, prior inspection findings of acceptable or degraded coatings, and coating replacement history.
        v. The extent of inspections and the basis for the extent of inspections if it is not 100 percent.
        vi. The training and qualification of individuals involved in coating inspections.
        vii. How trending of coating degradation will be conducted.
        viii. Acceptance criteria.

ix. Corrective actions for coatings that do not meet acceptance criteria.
x. The program(s) that will be augmented to include the above requirements.

c. State how LRA Section 3 Table 2s, Appendix A, and Appendix B will be revised to address the program used to manage loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage.

4. Managing aging effects of fire water system components
   a. State that inspections and testing of in-scope fire water system components will be conducted in accordance with Table 4a, or provide justification for any portions that will not be inspected or tested in this manner.

   b. State whether the enhancement to use wall thickness evaluations is in lieu of conducting flow tests or internal visual examinations, and if it is, state the basis for why wall thickness measurements in the absence of flow testing or internal visual examinations provide reasonable assurance that the intended functions of in-scope fire water system components will be maintained consistent with the CLB for the PEO.

   c. Add a requirement to the program to conduct follow-up volumetric examinations if internal visual inspections detect surface irregularities that could be indicative of wall loss below nominal pipe wall thickness, or state the basis for why visual inspections alone will provide reasonable assurance that the intended functions of in-scope fire water system components will be maintained consistent with the CLB for the PEO.

   d. For portions of water-based fire protection system components that are periodically subjected to flow but designed to be normally dry, such as dry-pipe or preaction sprinkler system piping and valves, but not configured to completely drain, state the following:

      i. The inspection method to ensure that fouling is not occurring.
      ii. The parameters to be inspected.
      iii. When inspections will commence and the frequency of subsequent inspections.
      iv. The extent of inspections and the basis for the extent of inspections if it is not 100 percent.
      v. Acceptance criteria.
      vi. How much of this piping will be periodically inspected for wall thickness and how often the inspections will occur.

   e. Revise the Aboveground Metallic Tanks Program to not include the fire water storage tank and include this tank in the scope of the Fire Water System Program. In addition, state that the tank inspections will be in accordance with the inspections requirements of NFPA 25. Alternatively, state why conducting inspections in accordance with the Aboveground Metallics Tanks Program provides reasonable assurance that the intended functions of fire water storage tank will be maintained consistent with the CLB for the PEO.

   f. State how LRA Section 3 Table 2s and Appendices A.1.13 and B.1.13 will be revised to address the above changes.

5. Scope and inspection recommendations of GALL Report AMP XI.M29, "Aboveground Metallic Tanks"

    a. State whether there are any in-scope indoor welded storage tanks that meet all of the following criteria:

        i. have a large volume (i.e., greater than 100,000 gallons)
        ii. are designed to near-atmospheric internal pressures
        iii. sit on concrete or soil
        iv. are exposed internally to water

    b. State how LRA Section 3 Table 2s and Appendices A.1.1 and B.1.1 will be revised to be consistent with the attached Table ~~4a~~5a. Alternatively, state and justify portions that will not be consistent.

6. Corrosion under insulation

    a. State how LRA Section 3 Table 2s and the appropriate AMPs and corresponding Updated Final Safety Analysis Report (UFSAR) supplements will be revised to address the recommendations discussed above related to CUI for outdoor insulated components and indoor insulated components operated below the dew point. Alternatively, state and justify portions that will not be consistent with the recommendations related to CUI, above.

Table 4a Fire Water System Inspection and Testing Recommendations[1,2,56]	
Description	NFPA 25 Section
Sprinkler Systems	
Sprinkler inspections	5.2.1.1
Pipe and fitting inspections	5.2.2
Hanger and seismic brace inspections	5.2.3
Sprinkler testing	5.3
~~Gauge testing~~	~~5.3.2~~
Obstruction, internal inspection of piping	14.2[4] and 14.3
Standpipe and Hose Systems	
Piping inspections	6.2.1
Flow tests	6.3.1
Hydrostatic tests	6.3.2
Private Fire Service Mains	
Exposed piping	7.2.2.1
Testing	7.3.1, 7.3.2, 7.3.3.1
Fire Pumps	
Suction screens	8.3.3.7
Water Storage Tanks	
Exterior Inspections	9.2.5.5
Interior inspections	9.2.6[5], 9.2.7
Valves and System-Wide Testing	
Main drain test	13.2.5
~~Gauge inspection and testing~~[3]	~~13.2.7~~
Preaction valves and deluge valves	13.4.3.2.2 - 13.4.3.2.8
Dry pipe valves and quick opening devices	13.4.4.2.2 - 13.4.4.2.3, 13.4.4.2.9
Pressure reducing valves and relief valves	13.5.1.2, 13.5.2.2, 13.5.3.2, 13.5.4.3, 13.5.5.2
Hose Valves	13.5.6.1.7
Water Fixed Spray Systems	
Strainers (annual and after each system actuation)	10.2.1.6, 10.2.1.7, 10.2.7
Water supply	10.2.6.2

System components (annual and after each system actuation)	10.2.4
Operation Test (annual)	10.3.4, 10.3.5, 10.4.1
Foam Water Sprinkler Systems	
System piping and fittings	11.2.3. (1), (2)
Hangers and supports	11.2.4 (1)
Water supply	11.2.6.2
Strainers (quarterly)	11.2.7.1
Storage tanks (external – quarterly)	11.2.9.5.1.2 (2)
Operational Test Discharge Patterns (annually)	11.3.2.6, 11.3.2.7, 11.3.3
Storage tanks (internal – 10 years)	11.4.3, 11.4.4.2, 11.4.5, 11.4.6.4, 11.4.7.4

1. All terms and references are to NFPA 25 2011 Edition. The staff is referring to NFPA 25 2011 Edition as a common reference for the description of the scope and periodicity of specific inspections and tests. It should not be inferred that the CLB needs to be revised to include all the inspection, testing and maintenance requirements of this document. The above inspections and tests are related to the management ofage-managing applicable aging effects for passive long-lived in-scope components in the fire water system. Inspections and tests not related to the above are to be conducted in accordance with the current licensing basis. If the current licensing basis states more frequent inspections than required by NFPA 25, the current licensing basis should be met.
2. A reference to a section includes all sub-bullets unless otherwise noted (e.g., a reference to 5.2.1.1 includes 5.2.1.1.1 through 5.2.1.1.7).
3. The phrase, "[gauges] are in good condition," should be interpreted to mean that there is no pressure boundary leakage. All gauges that are installed on in-scope fire water systems should meet the requirement of verifying that normal pressure is being maintained.
4.3. The alternative nondestructive examination methods permitted by 14.2.1.1 are limited to those that can ensure that flow blockage will not occur.
5.4. In regard to Section 9.2.6.4, the threshold for taking action required in Section 9.2.7 is as follows: pitting and general corrosion beyond nominal wall depth and any coating failure where bare metal is exposed. Blisters should be repaired. Adhesion testing should be performed in the vicinity of blisters even though bare metal may not have been exposed.
6.5. Items in areas that are inaccessible for safety considerations due to factors such as continuous process operations and energized electrical equipment shall be inspected during each scheduled shutdown but not more than every refueling outage interval.

Table 5a Tank Inspection Recommendations[1,7]				
Material	Environment	AERM	Inspection Technique[9]	Inspection Frequency
Inspections to identify aging of inside surfaces of tank shell, roof, and bottom Inside Surface (IS), Outside Surface (OS)[6,8]				
Steel	Raw water	Loss of material	Visual from IS or Volumetric from OS[10]	Each 10-year period starting 10 years before the period of extended operation
Steel	Treated water	Loss of material	Visual from IS or Volumetric from OS[10]	One-time inspection conducted in accordance with AMP XI.M32
Stainless steel	Treated water	Loss of Material	Visual from IS or Volumetric from OS[10]	One-time inspection conducted in accordance with AMP XI.M32
Aluminum	Treated water	Loss of Material	Visual from IS or Volumetric from OS[10]	One-time inspection conducted in accordance with AMP XI.M32
Inspections to identify aging of external surfaces of tank roof and tank shell, and bottom not exposed to soil or concrete				
Steel	Air – indoor controlled Air – indoor uncontrolled Air – outdoor	Loss of material	Visual from OS	Each refueling outage interval
Stainless steel	Air – indoor controlled Air – indoor uncontrolled	Cracking	Surface [11]	Each 10-year period starting 10 years before the period of extended operation
Stainless steel	Air-outdoor	Loss of material	Visual from OS	Each refueling outage interval[5]
		Cracking	Surface[11]	Each 10-year period starting 10 years before the period of extended operation

Table 5a Tank Inspection Recommendations[1,7]				
Material	Environment	AERM	Inspection Technique[9]	Inspection Frequency
Aluminum	Air – indoor controlled Air – indoor uncontrolled	Cracking	Surface[11]	Each 10-year period starting 10 years before the period of extended operation
Aluminum	Air-outdoor	Loss of material	Visual from OS	Each refueling outage interval
		Cracking	Surface[11]	Each 10-year period starting 10 years before the period of extended operation
Inspections to identify aging of external surfaces of tank bottoms and tank shells exposed to soil or concrete				
Steel	Soil or concrete	Loss of material	Volumetric from IS[4]	Each 10-year period starting 10 years before the period of extended operation[3]
Stainless steel	Soil or concrete	Loss of material	Volumetric from IS[4]	Each 10-year period starting 10 years before the period of extended operation[3]
Aluminum	Soil or concrete	Loss of Material	Volumetric from IS[4]	Each 10-year period starting 10 years before the period of extended operation[3]

1. GALL Report AMP XI.M30, "Fuel Oil Chemistry," is used to manage loss of material on the internal surfaces of fuel oil storage tanks. GALL Report AMP XI.M42 is used to manage loss of material and cracking for the external surfaces of buried tanks.
2. A one-time inspection conducted in accordance with GALL Report AMP XI.M32 may be conducted in lieu of periodic inspections if the fuel oil specifications have not been changed since 35 years prior to placing the tank in service, or an evaluation has been conducted documenting that any change would not adversely impact the tank's internal surfaces (e.g., low sulfur fuel interaction with coatings).
3. A one-time inspection conducted in accordance with GALL Report AMP XI.M32 may be conducted in lieu of periodic inspections if an evaluation conducted prior to the PEO and during each 10-year period during the PEO demonstrates that the soil under the tank is not corrosive using actual soil samples that are analyzed for each individual parameter (e.g., resistivity, pH, redox potential, sulfides, sulfates, moisture) and overall soil corrosivity.

   Alternatively, a one-time inspection conducted in accordance with GALL Report AMP XI.M32 may be conducted in lieu of periodic inspections if the bottom of the tank has been cathodically protected such that the availability and effectiveness criteria of LR-ISG-2011-03, "Changes to the Generic Aging Lessons Learned (GALL) Report Revision 2 Aging Management Program (AMP) XI.M41, 'Buried and Underground Piping

Table 5a Tank Inspection Recommendations[1,7]				
Material	Environment	AERM	Inspection Technique[9]	Inspection Frequency

and Tanks',” Table 4a., “Inspection of Buried Pipe,” have been met commencing 5 years prior to the PEO, and the criteria continues to be met throughout the PEO. The evaluation should include soil sampling from underneath the tank.

4. When volumetric examinations of the tank bottom cannot be conducted due to the tank being coated, an exception should be stated, and the accompanying justification for not conducting inspections should include the considerations in footnote 3, above, or an alternative examination methodology is proposed.
5. A one-time inspection conducted in accordance with GALL Report AMP XI.M32 may be conducted in lieu of periodic inspections if an evaluation conducted prior to the PEO and during each 10-year period during the PEO demonstrates that environmental impacts due to such factors as the plant being located within approximately 5 miles of a saltwater coastline, those within 1/2 mile of a highway that is treated with salt in the wintertime, those areas in which the soil contains more than trace chlorides, those plants having cooling towers where the water is treated with chlorine or chlorine compounds, and those areas subject to chloride contamination from other agricultural or industrial sources are not present in the vicinity of the plant. The evaluation should include soil sampling in the vicinity of the tank (soil results are indicative of compounds atmospheric fallout that could be present on surfaces of the tank) to ensure that chlorides are not present at sufficient levels to cause pitting and crevice corrosion.
6. Inspections to identify aging of the inside surfaces of tank shell, roof, and bottom should cover all the inside surfaces. Where this is not possible due to tank configuration (e.g., tanks with floating covers or bladders the LRA should include a justification for how aging effects will be detected prior to loss of intended function.
7. When one-time internal inspections in accordance with the above footnotes are used in lieu of periodic inspections, the one-time inspection must occur within the 5 year period prior to commencement of the PEO.
8. For tank configurations where deleterious materials could accumulate on the tank bottom (e.g., sediment, silt), the tank bottom internal inspections should include inspections of the side wall of the tank up to the top of the sludge affected region.
9. Alternative inspection methods may be used to inspect both surfaces (i.e., internal, external) or the opposite surface (e.g., inspecting the internal surfaces for loss of material from the external surface, inspecting for corrosion under external insulation from the internal surfaces of the tank) as long as the method has been demonstrated effective at detecting the AERM and a sufficient amount of the surface is inspected to ensure that localized aging effects are detected. For example, the low frequency electromagnetic technique (LFET) can be used to scan an entire surface of a tank. If follow-up ultrasonic examinations are conducted in any areas where the wall thickness is below nominal, an LFET inspection can effectively detect loss of material in the tank shell, roof, or bottom.
10. At least 25 percent of the tank's internal surface is inspected by a method capable of precisely determining wall thickness. The inspection method must be capable of detecting both general and pitting corrosion and must be qualified and demonstrated effective by the applicant.
11. A minimum of either a combination of 25 1-square-foot sections for tank surfaces and for

Table 5a Tank Inspection Recommendations[1,7]				
Material	Environment	AERM	Inspection Technique[9]	Inspection Frequency
welds, 1-linear-foot of weld length; or 20 percent of the tank's surface are examined. The sample inspection points are distributed such that inspections occur in those areas most susceptible to cracking (e.g., areas where contaminants could collect, inlet and outlet nozzles, welds).				

RAI 3.5.2.3.4-1a (Follow Up) - changes were made as marked up below, and a mutual understanding was reached by the staff and the applicant.

Background:

The response to RAI 3.5.2.3.4-1 stated that:

1. Jacketing is not present on all in-scope fiberglass and calcium silicate insulation exposed to uncontrolled indoor air in LRA Table 3.5.2-4 with a function to limit heat transfer.
2. When jacketing is provided, the installation is performed in accordance with "skill-of-the-craft."
3. Leakage and spray, if occurring, are abnormal conditions that are identified, corrected and evaluated for the potential effect on surrounding equipment, as necessary, under the corrective action program and work control processes.
4. A review of plant-specific operating experience identified no aging effects that resulted in a loss of intended function for insulation.

LRA Table 3.0-2 defines uncontrolled indoor air as "[a]ir with temperature less than 150°F, humidity up to 100% and protected from precipitation." The definition continues by stating, "[h]umidity levels up to 100 percent are assumed and the surfaces of components in this environment may be wet."

Issue:

The staff found the response to RAI 3.5.2.3.4-1 unacceptable because while the staff acknowledges that leakage and spray are abnormal conditions that would be addressed by the corrective action program and work control process, the insulation is exposed to indoor uncontrolled air. The staff lacks sufficient information to conclude that routine sweating of pipes that could drip onto unjacketed insulation located below the pipe during humid conditions would be identified in the corrective action program. In addition, the applicant did not provide any evidence to demonstrate that the "skill-of-the-craft" approach for installing jacketing has been effective.

If the mechanical system environment of indoor air been selected, the staff would still find the response to be unacceptable. LRA Table 3.0-1, Service Environments for Mechanical Aging Management Reviews," defines indoor air as, "[a]ir in an environment protected from precipitation." The corresponding definition in GALL Report Table IX.D for air-indoor uncontrolled is, "[u]ncontrolled indoor air is associated with systems with temperatures higher than the dew point (i.e., condensation can occur, but only rarely; equipment surfaces are normally dry). Although condensation occurs rarely in this air environment, insulation can retain the condensation and its ability to reduce heat transfer will be degraded.

Request:

Amend the LRA to include aging management of reduction of insulation effectiveness for in-scope fiberglass and calcium silicate insulation or:

1. State whether sweating of pipes during plant operation is identified as a condition adverse to quality in the corrective action program. If it is, provide evidence that either sweating is not occurring or that it has routinely been identified and corrected.

2. State whether any in-scope unjacketed fiberglass or calcium silicate insulation is installed, or could be installed in the future, in locations that are susceptible to wetting by sweating of *pipes during plant operation.*

3. State what evidence is available that "skill-of-the-craft" has been sufficient to ensure that insulation jacketing has been installed in a manner that will preclude insulation moisture intrusion.

4. ~~Alternatively, amend the LRA to include aging management of reduction of insulation effectiveness for in-scope fiberglass and calcium silicate insulation.~~

RAI B.1.34-1a (Follow Up) – was deleted per discussions, technical issues were resolved.
RAI B.1.34-6a (Follow Up) – was deleted per discussions, technical issues were resolved.

Telephone Conference Summary for Conference dated September 10, 2013

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. MF0481 AND MF0482) – SET 10.

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