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RA-21-0281
October 22, 2021

10 CFR 50.4
10 CFR Part 54

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station (ONS), Units 1, 2, and 3
Docket Numbers 50-269, 50-270, 50-287
Renewed License Numbers DPR-38, DPR-47, DPR-55
Subsequent License Renewal Application
Response to NRC Request for Additional Information B2.1.27-1

References:

1. Duke Energy Letter (RA-21-0132) dated June 7, 2021, Application for Subsequent Renewed Operating Licenses, (ADAMS Accession Number ML21158A193)
2. NRC Letter dated July 22, 2021, Oconee Nuclear Station, Units 1, 2, and 3 - Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding Duke Energy Carolinas' Application for Subsequent License Renewal (ADAMS Accession Number ML21194A245)
3. NRC E-mail dated September 22, 2021, Oconee SLRA - Request for Additional Information B2.1.27-1, ADAMS Accession Number ML21271A586

Ladies and Gentlemen:

By letter dated June 7, 2021 (Reference 1), Duke Energy Carolinas, LLC (Duke Energy) submitted an application for the subsequent license renewal of Renewed Facility Operating License Numbers DPR-38, DPR-47, and DPR-55 for the Oconee Nuclear Station (ONS), Units 1, 2, and 3 to the U.S. Nuclear Regulatory Commission (NRC). On July 22, 2021 (Reference 2), the NRC determined that ONS subsequent license renewal application (SLRA) was acceptable and sufficient for docketing. In an email from Angela X. Wu (NRC) to Steve Snider (Duke Energy) dated September 22, 2021 (Reference 3), the NRC transmitted specific requests for additional information (RAI) to support completion of the Safety Review. The mutually agreed date to provide the response to the RAI is within 30 days from the date of Reference 3.

Enclosure 1 contains the response to the request for additional information. Enclosure 2 contains updates to sections of the SLRA affected by the response.

SLRA changes are described along with the affected SLRA section(s), SLRA page number(s), and SLRA mark-ups. For clarity, deletions are indicated by strikethrough and inserted text by underlined red font**.**

Commitment #24 in Appendix A, Table A6.0-1, Subsequent License Renewal Commitments is being revised to include that periodic wall thickness measurements may be conducted in lieu of visual inspections for managing loss of coating integrity.

Should you have any questions regarding this submittal, please contact Paul Guill at (704) 382-4753 or by email at paul.guill@duke-energy.com.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 22, 2021.

Sincerely,

Steven M. Snider
Site Vice President
Oconee Nuclear Station

Enclosures:

Enclosure 1: Response to Request for Additional Information
Enclosure 2: SLRA Revisions

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ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSE TO REQUESTS FOR ADDITIONAL INFORMATION

Enclosure 1
Subsequent License Renewal Application
Response to Requests for Additional Information

Regulatory Basis:

10 CFR 54.21(a)(3) requires an applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. One of the findings that the staff must make to issue a renewed license (10 CFR 54.29(a)) is that actions have been identified and have been or will be taken with respect to managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under 10 CFR 54.21, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis. In order to complete its review and enable making a finding under 10 CFR 54.29(a), the staff requires additional information in regard to the matters described below.

Background:

SLRA Section B2.1.27, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks," states "[t]he Oconee Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks AMP is a new program that will be consistent with the ten elements of AMP XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks" specified in NUREG-2191 (GALL-SLR), as modified by SLR-ISG-2021-02-MECHANICAL, "Updated Aging Management Criteria for Mechanical Portions of the Subsequent License Renewal Guidance" with the following exceptions [not related to the subject RAI]."

GALL-SLR Report AMP XI.M42 states AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," AMP XI.M20, "Open-Cycle Cooling Water System," or AMP XI.M21A, "Closed Treated Water Systems," are acceptable alternatives to the inspections recommended in AMP XI.M42 for internal coatings when the following six conditions are met: (1) loss of coating or lining integrity cannot result in downstream effects; (2) the component's only CLB [current licensing basis] intended function is leakage boundary (spatial) or structural integrity (attached); (3) the internal environment does not contain chemical compounds that could cause accelerated corrosion; (4) the internal environment would not promote microbiologically influenced corrosion of the base metal; (5) the coated/lined components are not located in the vicinity of uncoated components that could cause a galvanic couple to exist; and (6) the design for the component did not credit the coating/lining (e.g., the corrosion allowance was not zero).

At Oconee, the following programs will be used to manage loss of coating or lining integrity in lieu of the Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks program:

- The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program will manage the following internally-coated components: (a) drain pans cited in SLRA Table 3.3.2-29, "Auxiliary Systems - Ventilation Systems - Aging Management Evaluation;" (b) package steam fired water heater tank cited in SLRA Table 3.3.2-36, "Auxiliary Systems - Plant Drinking Water System - Aging Management Evaluation;" and (c) feedwater pump turbine oil and main turbine oil tanks cited in SLRA Table 3.3.2-30, "Auxiliary Systems - Lube Oil System - Aging Management Evaluation."
- The Water Chemistry and One Time Inspection programs will manage the internally-coated powdex and slurry tanks cited in SLRA Table 3.4.2-1, "Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation."

- The Open Cycle Cooling Water program will manage the following internally-coated components: (1) main condenser waterbox and tubesheet cited in SLRA Table 3.4.2-1; and (2) main turbine oil tank oil cooler heat exchanger head cited in SLRA Table 3.3.2-30.

Request for Additional Information (RAI) B2.1.27-1:

Issue:

1. GALL-SLR Report AMP XI.M42 states that AMPs XI.M38, XI.M20, and XI.M21A are acceptable alternatives to the inspections recommended in AMP XI.M42 when six conditions are met. The staff seeks additional clarification regarding how the six conditions to utilize an alternative AMP are met for the components cited in the *Background* section above (where Oconee has elected to use an alternative AMP to manage loss of coating integrity).
2. As noted above, GALL-SLR Report AMP XI.M42 states various periodic internal surface inspection programs (i.e., AMPs XI.M38, XI.M20, and XI.M21A) can be used in lieu of AMP XI.M42 provided certain conditions are met; however, Oconee is proposing to use the One-Time Inspection and Water Chemistry programs to manage loss of coating integrity for the powdex and slurry tanks. The staff seeks additional clarification regarding the adequacy of a one-time inspection approach (in lieu of a periodic inspection approach) for these tanks.

Request:

1. For each of the components cited in the *Background* section of this RAI, provide additional information with respect to how the six conditions delineated in GALL-SLR Report AMP XI.M42 to utilize an alternative AMP are met (or provide an alternative basis with respect to the adequacy of these AMPs to manage loss of coating integrity).
2. For the internally-coated powdex and slurry tanks cited in SLRA Table 3.4.2-1, provide additional technical justification with respect to the adequacy of a one-time inspection approach (in lieu of a periodic inspection approach) for these tanks.

Response to RAI B2.1.27-1:

Request 1:

The following information is provided for each of the components cited in the Background section of this RAI on how the six conditions delineated in GALL-SLR Report AMP XI.M42 to utilize an alternative AMP are met. Note that the revisions made to the SLRA as a result of the below are addressed in Enclosure 2.

Air Handling Unit Drain Pans [cited in SLRA Table 3.3.2-29]

A Belzona coating has been applied to drain pans for certain air handling units located in the Auxiliary Building and Turbine Building as a repair for degraded galvanized steel surfaces.

The six conditions delineated in GALL-SLR Report AMP XI.M42 to utilize an alternative AMP are evaluated below.

(1) The drain pans are not located upstream of any equipment that performs (a)(1) or (a)(3) intended functions. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the drain pans is leakage boundary (spatial interaction).

(3) The internal environment for the drain pans is condensation from the air handling units (evaluated as a waste water environment). The condensation does not contain chemical compounds that could cause accelerated corrosion.

(4) The internal environment for the drain pans is condensation from the air handling units which does not promote microbiologically influenced corrosion.

(5) The coatings are applied to the galvanized steel surfaces of the drain pan such that a potential failure of the coating will not create a galvanic couple.

(6) The coating is applied as a repair and is not credited in the original design.

The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program is credited for aging management. Existing preventive maintenance activities for the air handling units provide opportunities for periodic inspection of the drain pans.

Package Steam Fired Water Heater Tank [cited in SLRA Table 3.3.2-36]

The component is a water heater which is no longer in service. However, since the water heater has not been formally abandoned and permanently isolated, it is conservatively assumed to have a structural integrity function as a leakage boundary. Prior to removal from service, the water heater lining was inspected every 18 months in accordance with State of South Carolina vessel inspection requirements. Recent inspections have concluded the water heater is not fit for continued service. If the water heater is repaired or replaced and put back into service, then ONS will follow State of South Carolina vessel inspection requirements.

The six conditions delineated in GALL-SLR Report AMP XI.M42 to utilize an alternative AMP are evaluated below.

(1) The water heater is not located upstream of any equipment that performs (a)(1) or (a)(3) intended functions. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the tank is leakage boundary (spatial interaction).

(3) The internal environment of the water heater tank is normally plant drinking water (evaluated as a potable raw water environment) which does not contain chemical compounds that could cause accelerated corrosion.

(4) The water heater tank is supplied by the Plant Drinking Water System which is connected to the City of Seneca public water system which does not promote microbiologically influenced corrosion.

(5) The water heater tank is steel, the steam supply piping is steel, the water distribution piping is steel and copper. Galvanic corrosion is not a concern as the steel tank presents a large anode to the 2-1/2 inch copper piping.

(6) No corrosion allowance was identified for the water heater tank design. The coating is not credited in the design.

The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program is credited for aging management.

Feedwater Pump Turbine Oil Tanks [cited in SLRA Table 3.3.2-30]

The feedwater pump turbine oil tanks are isolated from the safety-related emergency feedwater pump turbine oil tanks by normally closed valves. The feedwater pump turbine oil transfer pump takes suction from the feedwater pump turbine oil tanks and provides flow to the ‘B’ lube oil purifier through a common line shared with the emergency feedwater pump turbine oil transfer pump discharge. Backflow to the emergency feedwater pump turbine oil tank is prevented by a check valve. From the common transfer pump discharge line, lubricating oil passes through the ‘B’ lube oil purifier and is processed through two filters and a coalescing chamber to remove particulate and water.

(1) If any coating debris were present in the oil, it would be removed by the filters and detected through monitoring of filter differential pressure. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the oil tanks is leakage boundary (spatial interaction).

(3) The internal environment of the tanks is lubricating oil which does not contain chemical compounds that could cause accelerated corrosion.

(4) The internal environment of the tanks is lubricating oil which does not promote microbiologically influenced corrosion.

(5) The oil tank and the connecting piping are steel; therefore, a galvanic couple does not exist.

(6) No corrosion allowance was identified for the feedwater pump turbine oil tank design. The coating is not credited in the design.

Oconee inspects the internal oil tank coatings every 4 years. If the coatings are damaged, any loose coating material is removed, however the site approach is not to repair the coatings. The tank material is inspected for indications of corrosion. If corrosion is identified an evaluation is performed to determine the necessary corrective actions. Wall thickness measurements may be required based on the evaluation. The corrective actions may include re-coating the tank.

The *Lubricating Oil Analysis* and *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* programs are credited for aging management.

Main Turbine Oil Tanks [cited in SLRA Table 3.3.2-30]

The main turbine oil tanks are isolated from the safety-related emergency feedwater pump turbine oil tanks by normally closed valves. The lube oil purifier pump takes suction from the main turbine oil tank drain and for processing through two filters and a coalescing chamber to remove particulate and water.

(1) If any coating debris were present in the oil, it would be removed by the filters and detected through monitoring of filter differential pressure. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the oil tanks is leakage boundary (spatial interaction).

(3) The internal environment of the tanks is lubricating oil which does not contain chemical compounds that could cause accelerated corrosion.

(4) The internal environment of the tanks is lubricating oil which does not promote microbiologically influenced corrosion.

(5) The oil tank and the connecting piping are steel; therefore, a galvanic couple does not exist.

(6) No corrosion allowance was identified for the main turbine oil tank design. The coating is not credited in the design.

Oconee inspects the internal oil tank coatings every 4 years. If the coatings are damaged, any loose coating material is removed, however the site approach is not to repair the coatings. The tank material is inspected for indications of corrosion. If corrosion is identified an evaluation is performed to determine the necessary corrective actions. Wall thickness measurements may be required based on the evaluation. The corrective actions may include re-coating the tank.

The *Lubricating Oil Analysis* and *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* programs are credited for aging management.

Powdex and Slurry Tanks [cited in SLRA Table 3.4.2-1]

The powdex and slurry tanks allow for mixing of resins used in the condensate polishing demineralizers. These tanks are normally isolated from Condensate System and are only in service following backwash of a demineralizer when new precoating is applied. When in service, the precoat pump draws resin slurry from the tank and provides it to the applicable demineralizer.

(1) If any coating debris were present in the slurry, it would be removed by the demineralizer. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the tanks is leakage boundary (spatial interaction).

(3) The internal environment of the tanks is condensate or demineralized quality water which does not contain chemical compounds that could cause accelerated corrosion.

(4) The internal environment of the tanks is condensate or demineralized quality water which does not promote microbiologically influenced corrosion.

(5) The tanks and the connecting piping are steel; therefore, a galvanic couple does not exist.

(6) No corrosion allowance was identified for the powdex and slurry tank design. The coating is not credited in the tank design.

The application is being amended to credit the *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program for aging management in place of the combination of the *Water Chemistry* and *One-Time Inspection* programs. See response to request 2 for this RAI.

The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program is credited for aging management.

Main Turbine Oil Tank Oil Cooler Heat Exchanger Head [cited in SLRA Table 3.3.2-30]

The Unit 1 and 2 Main Turbine Oil Tank Coolers have local coatings (Belzona) that serve as repairs of the internal surface of the heat exchanger head. The Unit 3 Main Turbine Oil Tank Coolers do not have an internal coating or lining.

(1) The main turbine oil tank coolers are not located upstream of any equipment that performs (a)(1) or (a)(3) intended functions. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the cooler is leakage boundary (spatial interaction).

(3) The internal environment for the cooler is raw water from Lake Keowee. Water from Lake Keowee is non-aggressive and does not contain chemical compounds that could cause accelerated corrosion.

(4) The internal environment for the cooler is raw water from Lake Keowee. Water from Lake Keowee is non-aggressive and a review of operating experience shows that leaks due to microbiologically influenced corrosion (MIC) are rare. A total of five piping segments in raw water systems have experienced leaks at Oconee over the past 10 years where MIC was identified as a contributing cause or potential contributing cause and they are all stagnant or intermittent flow lines.

(5) The coatings are applied to the gray cast iron surfaces of the oil tank cooler head such that a potential failure of the coating will not create a galvanic couple.

(6) The coatings are applied as a repair and were not credited in the original design.

The *Open-Cycle Cooling Water System* program is credited for aging management. Existing preventive maintenance activities require periodic internal inspections of the Unit 2 main turbine oil tank cooler.

Main Condenser Outlet Waterboxes (including Tubesheets) and CCW Discharge Piping [cited in SLRA Table 3.4.2-1, Condensate and Table 3.3.2-48, Condenser Circ Water, respectively]

The main condenser consists of inlet piping, an inlet waterbox, the condenser, an outlet waterbox, and discharge piping. The application is being amended to clarify the aging management strategies for the inlet piping, inlet waterboxes (including tubesheets), the outlet waterboxes (including tubesheets), and the discharge piping.

SLRA Table 3.4.2-1 lists the main condenser waterbox with a pressure boundary function. For the internal raw water environment loss of coating or lining integrity is managed with the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* and *Open-Cycle Cooling Water System* programs. The *Open-Cycle Cooling Water System* program uses a Note E indicating that a different program is credited with plant-specific note 2 stating "Internal surfaces of the main condenser outlet waterboxes and tubesheets will be managed with the Open Cycle Cooling Water AMP."

The inlet waterbox (including the tubesheets) has a pressure boundary function. The outlet waterbox and the outlet waterbox tubesheets should be listed with a structural integrity function. Once the condenser circulating water has passed through the tubes it is no longer required to perform a cooling function. SLRA Table 3.4.2-1 requires revision to separate out a structural integrity function for the main condenser waterbox (outlet side) and the main condenser tubesheet (outlet side). The *Open-Cycle Cooling Water System* program will be credited for aging management of the components with a structural integrity function. The *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* program will be credited for aging management of the components with a pressure boundary function.

The inlet and outlet piping to the main condenser is addressed in Table 3.3.2-48 as part of the Condenser Circulating Water System. The inlet piping is evaluated with a pressure boundary function and credits the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* program. The outlet piping is evaluated with a structural integrity function and credits the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* program. SLRA Table 3.3.2-48 requires revision to credit the *Open-Cycle Cooling Water System* program for the discharge piping with a structural integrity function.

(1) The main condenser outlet waterboxes (including tubesheets) and CCW discharge piping are not located upstream of any equipment that perform (a)(1) or (a)(3) intended functions. Therefore, failure of the coating will not result in any downstream effects.

(2) The only intended function of the outlet waterboxes (including tubesheets) and CCW discharge piping is leakage boundary (spatial interaction).

(3) The internal environment for the outlet waterboxes (including tubesheets) and CCW discharge piping is raw water from Lake Keowee. Water from Lake Keowee is non-aggressive and does not contain chemical compounds that could cause accelerated corrosion.

(4) The internal environment for this equipment is raw water from Lake Keowee. Water from Lake Keowee is non-aggressive and a review of operating experience shows that leaks due to microbiologically influenced corrosion are rare. A total of five piping segments in raw water systems have experienced leaks at Oconee over the past 10 years where MIC was identified

as a contributing cause or potential contributing cause and they are all stagnant or intermittent flow lines.

(5) The condenser shell, waterboxes, tubesheets, and discharge piping are steel. The main condenser tubes are stainless steel. Galvanic corrosion is not a concern as the steel tubesheets present a large anode to the 7/8 inch stainless steel tubes.

(6) No corrosion allowance was identified in the outlet waterboxes (including tubesheets) or CCW discharge piping design. The coatings are not credited in the design.

The *Open-Cycle Cooling Water System* program is credited for aging management. Existing preventive maintenance activities require periodic internal inspections of the internal coating of the waterboxes (including tubesheets) and of the CCW discharge piping.

Request 2:

In lieu of providing a technical justification, Oconee elects to manage loss of coating integrity and loss of material using a periodic program, the *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program. In lieu of performing visual inspections, wall thickness measurements will be performed in accordance with the alternatives discussed in NUREG-2191 AMP XI.M42 Element 4. Under this alternative, external wall thickness measurements will be performed on a representative sample every 10 years, commencing 10 years prior to the subsequent period of extended operation to confirm the acceptability of the corrosion rate of the base metal. For heat exchangers and tanks, a representative sample includes 25 percent coverage of the accessible external surfaces. As internally coated or lined components in the scope of *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program must meet the six conditions for using the alternative program for managing internal coatings or linings, the conditions under which the alternative use of wall thickness measurements can be used has been met. Refer to the response to Question 1 for details. The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program will be revised to allow wall thickness measurements in lieu of visual inspections for internally coated or lined components within the scope of the program.

Note that the revisions made to the SLRA as a result of the above are addressed in Enclosure 2.

ENCLOSURE 2

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

Enclosure 2
Subsequent License Renewal Application
SLRA Updates

Request 1:

SLRA Table 2.3.4-1 page 2-250 is revised as follows:

Table 2.3.4-1 Condensate System

Component/Commodity Group	Intended Functions
Main Condenser Tubesheet **(Inlet Water Box)**	Pressure Boundary
Main Condenser Tubesheet (Outlet Water Box)	**Structural Integrity**
Main Condenser Water Box **(Inlet)**	Pressure Boundary
Main Condenser Water Box (Outlet)	**Structural Integrity**

SLRA Table 3.3.1 page 3-478 is revised as follows:

Table 3.3.1 Summary of Aging Management Programs for Auxiliary Systems Evaluated in Chapter VII of the GALL-SLR Report

Item Number	Component	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1-138	Any material piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed-cycle cooling water, raw water, raw water (potable), treated water, treated borated water, fuel oil, lubricating oil, waste water, air-dry, air, condensation	Loss of coating or lining integrity due to blistering, cracking, flaking, peeling, delamination, rusting, or physical damage; loss of material or cracking for cementitious coatings/linings	AMP XI. M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	Consistent with NUREG-2191 with exceptions, and a different program is credited for some components. Aging effects for the Elevated Water Storage Tank are managed by the *Fire Water System* (B2.1.16) program. Aging effects for components in the Plant Drinking Water System, Ventilation System and Lube Oil System are managed by the *Inspection of Internal Surfaces of Miscellaneous Piping and Ducting Components* (B2.1.24) program. Components in the Lube Oil System aligned to this item are also managed by the *Open-Cycle Cooling Water System* (B2.1.11) program. **Aging effects for components in the Condensate System are managed by the *Open-Cycle Cooling Water System* (B2.1.11).** Exceptions apply to the NUREG-2191 recommendations for the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* (B2.1.27) program implementation.

SLRA Table 3.3.1 page 3-479 is revised as follows:

Table 3.3.1 Summary of Aging Management Programs for Auxiliary Systems Evaluated in Chapter VII of the GALL-SLR Report

Item Number	Component	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1-139	Any material piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed-cycle cooling water, raw water, raw water (potable), treated water, treated borated water, fuel oil, lubricating oil, waste water. air-dry, air, condensation	Loss of material due to general, pitting, crevice corrosion, MIC	AMP XI. M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	Consistent with NUREG-2191 with exceptions, and a different program is credited for some components. Aging effects for the Elevated Water Storage Tank are managed by the *Fire Water System* (B2.1.16) program. Aging effects for components in the Plant Drinking Water and Ventilation Systems are managed by the *Inspection of Internal Surfaces of Miscellaneous Piping and Ducting Components* (B2.1.24) program. **Aging effects for components in the Condensate System are managed by the *Open-Cycle Cooling Water System* (B2.1.11).** Exceptions apply to the NUREG-2191 recommendations for the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* (B2.1.27) program implementation.

SLRA Table 3.3.2-48 page 3-927 is revised as follows:

Table 3.3.2-48 Auxiliary Systems - Condenser Circulating Water - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping	Structural Integrity	Steel	Underground (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.I.AP-284	3.3.1- 109	B
			Waste Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.E5.A-785	3.3.1- 193	A
				Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-281	3.3.1- 091	A,1
		Steel with Internal Coating/Lining	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A, 4
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A, 4
			Raw Water (Internal)	Loss of Coating or Lining Integrity	~~Internal Coatings/Linings for In- Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)~~ Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-416	3.3.1- 138	~~B~~ E, 4

SLRA Table 3.3.2-48 page 3-928 is revised as follows:

Table 3.3.2-48 Auxiliary Systems - Condenser Circulating Water - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping	Structural Integrity	Steel with Internal Coating/Lining	Raw Water (Internal)	Loss of Material	~~Internal Coatings/Linings for In- Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)~~ **Open-Cycle Cooling Water System (B2.1.11)**	VII.C1.A-414	3.3.1- 139	~~B~~ **E, 4**

SLRA Table 3.3.2-48 page 3-938 is revised as follows:

Table 3.3.2-48 Auxiliary Systems - Condenser Circulating Water - Aging Management Evaluation

Plant Specific Notes:

1. Flow blockage due to fouling is not a concern for components that perform a structural integrity function.
2. The submersible pump is normally stored in the standby shutdown facility. The pump is exposed to raw water only during brief periods of time when the pump is flow tested. The normal environment is air indoor uncontrolled.
3. The terminology “Piping and Piping Components” represents pipes, pipe fittings (reducers, elbows, tees, etc.), and in-line piping components (e.g. valves, traps, strainers, orifices, flow elements, etc.) and is used to identify components with the system that are susceptible to wall thinning (due to erosion or flow accelerated corrosion) or cumulative fatigue damage. Component susceptibility to these aging effects is determined by susceptibility analyses, operating experience, or system design.
4. **This line item represents the main condenser discharge piping.**

SLRA Table 3.4.2-1 page 3-1121 is revised as follows:

Table 3.4.2-1 Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Main Condenser Tubesheet **(Inlet Waterbox)**	Pressure Boundary	Steel with Internal Coating/Lining	Raw Water (Internal)	Loss of Coating or Lining Integrity	Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)	VIII.E.S-401	3.4.1- 066	B
					~~Open-Cycle Cooling Water System (B2.1.11)~~	~~VIII.E.S-401~~	~~3.4.1- 066~~	~~E, 2~~
				Loss of Material	Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)	VIII.E.S-414	3.4.1- 067	B
					~~Open-Cycle Cooling Water System (B2.1.11)~~	~~VIII.E.S-414~~	~~3.4.1- 067~~	~~E, 2~~
			Treated Water (External)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.S-432	3.4.1- 081	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-77	3.4.1- 015	A
					Water Chemistry (B2.1.2)	VIII.E.SP-77	3.4.1- 015	A

SLRA Table 3.4.2-1 page 3-1121 is revised as follows:

Table 3.4.2-1 Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Main Condenser Tubesheet (Outlet Waterbox)	Structural Integrity	Steel with Internal Coating/ Lining	Raw Water (Internal)	Loss of Coating or Lining Integrity	Open-Cycle Cooling Water System (B2.1.11)	VIII.E.S-401	3.4.1- 066	E, 2
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VIII.E.S-414	3.4.1- 067	E, 2
			Treated Water (External)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.S-432	3.4.1- 081	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-77	3.4.1- 015	A
					Water Chemistry (B2.1.2)	VIII.E.SP-77	3.4.1- 015	A

SLRA Table 3.4.2-1 page 3-1122 is revised as follows:

Table 3.4.2-1 Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Main Condenser Waterbox **(Inlet)**	Pressure Boundary	Steel with Internal Coating/Lining	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VIII.H.S-29	3.4.1- 034	A
			Raw Water (Internal)	Loss of Coating or Lining Integrity	Internal Coatings/Linings for In- Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)	VIII.E.S-401	3.4.1- 066	B
					~~Open-Cycle Cooling Water System (B2.1.11)~~	~~VIII.E.S-401~~	~~3.4.1- 066~~	~~E, 2~~
				Loss of Material	Internal Coatings/Linings for In- Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)	VIII.E.S-414	3.4.1- 067	B
					~~Open-Cycle Cooling Water System (B2.1.11)~~	~~VIII.E.S-414~~	~~3.4.1- 067~~	~~E, 2~~

SLRA Table 3.4.2-1 page 3-1122 is revised as follows:

Table 3.4.2-1 Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Main Condenser Waterbox (Outlet)	Structural Integrity	Steel with Internal Coating/Lining	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VIII.H.S-29	3.4.1- 034	A
			Raw Water (Internal)	Loss of Coating or Lining Integrity	Open-Cycle Cooling Water System (B2.1.11)	VIII.E.S-401	3.4.1- 066	E, 2
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VIII.E.S-414	3.4.1- 067	E, 2

Request 2:

SLRA Table 3.4.1 page 3-1094 is revised as follows:

Table 3.4.1 Summary of Aging Management Programs for Steam And Power Conversion System Evaluated in Chapter VIII of the GALL-SLR Report

Item Number	Component	Aging Effect/Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.4.1-066	Any material piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed-cycle cooling water, raw water, treated water, lubricating oil	Loss of coating or lining integrity due to blistering, cracking, flaking, peeling, delamination, rusting, or physical damage; loss of material or cracking for cementitious coatings/linings	AMP XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	Consistent with NUREG-2191 with exceptions. Exceptions apply to the NUREG-2191 recommendations for the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* (B2.1.27) program implementation. In addition, Condensate System components using a different aging management program were aligned to 3.4.1-066 and 3.4.1-067: • Main Condenser outlet waterbox and tubesheet coatings are managed by the *Open Cycle Cooling Water System* (B2.1.11) program. • Powdex and Slurry Tanks coatings are managed by the ~~*Water Chemistry* (B2.1.2) program and *One-Time Inspection* (B2.1.20)~~ ***Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* (B2.1.24)** program.

SLRA Table 3.4.2-1, page 3-1138 is revised as follows:

Table 3.4.2-1 Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tank (powdex and slurry)	Structural Integrity	Steel with Internal Coating/Lining	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VIII.H.S-29	3.4.1- 034	A
			Treated Water (Internal)	Loss of Coating or Lining Integrity	~~One-Time Inspection (B2.1.20)~~ **Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)**	VIII.E.S-401	3.4.1- 066	E

SLRA Table 3.4.2-1, page 3-1139 is revised as follows:

Table 3.4.2-1 Steam and Power Conversion Systems - Condensate System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tank (powdex and slurry)	Structural Integrity	Steel with Internal Coating/Lining	Treated Water (Internal)	~~Loss of Coating or Lining Integrity~~	~~Water Chemistry (B2.1.2)~~	~~VIII.E.S-401~~	~~3.4.1-066~~	~~E~~
				Loss of Material	~~One-Time Inspection (B2.1.20)~~ **Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)**	~~VIII.E.SP-75~~ **VIII.E.S-414**	~~3.4.1-012~~ **3.4-1, 067**	~~A~~ **E**
					~~Water Chemistry (B2.1.2)~~	~~VIII.E.SP-75~~	~~3.4.1-012~~	~~A~~

SLRA Section A2.20, pages A-21 and A-22 are revised as follows:

A2.20 One-Time Inspection

Program Description

The *One-Time Inspection* AMP is a new condition monitoring program that will manage loss of material, cracking, and reduction of heat transfer of components exposed to treated borated water, treated water, waste water, raw water, air, condensation, underground, fuel oil, or lubricating oil environments. ~~The program also manages loss of coating integrity for certain components that do not perform a pressure boundary intended function and where loss of coating integrity would not impact the intended functions of downstream components~~.

SLRA Section A2.24 pages A-25 and A-26 are as revised as follows:

A2.24 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

Program Description

The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* AMP is a new condition monitoring program that will manage loss of material and cracking of metallic components, as well as loss of material, cracking, blistering, hardening, and loss of strength of polymeric and elastomeric materials. The program also manages loss of coating integrity for certain components that do not perform a pressure boundary intended function and where loss of coating integrity would not impact the intended functions of downstream components. Reduction of heat transfer and flow blockage will also be managed. This program will consist of visual inspections of internal surfaces of piping, piping components, ducting, heat exchanger components, polymeric and elastomeric components, and other mechanical components. Applicable environments include air, condensation, closed cycle cooling water, diesel exhaust, fuel oil, gas, lubricating oil, raw water, treated water, and waste water. Periodic visual (VT-1) or surface examinations will be performed to detect cracking of stainless steel components exposed to a diesel exhaust, potable raw water, and waste water and in copper alloys exposed to waste water. Visual inspections may be conducted in lieu of VT-1 or surface examinations where it has been analytically demonstrated that surface cracks can be detected by leakage prior to a crack challenging the structural integrity or intended function of the component. **Periodic wall thickness measurements may be conducted in lieu of visual inspections for managing loss of coating integrity.** Except for hardening and loss of strength of elastomers, aging effects associated with components within the scope of the *Open Cycle Cooling Water System* (A2.11) AMP, *Closed Treated Water Systems* (A2.12) AMP, and *Fire Water System* (A2.16) AMP will not be managed by this program. The Inspections of Internal Surfaces of Miscellaneous Piping and Ducting Components is not relied on to manage recurring internal corrosion.

SLRA Table A6.0-1, pages A-89 is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
24	*Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program	The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* AMP is a new condition monitoring program that will manage loss of material and cracking of metallic components, as well as loss of material, cracking, blistering, hardening and loss of strength of polymeric and elastomeric materials. The program also manages loss of coating integrity for certain components that do not perform a pressure boundary intended function and where loss of coating integrity would not impact the intended functions of downstream components. Reduction of heat transfer and flow blockage will also be managed. This program will consist of visual inspections of all accessible internal surfaces of piping, piping components, ducting, heat exchanger components, polymeric and elastomeric components, and other mechanical components. **Periodic wall thickness measurements may be conducted in lieu of visual inspections for managing loss of coating integrity.** Periodic visual (VT-1) or surface examinations will be performed to detect cracking of stainless steel components exposed to a diesel exhaust, potable raw water, and waste water and in copper alloys exposed to waste water. Industry and plant-specific OE will be considered in the development and implementation of this program.	B2.1.24	The program for SLR will be implemented six months prior to the SPEO.

SLRA Section B2.1.20, page B-150 is revised as follows:

B2.1.20 ONE-TIME INSPECTION

Program Description

The *One-Time Inspection* AMP is a new condition monitoring program that will manage loss of material, cracking, and reduction of heat transfer of components exposed to treated borated water, treated water, waste water, raw water, air, condensation, underground, fuel oil, or lubricating oil environments. ~~The program also manages loss of coating integrity for certain components that do not perform a pressure boundary intended function and where loss of coating integrity would not impact the intended functions of downstream components.~~

The *One-Time Inspection* program will conduct one-time inspections of susceptible locations to verify the effectiveness of the *Water Chemistry* program (B2.1.2), the *Fuel Oil Chemistry* program (B2.1.18), and *Lubricating Oil Analysis* program (B2.1.25). The program will verify either no unacceptable age-related degradation is occurring or require additional actions to ensure the intended function of affected components will be maintained during the SPEO. For steel components exposed to environments that do not include corrosion inhibitors, the *One-Time Inspection* program will verify that long term loss of material will not result in a loss of intended function by performing wall thickness measurements on a representative sample of components in each environment. The program also verifies that fouling is not occurring in heat exchanger tubes exposed to lubricating oil and treated water environments, that loss of material due to erosion of the high pressure safety injection minimum flow orifice is not occurring such that intended functions could be impacted, and that loss of material and/or cracking of aluminum, nickel alloy, and stainless steel in an air or condensation environment is not occurring. Additionally, the program ensures that cracking of stainless steel piping exposed to reactor cooling leakage or air in reactor vessel leakage detection piping and comparable locations in the reactor coolant system is not occurring.

The elements of the program include: (a) determination of the sample size of components to be inspected based on an assessment of materials of fabrication, environment, plausible aging effects, and OE, (b) identification of the inspection locations in the system or component based on the potential for the aging effect to occur, (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined, and (d) an evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the SPEO.

The program includes inspections that are focused on locations that are isolated from the flow stream, that are stagnant, or have low flow for extended periods and are susceptible to the gradual accumulation or concentration of agents that promote certain aging effects. The inspections will include a representative sample of the system population and will focus on the bounding or lead components most susceptible to aging due to time in service, and severity of operating conditions. A representative sample size of 20% of the population (up to a maximum of 25 component inspections) will be established for each material, environment, and aging effect combination. The program verifies either that unacceptable degradation is not occurring or requires additional actions be performed that will ensure the intended function of affected components will be maintained during the SPEO.

SLRA Section B.2.1.24, pages B-171 and B-172 are revised as follows:

B2.1.24 INSPECTION OF INTERNAL SURFACES IN MISCELLANEOUS PIPING AND DUCTING COMPONENTS

Program Description

The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* AMP is a new condition monitoring program that will manage loss of material and cracking of metallic components, as well as loss of material, cracking, blistering, hardening, and loss of strength of polymeric and elastomeric materials. The program also manages loss of coating integrity for certain components that do not perform a pressure boundary intended function and where loss of coating integrity would not impact the intended functions of downstream components. Reduction of heat transfer and flow blockage will also be managed. This program will consist of visual inspections of internal surfaces of piping, piping components, ducting, heat exchanger components, polymeric and elastomeric components, and other mechanical components. Applicable environments include air, condensation, closed cycle cooling water, diesel exhaust, fuel oil, gas, lubricating oil, raw water, treated water, and waste water. Except for elastomeric and polymeric components, aging effects associated with components within the scope of the *Open Cycle Cooling Water System* (B2.1.11) AMP, *Closed Treated Water Systems* (B2.1.12) AMP, and Fire Water System (B2.1.16) AMP will not be managed by this program.

Steel piping exposed piping exposed to raw water in the high pressure service water system and Keowee fire detection/protection system having only CLB intended functions of leakage boundary (spatial) as defined in the NUREG-2192, Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants Table 2.1-4(b) is managed for loss of material (due to general, pitting, crevice corrosion and microbiologically influenced corrosion) by this program. Steel piping in these systems is susceptible to recurring internal corrosion but this program is not credited to manage recurring internal corrosion. The *Open-Cycle Cooling Water Systems* (B2.1.11) program supplements this program and provides for management of recurring internal corrosion for steel piping exposed to raw water in the high pressure service water system and Keowee fire detection/protection system.

This program relies on internal inspections performed during the periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections and when appropriate, surface examinations. For certain materials, such as flexible polymers, physical manipulation to detect hardening or loss of strength is used to augment the visual examinations conducted under this program. This program relies on periodic visual (VT-1) or surface examinations to manage cracking due to stress corrosion cracking in stainless steel components exposed to diesel exhaust, potable raw water, and waste water and in copper alloys exposed to waste water. Visual inspections may be conducted in lieu of VT-1 or surface examinations where it has been analytically demonstrated that surface cracks can be detected by leakage prior to a crack challenging the structural integrity or intended function of the component. **Periodic wall thickness measurements may be conducted in lieu of visual inspections for managing loss of coating integrity.**

At a minimum, in each 10-year period during the SPEO a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population per unit are typically inspected. However, since Oconee is a three-unit site, this maximum number will be reduced to 17 components per population per unit where the sample size is not based on a percentage of the population. This is acceptable because design, operating, and environmental conditions between the units are similar enough such that the aging effects are not occurring differently. All three units are of comparable age, and changes to water chemistry practices, operating conditions, etc., have been implemented in a consistent manner across all three units. A measurement uncertainty recapture power uprate license amendment request was approved by the NRC in January 2021 (ADAMS Accession Number ML20335A001). Implementation of the measurement uncertainty recapture power uprate will not substantively change operating conditions such that the rate of aging effects managed by this program would be affected. No other power uprates have been implemented on any of the Oconee Units. Water chemistry programs monitor various chemistry parameters and require out-of-spec conditions to be corrected under the corrective action program in a timely manner. Raw water systems for all three units draw from the same water sources. Oconee has only one (standby shutdown facility) diesel generator, such that distribution of diesel generator run times is not an issue. Therefore, a reduced maximum sample population size will provide a representative sample of the condition of the plant equipment and the existence of the aging effects involved.

When wall thickness measurements are performed in lieu of visual inspections of coatings, a representative sample of external wall thickness measurements will be performed every 10 years with the first inspection performed in the 10 years prior to the subsequent period of extended operation A representative sample includes 25 percent coverage of the accessible external surfaces of tanks in the scope of the program.