**Tennessee Valley Authority,** 1101 Market Street, Chattanooga, Tennessee 37402

July 3, 2013

10 CFR Part 54

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Sequoyah Nuclear Plant, Units 1 and 2
Facility Operating License Nos. DPR-77 and DPR-79
NRC Docket Nos. 50-327 and 50-328

Subject: **Response to NRC Request for Additional Information Regarding the Review of the Sequoyah Nuclear Plant, Units 1 and 2, License Renewal Application, Set 5 (TAC Nos. MF0481 and MF0482)**

References:
1. TVA Letter to NRC, "Sequoyah Nuclear Plant, Units 1 and 2 License Renewal," dated January 7, 2013 (ADAMS Accession No. ML13024A004)
2. NRC Letter to TVA, "Requests for Additional Information for the Review of the Sequoyah Nuclear Plant, Units 1 and 2, License Renewal Application – Set 5," dated June 5, 2013 (ADAMS Accession No. ML13134A201)

By letter dated January 7, 2013 (Reference 1), Tennessee Valley Authority (TVA) submitted an application to the Nuclear Regulatory Commission (NRC) to renew the operating license for the Sequoyah Nuclear Plant, Units 1 and 2. The request would extend the license for an additional 20 years beyond the current expiration date. By letter dated June 5, 2013 (Reference 2), the NRC forwarded a request for additional information (RAI). The required date for the response is within 30 days of the date stated in the RAI, i.e., no later than July 5, 2013.

The enclosure to this letter provides TVA's response to the Reference 2 RAI. There are no new commitments contained in this submittal.

Consistent with the standards set forth in 10 CFR 50.92(c), TVA has determined that the additional information, as provided in this letter, does not affect the no significant hazards considerations associated with the proposed application previously provided in Reference 1.

A D04
NRR

Please address any questions regarding this submittal to Henry Lee at (423) 843-4104.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 3rd day of July 2013.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosure: TVA Responses to NRC Request for Additional Information

cc (Enclosure):
NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Sequoyah Nuclear Plant

**ENCLOSURE**

**Tennessee Valley Authority**
**Sequoyah Nuclear Plant, Units 1 and 2 License Renewal**

**TVA Responses to NRC Request for Additional Information**

***RAI 2.3.3.2-1***

*The following license of renewal application (LRA) boundary drawing shows the following fire protection systems/components as out of scope (i.e., not colored in orange):*

| *LRA Drawing* | *Systems/Components* | *Location* |
|---|---|---|
| *LRA-1,2-47W850-10* | *Fire suppression system associated with 5th Diesel Generator Building* | *F8* |
| *LRA-1,2-47W850-27* | *Fire Hydrant – 0-HYD-26-2661* | *F9* |
| | *Fire Hydrant – 0-HYD-26-2663* | *B9* |

*Request:*

1. *The staff requests that the applicant verify whether the fire protection systems/components listed above are in the scope of license renewal in accordance with 10 CFR 54.4(a) and whether they are subject to an aging management review (AMR) in accordance with 10 CFR 54.21(a)(1).*
2. *If they are excluded from the scope of license renewal and are not subject to an AMR, the staff requests that the applicant provide justification for the exclusion.*

**RAI 2.3.3.2-1 RESPONSE:**

1. The fire protection system and components listed above perform no license renewal intended function and therefore are not within the scope of license renewal in accordance with 10 CFR 54.4(a) and are not subject to aging management review (AMR) in accordance with 10 CFR 54.21(a)(1).

2. The fire suppression system associated with the 5th diesel generator building (also known as the additional diesel generator building) includes no equipment credited with fire prevention, detection, or mitigation in areas containing equipment important to safe operation of the plant or systems that contain plant components credited for safe shutdown following a fire per 10 CFR 50.48. As stated in Note 3 of LRA drawing LRA-1,2-47W850-10, the high pressure fire protection system in the 5th diesel generator building is inactive. This system is located downstream of the locked closed yard header isolation valve 0-026-1616 (see LRA drawing LRA-1,2-47W850-24, location C4). This includes all piping, valves, and associated equipment pertaining to the 0-FCV-026-0260 deluge valve system (see LRA-1,2-47W850-10, location F8) and the aqueous film-foaming system. As stated in the note for SQN UFSAR Table 3.2.1-1, SQN abandoned the 5th diesel generator and associated equipment in 1986. The additional diesel generator building, a Category I structure built to house the 5th diesel generator, contains an un-isolable section of safety-related essential raw cooling water (ERCW)

piping. Blind flanges were installed where the piping immediately emerges through the base slab floor and a missile protection structure was installed over the blind flanges. The Category I qualification only applies to portions of the building structure required to support and protect this ERCW piping, which consists of the base slab floor and the missile protection structure. This passive ERCW piping is not susceptible to significant damage by fire.

Fire hydrants 0-HYD-026-2661 and 0-HYD-026-2663 are located on LRA drawing LRA-1,2-47W850-27 at coordinates F9 and B9, respectively. This is the high pressure fire protection (HPFP) pump house in fire area FAF-001 and fire area FAF-002. As stated in Appendix A of the SQN Fire Hazards Analysis Calculation, these areas are not safety-related (do not contain safety-related equipment or equipment required for safe shutdown). The primary fire suppression for these areas is automatic suppression (wet pipe sprinklers). Also, the electric and diesel fire pumps are located in the HPFP house, each in its own room, with the rooms separated by a three-hour fire wall. There is no manual suppression required for these areas, so hydrants 0-HYD-026-2661 and 0-HYD-026-2663 are not required as a back-up for the HPFP pump house. There are no other buildings containing safety-related equipment or equipment required for safe shutdown in the proximity of fire hydrants 0-HYD-026-2661 and 0-HYD-026-2663. Therefore, these two fire hydrants are not required for primary or back-up fire suppression. Therefore, no aging management review is required for the fire suppression system associated with the 5th diesel generator building or for fire hydrants 0-HYD-026-2661 and 0-HYD-026-2663 because these components do not support an intended function for license renewal.

***RAI 2.3.3.2-2***

*Tables 2.3.3-2 and 3.3.2-2 of the LRA do not include the following fire protection components:*

- *fire hose connections, and hose racks*
- *pipe supports, hangers, and couplings*
- *yard fire hydrants*
- *water sprinklers and hose standpipe*
- *manual sprinkler systems for post accident facility, post accident system filters, and 125-volt vital battery board rooms I, II, III, and IV*
- *outdoor oil-filled transformer fire suppression system*
- *charcoal high-efficiency particulate air (HEPA) filter automatic fixed water spray system*
- *floor drains for fire water*
- *dikes and curbs for oil spill confinement*
- *fire damper housing*

*Request:*

1. *The staff requests that the applicant verify whether the fire protection components listed above are in the scope of license renewal in accordance with 10 CFR 54.4(a) and whether they are subject to an AMR in accordance with 10 CFR 54.21(a)(1).*
2. *If they are excluded from the scope of license renewal and are not subject to an AMR, the staff requests that the applicant provide justification for the exclusion.*

**RAI 2.3.3.2-2 RESPONSE:**

The components listed above are within the scope of license renewal based on the requirements of 10 CFR 50.48 and Appendix R in accordance with 10 CFR 54.4(a)(3) and are subject to AMR in accordance with 10 CFR 54.21(a)(1), with the exception of certain fire hydrants, the sprinkler system for the post accident system filters, the outdoor oil-filled transformer fire suppression system, and the floor drains.

Fire hose connections are within the scope of license renewal and subject to AMR. Fire hose connections are included in LRA Table 2.3.3-2 under the component type *piping* with AMR results in LRA Table 3.3.2-2.

Hose racks are within the scope of license renewal and subject to AMR. Hose racks are included in the structural AMR as component type *fire hose reels*. This item is included in LRA Table 2.4-4 with AMR results in LRA Table 3.5.2-4.

Pipe supports and hangers are within the scope of license renewal and subject to AMR. Pipe support and hangers are included in the structural AMR as component type *component and piping supports.* This item is included in LRA Table 2.4-4 with AMR results in LRA Table 3.5.2-4.

Couplings are within the scope of license renewal and subject to AMR. Couplings are included in LRA Table 2.3.3-2 under the component type *piping* with AMR results in LRA Table 3.3.2-2.

Yard fire hydrants are within the scope of license renewal and subject to AMR where the hydrant performs an intended function for license renewal, as indicated on license renewal drawings in the LRA-1,2-47W850-x series of drawings. The intended function for yard hydrants for license renewal is to provide a secondary fire suppression option for "defense in depth" for

structures containing safety-related equipment or equipment required for safe shutdown. Yard fire hydrants are included in LRA Table 2.3.3-2 under the component type *valve body* with AMR results in LRA Table 3.3.2-2.

Water sprinklers are within the scope of license renewal and subject to AMR. Sprinklers are included in LRA Table 2.3.3-2 under the component type *nozzle* with AMR results in LRA Table 3.3.2-2.

Hose standpipes are within the scope of license renewal and subject to AMR. Standpipes are included in LRA Table 2.3.3-2 under the component type *piping* with AMR results in LRA Table 3.3.2-2.

The sprinkler system for the post accident sampling facility is an automatic system that is within the scope of license renewal and subject to AMR. The post accident sampling facility is shown on LRA drawing LRA-1,2-47W850-7, locations C–D, 1 and E,10. The facility consists of two rooms in the auxiliary building, which are described on the drawing as "Fuel Transfer Valve Rm/Post Accident Sampling Rm" followed by the room designations 706.0-A9 and 706.0-A8, respectively.

The post accident sampling filters, which are part of the ventilation system for the post accident sampling facility described in LRA Section 2.3.3.5, are shown on LRA drawing LRA-1,2-47W850-2, location D–E, 7. These filters have no intended function for license renewal; therefore, the manual sprinkler system for these filters is not within the scope of license renewal in accordance with 10 CFR 54.4(a)(3). However, as shown on drawing LRA-1,2-47W850-2, the sprinkler supply lines up to the filters are within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). These components are included in LRA Table 2.3.3-17-6 with aging management review results in LRA Table 3.3.2-17-6.

The manual fire protection system for the 125-volt vital battery board rooms I, II, III, and IV is within the scope of license renewal and subject to AMR. Fire water piping for the 125-volt vital battery board rooms I, II, III, and IV is shown on LRA drawing LRA-1,2-47W850-6, location A–B, 10–12.

The outdoor oil-filled transformers depicted on LRA drawing LRA-1,2-47W850-4 and -12 are not safety-related nor are they required for safe shutdown. As discussed in LRA Section 2.5, common station service transformers A, B, and C are within the scope of license renewal as part of the recovery from station blackout; however, they are not required for safe shutdown in accordance with 10 CFR 50.48 and Appendix R. Also, openings in exterior walls of safety-related buildings are greater than 50 feet from any flammable oil-filled transformer. Therefore, the outdoor oil-filled transformer fire suppression system is not within the scope of license renewal.

Various ventilation systems have filter trains that include a HEPA filter and a charcoal adsorber.

- The auxiliary building gas treatment system, described in LRA Section 2.3.3.5, has HEPA filters followed by charcoal filters, as shown on LRA drawing LRA-1,2-47W866-10, location E,8 and E,2. Fire water spray protection for these filters is within the scope of license renewal and subject to AMR as shown on LRA drawing LRA-1,2-47W850-8, location E, 8–9 and E, 3–4.
- The reactor building purge (also known as containment purge), described in LRA Section 2.3.3.5, has HEPA filters followed by charcoal filters. The fire water spray

protection for these filters is within the scope of license renewal and subject to AMR as shown on LRA drawing LRA-1,2-47W850-8, location H, 1–2 and H, 8–9.

- The emergency gas treatment system, described in LRA Section 2.3.3.5, has HEPA filters followed by charcoal filters. The fire water spray protection for these filters is within the scope of license renewal and subject to AMR as shown on LRA drawing LRA-1,2-47W850-8, location A,3 and A, 6–7.
- The main control room emergency air cleanup system, described in LRA Section 2.3.3.6 and located in the control building, contains HEPA filters followed by charcoal adsorbers. Fire water spray protection for these filters is within the scope of license renewal and subject to AMR as shown on LRA drawing LRA-1,2-47W850-9, location A,11.

Floor drains for fire water are not credited for draining in the internal flooding analysis. However, floor drains are within the scope of license renewal in accordance with 10 CFR 54.4(a)(2) as components with a pressure boundary intended function. Floor drains within the scope of license renewal and subject to AMR may be seen on LRA drawings in the LRA-1,2-47W852-x series, Floor and Equipment Drains. Floor drains are included in LRA Table 2.3.3-17-15 under the component type *piping* with AMR results in LRA Table 3.3.2-17-15.

Dikes and curbs for oil spill confinement are within the scope of license renewal and subject to AMR. These structural components are included in the structural AMR under component type *curbs* with a flood barrier intended function. They are included in LRA Table 2.4-4 with AMR results in LRA Table 3.5.2-4.

Fire damper housings are within the scope of license renewal and subject to AMR. Where fire damper housings are in ductwork, they are included in the AMR covering the ductwork as depicted on LRA ventilation drawings (LRA-1,2-47W866-x series). Where fire damper housings are embedded in walls, they are considered to be structural components and are included in LRA Table 2.4-4, line items for Fire protection components – miscellaneous steel including framing steel/Fire barrier/Carbon steel, with AMR results in LRA Table 3.5.2-4.

***RAI 2.4.4-1***

*Section 2.4.4, "Bulk Commodities," of the LRA provides the scoping and screening results of various structures within the scope of license renewal and subject to an AMR. LRA Table 2.4-4, includes fire barriers (doors; fire protection components, miscellaneous steel, including framing steel; penetration seals (end caps) and sleeves; manways, hatches, manhole covers and hatch covers; fire stops; fire wrap; and penetration seals). However, scoping and screening results in Table 2.4-4 of the LRA does not include the following type of fire barriers:*

- *walls, floors, and ceilings*
- *fire retardant coating for exposed structural steel*
- *essential raw cooling water system fire retardant coating for metal enclosure (junction box)*
- *cable fire retardant coating*
- *radiant energy shields*

*Request:*

1. *The staff requests that the applicant verify whether the fire barriers listed above are in the scope of license renewal in accordance with 10 CFR 54.4(a) and whether they are subject to an AMR in accordance with 10 CFR 54.21(a)(1).*
2. *If they are excluded from the scope of license renewal and are not subject to an AMR, the staff requests that the applicant provide justification for the exclusion.*

**RAI 2.4.4-1 RESPONSE**

1. The fire barriers listed above are in the scope of SQN license renewal in accordance with 10 CFR 54.4(a) and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). They are shown in the LRA tables as described below.

   The fire barriers "walls, floors, and ceilings" are included in the LRA in several places as follows.

   1. The Concrete component "Concrete (accessible areas): Shield building wall and dome; interior" with an intended function of "Fire barrier" is listed in LRA Table 2.4-1 and the AMR results for the component are provided in LRA Table 3.5.2-1.

   2. The Concrete component "Beams, columns, floor slabs and interior walls" with an intended function of "Fire barrier" is listed in LRA Table 2.4-2 and AMR results for the component are provided in LRA Table 3.5.2-2.

   3. The Concrete component "Concrete (accessible areas): all" with an intended function of "Fire barrier" is listed in LRA Table 2.4-2 and the AMR results for the component are provided in LRA Table 3.5.2-2.

   4. The Concrete component "Beams, columns, floor slabs and interior walls" with an intended function of "Fire barrier" is listed in LRA Table 2.4-3 and AMR results for the component are provided in LRA Table 3.5.2-3.

5. The Concrete component "Concrete (accessible areas): interior and above-grade exterior" with an intended function of "Fire barrier" is listed in LRA Table 2.4-3 and AMR results for the component are provided in LRA Table 3.5.2-3.

6. The Concrete component "Roof slabs" with an intended function "Fire barrier" is listed in LRA Table 2.4-3 and the AMR results for the component are provided in LRA Table 3.5.2-3.

The fire barrier "fire retardant coating for exposed structural steel" is included in the LRA as Other Materials component "Fire wrap" with an intended function of "Fire barrier" in LRA Table 2.4-4. The material of the component is Pyrocrete and AMR results for the component and the material Pyrocrete are provided in LRA Table 3.5.2-4.

The fire barrier "essential raw cooling water system fire retardant coating for metal enclosure (junction box)" is included in the LRA as Other Materials component "Fire wrap" with an intended function of "Fire barrier" in LRA Table 2.4-4. The material of the component is Pyrocrete and AMR results for the component and the material Pyrocrete are provided in LRA Table 3.5.2-4.

The fire barrier "cable fire retardant coating" is listed in the LRA as Other Materials component "Fire wrap" with an intended function of "Fire barrier" in LRA Table 2.4-4. The material of the cable fire retardant coating is Thermo-lag and AMR results are provided in LRA Table 3.5.2-4. The following change to the LRA clarifies that Thermo-lag instead of Flamemastic is the credited cable fire retardant coating for SQN. The changes to LRA Section 3.5.2.1.4 and LRA Table 3.5.2-4 follow with additions underlined and deletions lined through.

3.5.2.1.4 Bulk Commodities

Materials

Bulk commodity components are constructed of the following materials.

- ~~Flamemastic~~

**Table 3.5.2-4: Bulk Commodities**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Program | NUREG-1801 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Fire wrap | FB | Carborundum durablanket, carborundum fibersil cloth, Arlon silicone boot, Thermolag ~~Flamemastic,~~ Pyrocrete | Air-indoor uncontrolled | Loss of material, Change in material properties, Cracking/ delamination, separation | Fire Protection | - | - | J |

The fire barrier "radiant energy shields" is included in the LRA as part of the Steel and Other Metals component "Fire protection components miscellaneous steel including framing steel" in LRA Table 2.4-4 with an intended function of "Fire barrier." The material of the component is carbon steel and AMR results for the component and material carbon steel are provided in LRA Table 3.5.2-4.

2. The fire barriers listed above are in the scope of license renewal and subject to an AMR.

***RAI 3.1.2-1***

*Background:*

*LRA Table 3.1.2-2 indicates that the lower core support plate made of cast austenitic stainless steel (CASS) is being managed for "loss of fracture toughness" by the Reactor Vessel Internals Program as an "expansion" component. LRA Section 3.1.2.2.9.A.6 indicates that the lower core support plate is also known as the lower support casting. In addition, LRA Table C-2, "Expansion Components at SQN Units 1 and 2," indicates that the "Lower internals assembly – Lower support casting" is managed for thermal embrittlement.*

*In response to applicant/licensee action item (A/LAI) No.7 in LRA Appendix C the applicant indicates that reduction in fracture toughness due to thermal and irradiation embrittlement is not applicable to the lower core support plate.*

*Issue:*

*The information in LRA Table 3.1.2-3 and LRA Table C-2 is inconsistent with the information provided in the applicant's response to A/LAI No.7; thus, it is not clear whether or not the lower core support plate (i.e., lower support casting) is managed by the Reactor Vessel Internals Program for loss of fracture toughness.*

*Request:*

1. *Clarify whether "loss of fracture toughness" for the lower core support plate (i.e., lower support casting) is managed in the "expansion" component category within the Reactor Vessel Internals Program.*
2. *Revise the LRA, as necessary, to clarify this discrepancy between the information in LRA Table 3.1.2-3 and LRA Table C-2 and the information in the applicant's response to A/LAI No.7 in LRA Appendix C. Provide an explanation for these revisions*

**RAI 3.1.2-1 RESPONSE:**

1. As indicated in LRA Table 3.1.2-2 and LRA Appendix Table C-2, the lower core support plate (i.e., lower support casting) is managed for reduction of fracture toughness by the Reactor Vessel Internals Program as an expansion component. This is consistent with MRP-227-A, Table 4-6.

2. The change to the response to LRA Appendix C, Applicant/Licensee Action Item (A/LAI) No. 7 follows with additions underlined and deletions lined through to clarify the apparent discrepancy between LRA Table 3.1.2-2, Table C-2 and the response to A/LAI No. 7.

   Response to A/LAI No. 7

   "The lower support column bodies at SQN are fabricated from forged Type 304 and 304a stainless steel. Therefore, no site specific analysis is required for the lower support column bodies. The lower core support plates in Units 1 and 2 are~~is~~ fabricated from CF8_CASS. However, based on the certified material test report and the determination of susceptibility to reduction in fracture toughness due to thermal embrittlement described in NUREG-CR-4513, the lower core support plate is not subject to reduction in fracture toughness due thermal embrittlement because the delta ferrite concentration of the plate material is less than 8% in both units. In addition,

according to MRP-191 the lower core support plate is not subject to reduction in fracture toughness due to irradiation embrittlement. Therefore the lower core support plate will maintain its functionality under all licensing basis conditions of operation. The Reactor Vessel Internals Program will continue to manage the effects of aging on the lower core support plate as an expansion component."

The response to Applicant/License Action Item (A/LAI) No. 7 is based on the MRP-227-A Safety Evaluation request to provide a plant-specific analysis on CASS components and is independent of LRA Table 3.1.2-2 and Table C-2. The LRA response to A/LAI No. 7 does not exclude the Reactor Vessel Internals Program from managing the potential aging effect. The SQN Reactor Vessel Internals Program is consistent with MRP-227-A and GALL XI.M16A.

***RAI 3.1.2-2***

*Background:*

*LRA Table 3.1.2-2 indicates that the core barrel: upper core barrel and lower core barrel circumferential (girth) welds made of stainless steel are being managed for "loss of fracture toughness" by the Reactor Vessel Internals Program as a "primary" component.*

*LRA Table C-1, "Primary Components at SQN Units 1 and 2," indicates that the core barrel assembly: upper and lower core barrel cylinder girth welds are only managed for cracking (stress corrosion cracking, irradiation-assisted stress corrosion cracking, fatigue). Further, this table identifies the expansion link, examination method/frequency and examination coverage for this component.*

*Issue:*

*Since the upper and lower core barrel cylinder girth welds are being managed for loss of fracture toughness as a "primary component," it is not clear what the expansion link, examination method/frequency and examination coverage are.*

*Request:*

1. *Identify and justify the expansion link, examination method/frequency and examination coverage for the upper and lower core barrel cylinder girth welds when being managed for the aging effect of loss of fracture toughness as a "primary" component.*
2. *Revise the LRA, as necessary, and provide an explanation for these revisions.*

**RAI 3.1.2-2 RESPONSE:**

1. As indicated in LRA Appendix Table C-1, reduction of fracture toughness due to irradiation embrittlement is not directly managed for the upper and lower core barrel cylinder girth welds. It is indirectly monitored by EVT-1 inspection for cracks. MRP-227-A, Table 3-3 identifies the core barrel girth welds as primary components susceptible to stress corrosion cracking (SCC), irradiation-assisted stress corrosion cracking (IASCC) and irradiation embrittlement (reduction of fracture toughness). However, Table 4-3 of MRP-227-A includes only cracking as an aging effect because there are no practical means of inspection for irradiation embrittlement. The effects of irradiation embrittlement are instead considered in core barrel flaw tolerance analyses. Consequently, there are no expansion links, examination method/frequency or examination coverage associated with irradiation embrittlement.

2. LRA Tables 3.1.2-2 and C-1 are consistent with the corresponding MRP-227-A tables. No revision to the LRA is required.

***RAI 3.3.2.3.6-1***

*Background:*

*LRA Tables 3.3.2-6, 3.3.2-13 and 3.3.2-17-15 state that for fiberglass flexible duct connections, piping, and tanks exposed to internal and external indoor air, aging effects are not applicable and no aging management program (AMP) is proposed. The AMR items cite generic note G.*

*Regulatory Issues Summary 2012-02, "Insights Into Recent License Renewal Application Consistency with the Generic Aging Lessons Learned Report," states that when an applicant states that there is no aging effect requiring management (AERM) and no proposed AMP, the application should state the specific material type and grade of polymeric materials and greater detail on the specific environment (e.g., ultraviolet light, ozone, radiation).*

*Issue:*

*The staff noted that fiberglass piping can be constructed with different bonding agents (e.g., epoxy resin, reinforced vinyl ester) which can respond differently to environmental factors. Flexible duct connections could be subject to wear as defined by the Generic Aging Lessons Learned (GALL) Report Table IX.F, "Selected Definitions & Use of Terms for Describing and Standardizing Aging Mechanisms," which states that, "[w]ear is defined as the removal of surface layers due to relative motion between two surfaces or under the influence of hard, abrasive particles. Wear occurs in parts that experience intermittent relative motion, frequent manipulation, or in clamped joints where relative motion is not intended, but may occur due to a loss of the clamping force."*

*Request:*

1. *State the specific material type and grade for the fiberglass components including the bonding agent.*
2. *State whether high enough levels of ultraviolet light, ozone, or radiation could be present which would cause the components to age.*
3. *If the above environmental factors are impactful, state why there is no AERM, or otherwise, propose an AMP to manage the AERM.*
4. *State whether wear could be occurring in the flexible duct connections, and if wear could occur, how aging will be managed.*

**RAI 3.3.2.3.6-1 RESPONSE:**

1. On further review, aging management programs (AMPs) are proposed to manage the aging effects of these fiberglass components, as stated below. As a result, there is no longer a need to provide the specific material type and grade of the fiberglass components to justify that no AMPs are required.
2. It is possible that levels of ultraviolet light and ozone (radiation is not applicable to these components) could be present that would cause components to experience aging effects.
3. While the above environmental factors are not expected to have significant impacts, the associated aging effects will be managed with the External Surfaces Monitoring Program and the Internal Surfaces in Miscellaneous Piping and Ducting Components Program as described below.
4. Because the fiberglass flexible duct connections are designed to accommodate differential movement, significant wear is not expected at the connections.

Nevertheless, loss of material due to wear will be managed with the Internal Surfaces in Miscellaneous Piping and Ducting Components Program and the External Surfaces Monitoring Program as described below.

The changes to **LRA Tables 3.3.2-6, 3.3.2-13**, and **3.3.2-17-15** follow with additions underlined and deletions lined through to manage aging effects for the fiberglass components and given environments. In addition, Plant specific note 307 on page 3.3-72 is deleted as follows.

~~"307. This fiberglass piping is installed in the drain line for the ice condenser and is wetted only intermittently."~~

**Table 3.3.2-6**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Duct flexible connection | Pressure boundary | Fiberglass | Air – indoor (ext) | ~~None~~ Change in material properties | ~~None~~ External Surfaces Monitoring | - - | -- | G |
| Duct flexible connection | Pressure boundary | Fiberglass | Air – indoor (ext) | Loss of material-wear | External Surfaces Monitoring | | | G |
| Duct flexible connection | Pressure boundary | Fiberglass | Air – indoor (int) | ~~None~~ Loss of material-wear | ~~None~~ Internal Surfaces in Miscellaneous Piping and Ducting Components | - - | -- | G |

**Table 3.3.2-13**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Fiberglass | Air – indoor (ext) | ~~None~~ Change in material properties | ~~None~~ External Surfaces Monitoring | - - | -- | G |
| Piping | Pressure boundary | Fiberglass | Waste water (int) | ~~None~~ Change in material properties | ~~None~~ Internal Surfaces in Miscellaneous Piping and Ducting Components | - - | -- | G, ~~307~~ |
| Piping | Pressure boundary | Fiberglass | Waste water (int) | Cracking | Internal Surfaces in Miscellaneous Piping and Ducting Components | | | G |

**Table 3.3.2-17-15**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Fiberglass | Air – indoor (ext) | ~~None~~ Change in material properties | ~~None~~ External Surfaces Monitoring | - - | - - | G |
| Tank | Pressure boundary | Fiberglass | Waste water (int) | Change in material properties | Internal Surfaces in Miscellaneous Piping and Ducting Components | - - | - - | G |
| Tank | Pressure boundary | Fiberglass | Waste water (int) | Cracking | Internal Surfaces in Miscellaneous Piping and Ducting Components | - - | - - | G |

***RAI 3.5.2.3.4-1***

*Background:*

*LRA Table 3.5.2-4, "Bulk Commodities," includes fiberglass and calcium silicate insulation exposed to uncontrolled indoor air and states that there are no aging effects for these materials and environment combinations requiring age management and no AMP is proposed.*

*Issue:*

*LRA Table 3.5.2-4 states that one of the intended functions of the insulation, as defined in LRA Table 2.0-1, "Component Intended Functions: Abbreviations and Definitions," is to "provide insulating characteristics to reduce heat transfer (structural)."*

*The staff notes that in a dry environment of uncontrolled indoor air, without potential for water leakage, spray, or condensation, fiberglass and calcium silicate are expected to be inert to environmental effects. However, in moist environments, calcium silicate has been found to degrade. In addition, both fiberglass and calcium silicate insulation have the potential for prolonged retention of any moisture to which they are exposed; prolonged retention of moisture may increase thermal conductivity, thereby degrading the insulating characteristics, and also could accelerate the aging of insulated components. The staff noted that the LRA's description of insulation materials includes aluminum jacketing which, if properly installed, provides protection from ambient moisture for the heat-resistant insulating materials.*

*Request:*

*For those insulation components in LRA Table 3.5.2-4 with a function to limit heat transfer, state:*

1. *whether all in-scope insulation is covered by jacketing; and*
2. *how the configuration control plant-specific procedures for jacketing ensures that it is properly installed so as to prevent water intrusion into the insulation (e.g., seams on the bottom, overlapping seams) such that aging management is not required.*

**RAI 3.5.2.3.4-1 RESPONSE:**

1. Aluminum or stainless steel jacketing is not present on all in-scope fiberglass and calcium silicate insulation in LRA Table 3.5.2-4 with a function to limit heat transfer.

2. The installation of the jacketing for fiberglass and calcium silicate insulation material is performed in accordance with "skill of the craft" to ensure the jacketing is installed properly to provide protection from mechanical damage. Where provided, jacket can also protect insulation against water intrusion. However, there are no specific instructions provided in plant procedures for the preferred orientation and overlapping of seams for the installation of jacketing.

   As provided in LRA plant-specific note 503, loss of insulating characteristics due to insulation degradation is not an aging effect requiring management for insulation material. The SQN in-scope insulation located indoors is not exposed to moisture. 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 SQN corrective action program and work control processes. When not exposed to moisture, insulation made from fiberglass and calcium silicate in an air–indoor uncontrolled environment does not experience aging effects that would degrade its ability to perform its intended function. A

review of site operating experience identified no aging effects that resulted in a loss of intended function for insulation used at SQN.