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10 CFR 50.4
10 CFR Part 54

RA-21-0316
December 15, 2021

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

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 Supplement 3

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 Letter dated July 23, 2021, Oconee Nuclear Station, Units 1, 2, and 3 – Aging Management Audit Plan Regarding the Subsequent License Renewal Application Review, (ADAMS Accession Number ML21196A076)
4. Duke Energy Letter (RA-21-0249) dated October 28, 2021 Subsequent License Renewal Application Supplement 1 (ADAMS Accession ML21302A208)
5. Duke Energy Letter (RA-21-0288) dated November 11, 2021 Subsequent License Renewal Application Supplement 2 (ADAMS Accession ML21315A012)

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. By letter dated July 23, 2021 (Reference 3), the NRC issued the regulatory audit plan for the aging management portion of the SLRA review. During the audit conducted July 26, 2021 – October 8, 2021, Duke Energy agreed to supplement the SLRA with new or clarifying information. This letter provides the NRC staff with additional information in support of the development of the safety evaluation report. SLRA Supplements 1 and 2 are provided by References 4 and 5, respectively.

The Enclosure to this letter provides the index of topics to be supplemented. For each Attachment to this letter, changes are described along with the affected section(s), page number(s), and affected document mark-ups. For clarity, deletions are indicated by strikethrough and inserted text by underlined red font. Also, six commitment changes to Table A6.0-1 are provided in Attachments 2, 3, 9, 13, 14, and 15.

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 December 15, 2021.

Sincerely,

A handwritten signature in black ink, appearing to read "Steven M. Snider". The signature is fluid and cursive, with the first name "Steven" and last name "Snider" being clearly legible.

Steven M. Snider
Site Vice President
Oconee Nuclear Station

Enclosure:

Enclosure: Index of Attachment Topics Involving SLRA Supplement

Attachments:

- Attachment 1: Revised Selective Leaching Aging Management Program to Describe an Exception Regarding Buried Gray Cast Iron and Ductile Iron Components
- Attachment 2: Clarification of IWF Aging Management Program
- Attachment 3: Removed Seismic Gap Filler Material Discussions and Revised Structures Monitoring Aging Management Program
- Attachment 4: Fiber Reinforced Polymer exception for six-year inspection frequency
- Attachment 5: Updated to Address Steel or Stainless Steel Components in a Concrete Environment
- Attachment 6: Corrected Standard Industry Notes for Aging Management Evaluation of Steam Generators
- Attachment 7: Identified Component Supports, Anchor Bolts, Welds in Groups B1.1, B1.2 and B1.3 Evaluated in Fatigue TLAAs
- Attachment 8: Updated to Address the Environmentally-Assisted Fatigue Analysis for the Steam Generator Tube-to-Tubesheet Welds
- Attachment 9: Updated Operating Experience Discussion and Provided Additional Enhancements for Recirculating Water System
- Attachment 10: Revised SBO Recovery Path Figure 2.1.3-1
- Attachment 11: Revised Environment for Auxiliary and Turbine Buildings Masonry Walls
- Attachment 12: Revised Secondary Drawings for Coolant Storage System
- Attachment 13: Updated Screening and Aging Management Review of Water Control Structures
- Attachment 14: Clarified SLRA Section 3.5.2.2.1.3 regarding moisture barriers, borated water spills and water ponding
- Attachment 15: Revised Masonry Walls and Structures Monitoring Aging Management Programs

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ENCLOSURE

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
INDEX OF ATTACHMENT TOPICS INVOLVING SLRA SUPPLEMENTS

INDEX OF ATTACHMENT TOPICS INVOLVING SLRA SUPPLEMENTS	
Attachment Number	Topics
1	Revised Selective Leaching Aging Management Program to Describe an Exception Regarding Buried Gray Cast Iron and Ductile Iron Components
2	Clarification of IWF Aging Management Program
3	Removed Seismic Gap Filler Material Discussions and Revised Structures Monitoring Aging Management Program
4	Fiber Reinforced Polymer exception for six-year inspection frequency
5	Updated to Address Steel or Stainless Steel Components in a Concrete Environment
6	Corrected Standard Industry Notes for Aging Management Evaluation of Steam Generators
7	Identified Component Supports, Anchor Bolts, Welds in Groups B1.1, B1.2 and B1.3 Evaluated in Fatigue TLAAs
8	Updated to Address the Environmentally-Assisted Fatigue Analysis for the Steam Generator Tube-to-Tubesheet Welds
9	Updated Operating Experience Discussion and Provided Additional Enhancements for Recirculating Water System
10	Revised SBO Recovery Path Figure 2.1.3-1
11	Revised Environment for Auxiliary and Turbine Buildings Masonry Walls
12	Revised Secondary Drawings for Coolant Storage System
13	Updated Screening and Aging Management Review of Water Control Structures
14	Clarified SLRA Section 3.5.2.2.1.3 regarding moisture barriers, borated water spills and water ponding
15	Revised Masonry Walls and Structures Monitoring Aging Management Programs

ATTACHMENT 1

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

REVISED SELECTIVE LEACHING AGING MANAGEMENT PROGRAM TO
DESCRIBE AN EXCEPTION REGARDING BURIED GRAY CAST IRON
AND DUCTILE IRON COMPONENTS

**Revised Selective Leaching Aging Management Program to Describe an Exception Regarding Buried
Gray Cast Iron and Ductile Iron Components**

(TRP-33)

Affected SLRA Sections:

SLRA Table 3.3.1	SLRA Table 3.3.2-25	SLRA Table 3.3.2-41	SLRA Table 3.4.2-3
SLRA Table 3.3.2-12	SLRA Table 3.3.2-26	SLRA Table 3.3.2-46	SLRA Table 3.4.2-7
SLRA Table 3.3.2-15	SLRA Table 3.3.2-28	SLRA Table 3.3.2-48	SLRA Table 3.4.2-10
SLRA Table 3.3.2-18	SLRA Table 3.3.2-29	SLRA Table 3.3.2-49	SLRA Table 3.4.2-12
SLRA Table 3.3.2-19	SLRA Table 3.3.2-30	SLRA Table 3.3.2-50	SLRA Table B2-1
SLRA Table 3.3.2-21	SLRA Table 3.3.2-32	SLRA Table 3.3.2-52	SLRA Appendix B2.1.21
SLRA Table 3.3.2-22	SLRA Table 3.3.2-37	SLRA Table 3.4.1	
SLRA Table 3.3.2-23	SLRA Table 3.3.2-39	SLRA Table 3.4.2-1	
SLRA Table 3.3.2-24	SLRA Table 3.3.2-40	SLRA Table 3.4.2-2	

SLRA Page Numbers

3-464	3-722	3-765	3-869	3-958	3-1158
3-579	3-723	3-770	3-870	3-973	3-1168
3-622	3-724	3-772	3-874	3-974	3-1169
3-652	3-725	3-774	3-880	3-975	3-1174
3-657	3-726	3-776	3-907	3-976	3-1182
3-659	3-728	3-789	3-928	3-977	3-1216
3-660	3-730	3-796	3-929	3-1086	3-1237
3-667	3-732	3-798	3-930	3-1117	3-1238
3-688	3-736	3-824	3-932	3-1127	3-1252
3-690	3-738	3-847	3-933	3-1129	B-15
3-691	3-739	3-857	3-935	3-1130	B-154
3-695	3-740	3-858	3-936	3-1131	B-155
3-696	3-741	3-861	3-941	3-1132	
3-706	3-749	3-864	3-949	3-1133	
3-714	3-761	3-865	3-950	3-1134	
3-715	3-762	3-867	3-954	3-1141	
3-719	3-764	3-868	3-955	3-1142	

Description of Change:

The *Selective Leaching* AMP, as described in SLRA Appendix B, is revised to describe an exception to NUREG-2191 recommendations regarding the inspection sample size for buried gray cast iron and ductile iron components. SLRA Table 3.3.1, line item 3.3.1-072 and SLRA Table 3.4.1, line item 3.4.1-033 are revised to indicate that the *Selective Leaching* AMP has an exception to NUREG-2191 recommendations. SLRA Table B2-1 is also revised to indicate that the *Selective Leaching* AMP has an exception to NUREG-2191 recommendations.

In addition, the standard consistency note assigned to numerous AMR line items is revised due to the addition of an exception to the *Selective Leaching* AMP. Standard consistency note 'A' is changed to 'B' and standard consistency note 'C' is changed to 'D' for AMR line items crediting the *Selective Leaching* AMP.

SLRA Table 3.3.1, Item Number 3.3.1-072 (page 3-464) 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
3.3.1-072	Gray cast iron, ductile iron, copper alloy (>15% Zn or >8% Al) piping, piping components, heat exchanger components exposed to treated water, closed cycle cooling water, soil, raw water, raw water (potable), waste water	Loss of material due to selective leaching	AMP XI.M33, “Selective Leaching”	No	Consistent with NUREG-2191 <u>with exceptions</u> . In addition to auxiliary systems, components in Steam and Power Conversion systems are aligned to this item. <u>Exceptions apply to the NUREG-2191 recommendations for the Selective Leaching (B2.1.21) program implementation.</u>

SLRA Table 3.4.1, Item Number 3.4.1-033 (page 3-1086) 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
3.4.1-033	Gray cast iron, ductile iron, copper alloy (>15% Zn or >8% Al) piping, piping components exposed to treated water, raw water, closed-cycle cooling water	Loss of material due to selective leaching	AMP XI.M33, “Selective Leaching”	No	Consistent with NUREG-2191 <u>with exceptions</u> . <u>Exceptions apply to the NUREG-2191 recommendations for the Selective Leaching (B2.1.21) program implementation.</u>

SLRA Table B2-1 (page B-15) is revised as follows:

Table B2-1 ONS Program Consistency with NUREG-2191 Program

NUREG-2191 Program	Appendix B Reference	Existing or New	Program has NUREG-2191 Enhancements	Program has Exceptions to NUREG-2191
Selective Leaching	B2.1.21	New		X

SLRA Appendix B2.1.21 (page B-154) is revised as follows:

B2.1.21 SELECTIVE LEACHING

Program Description

For the one-time and periodic/opportunistic portions of the program, visual inspections supplemented by mechanical examination techniques such as chipping or scraping (for ductile and gray cast iron components) will be conducted on a representative sample of components of each material and environment combination of components. ~~A~~ Other than for ductile iron and gray cast iron components exposed to soil, a representative sample consists of three percent of each material and environment population per unit or a maximum of seven components per population per unit for periodic inspections or ten components per population for one-time inspections. Ductile iron and gray cast iron components exposed to soil within the scope of the program are limited to common buried fire header components, identified with no unit-specific designators. Therefore, this equipment will be addressed as a single unit. A representative sample for ductile iron and gray cast iron components exposed to soil consists of three percent of each material and environment population or a maximum of ten components per population total for the station. When inspections are performed on piping, a one foot axial length section will be considered as one inspection. Additionally, for one time and periodic/opportunistic inspections, one destructive examination will be performed per population. The number of visual/ mechanical inspections may be reduced by two for each destructive inspection performed beyond the minimum recommended number of destructive examinations required to be performed in each ten year interval. Since Oconee is a three-unit site, a reduced periodic visual/mechanical inspection sample size of seven components and one destructive inspection maximum per population per unit will be adopted for sample populations that are not percentage-based, other than for ductile iron and gray cast iron components exposed to soil. This sample size reduction 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, to plant equipment, and operating conditions 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.

SLRA Appendix B2.1.21 (page B-155) is revised as follows:

NUREG-2191 Consistency

The Oconee *Selective Leaching* AMP is a new program that, when implemented, will be consistent with the recommendations in NUREG-2191 XI.M33, Selective Leaching with the following exception.

Exception 1 to NUREG-2191

None

Program Element Affected: Detection of Aging Effects (Element 4)

1. NUREG-2191, Section XI.M33 recommends a representative sample size of three percent or a maximum of seven components for visual and mechanical examinations in addition to one destructive examination for each sample population (i.e., group of components with the same material and environment combination) at each unit for a three unit station, provided operating conditions at each unit are similar enough to provide representative inspection results. For ductile iron and gray cast iron components exposed to soil, the Oconee *Selective Leaching* AMP representative sample size will be defined in accordance with NUREG-2191, Section XI.M33 recommendations for a single unit station.

Justification for Exception 1

The gray cast iron and ductile iron piping and components exposed to soil within the scope of the *Selective Leaching* AMP are common (Unit 0) buried fire header components. All buried fire header piping within the scope of the program is cement-lined ductile iron designed and installed in accordance with the same specification.

System post indicator valves and hydrants are of similar design. The same coating system and backfill standards were used for all buried fire header piping and components. Other than certain valve and hydrant replacements, all buried fire header piping and components are of similar vintage and were installed prior to initial plant operation.

There are no known significant differences in the environmental conditions to which the non-unit specific or common yard piping and components located in the areas near Unit 1 versus Unit 2 versus Unit 3 are exposed. Soil testing results indicate some local variation in parameters used to assess soil corrosivity but do not indicate an overall difference in corrosivity of the soil in the area for one unit as compared to the other units. Selection of sample inspection locations will focus on bounding or leading indicator locations and consider various factors including local soil corrosivity, areas of known previous leakage, elevation of water table, time in service, and previous inspection results.

The buried gray cast iron and ductile iron piping and components exposed to soil within the scope of the *Selective Leaching* AMP is currently managed as common equipment, is of common design, and is exposed to the same environmental conditions and any attempt at a unit-specific division of this common set of components would be arbitrary. Further, the amount of buried fire header piping and components within the scope of subsequent license renewal is not primarily dependent on the number of units and, therefore additional inspections for multi-unit stations is not warranted.

SLRA Markups

For the SLRA Tables below, the Standard consistency note 'A' is changed to 'B' and standard consistency note 'C' is changed to 'D' for the Aging Management Review line items crediting the *Selective Leaching* Aging Management Program.

Table 3.3.2-12 Auxiliary Systems – Chemical Addition System – Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping and Piping Components	Structural Integrity	Stainless Steel	Treated Borated water >60°C (>140°F) (Internal)	Cumulative Fatigue Damage	TLAA	VII.E1.A-57	3.3.1- 002	A,6
Pump Casing (caustic addition)	Structural Integrity	Gray Cast Iron	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			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, 3
					Selective Leaching (B2.1.21)	VII.E5.A-547	3.3.1- 072	A B
Pump Casing (high pressure boric acid)	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Treated Borated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VII.A2.AP-79	3.3.1- 125	A

Table 3.3.2-15 Auxiliary Systems – Demineralized Water System – Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy (>15% Zn)	Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.F.SP-101	3.4.1- 016	A
					Selective Leaching (B2.1.21)	VII.C2.AP-32	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.F.SP-101	3.4.1- 016	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.G.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.G.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.E.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.E.SP-88	3.4.1- 011	A
		Steel	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
					Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A

Table 3.3.2-18 Auxiliary Systems - Alternate Chilled Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Heat Exchanger (alternate chiller 1,2 condenser) Fins	Heat Transfer	Aluminum	Air – Outdoor (External)	Cracking	One-Time Inspection (B2.1.20)	VII.F1.A-788a	3.3.1- 254	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.A-771a	3.3.1- 242	A
				Reduction of Heat Transfer	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-716	3.3.1- 151	C
Heat Exchanger (alternate chiller 1,2 condenser) Tubes	Heat Transfer	Copper Alloy	Air – Outdoor (External)	Reduction of Heat Transfer	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-716	3.3.1- 151	A
			Gas (Internal)	None	None	VII.J.AP-9	3.3.1- 114	C
	Pressure Boundary	Copper Alloy	Air – Outdoor (External)	None	None	VII.J.AP-144	3.3.1- 114	C
			Gas (Internal)	None	None	VII.J.AP-9	3.3.1- 114	C
Heat Exchanger (alternate chiller 1,2 evaporator) Head	Pressure Boundary	Gray Cast Iron	Air – Outdoor (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.AP-40	3.3.1- 080	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-189	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	<u>C</u> <u>D</u>

Table 3.3.2-18 Auxiliary Systems - Alternate Chilled Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (alternate chiller 1,2)	Pressure Boundary	Gray Cast Iron	Closed-Cycle Cooling Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	A B
Strainer Body	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C2.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C2.AP-221a	3.3.1- 006	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.A-52	3.3.1- 049	A
			Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	A
		Steel	Air – Outdoor (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-24	3.3.1- 080	A
				Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
Strainer Screen	Filtration	Stainless Steel	Closed-Cycle Cooling Water (External)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.A-52	3.3.1- 049	A
			Raw Water (Potable) (External)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	A

Table 3.3.2-18 Auxiliary Systems - Alternate Chilled Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tank Bladder (captive air expansion)	Pressure Boundary	Elastomer	Air (External)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.F1.AP-103	3.3.1- 096	C, 2
			Closed-Cycle Cooling Water (Internal)	Hardening or Loss of Strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C2.AP-259	3.3.1- 085	A
Valve Body	Pressure Boundary	Copper Alloy	Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-271	3.3.1- 093	A
		Ductile Iron	Air – Outdoor (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-24	3.3.1- 080	A
					Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
		Gray Cast Iron	Air – Outdoor (External)	Loss of Material	Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	A B
					External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-24	3.3.1- 080	A
					Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A

Table 3.3.2-18 Auxiliary Systems - Alternate Chilled Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Gray Cast Iron	Closed-Cycle Cooling Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C2.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C2.AP-221a	3.3.1- 006	A
			Air – Outdoor (External)	Cracking	One-Time Inspection (B2.1.20)	VII.I.A-734b	3.3.1- 205	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.I.A-761b	3.3.1- 232	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.A-52	3.3.1- 049	A
			Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	A
		Steel	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
			Air – Outdoor (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-24	3.3.1- 080	A

Table 3.3.2-19 Auxiliary Systems - Component Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (component cooling)	Structural Integrity	Steel	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
Pump Casing (drain tank)	Structural Integrity	Gray Cast Iron	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	A B
Sight Glass	Structural Integrity	Glass	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-48	3.3.1- 117	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-96	3.3.1- 117	A
			Closed-Cycle Cooling Water (Internal)	None	None	VII.J.AP-166	3.3.1- 117	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C2.AP-209a	3.3.1- 004	A

Table 3.3.2-21 Auxiliary Systems - Recirculating Cooling Water System - 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	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
Pump Casing (recirculating cooling water)	Pressure Boundary	Gray Cast Iron	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
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	A B
Sight Glass	Pressure Boundary	Glass	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-48	3.3.1- 117	A
			Closed-Cycle Cooling Water (Internal)	None	None	VII.J.AP-166	3.3.1- 117	A
		Steel	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
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
	Structural Integrity	Glass	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-48	3.3.1- 117	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-96	3.3.1- 117	A

Table 3.3.2-21 Auxiliary Systems - Recirculating Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Copper Alloy (>15% Zn)	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-199	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.AP-43	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C2.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C2.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.A-52	3.3.1- 049	A
			Closed-Cycle Cooling Water >60°C (>140°F) (Internal)	Cracking	Closed Treated Water System (B2.1.12)	VII.C2.AP-186	3.3.1- 043	A
		Steel	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
					Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
					Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
	Structural Integrity	Copper Alloy (>15% Zn)	Closed-Cycle Cooling Water (Internal)	Cracking	Closed Treated Water System (B2.1.12)	VII.C2.A-473a	3.3.1- 160	A

Table 3.3.2-21 Auxiliary Systems - Recirculating Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy (>15% Zn)	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-199	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.AP-43	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C2.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C2.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.A-52	3.3.1- 049	A
			Closed-Cycle Cooling Water >60°C (>140°F) (Internal)	Cracking	Closed Treated Water System (B2.1.12)	VII.C2.AP-186	3.3.1- 043	A
		Steel	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A

Table 3.3.2-22 Auxiliary Systems - Sample Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (chilled water)	Structural Integrity	Gray Cast Iron	Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	A, 1
					Selective Leaching (B2.1.21)	VII.G.A-51	3.3.1- 072	A B
Tank (sample cooling water surge)	Structural Integrity	Steel	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
			Raw Water (Potable) (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.G.A-532	3.3.1- 193	A
				Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	C, 1
Valve Body	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-271	3.3.1- 093	A

Table 3.3.2-22 Auxiliary Systems - Sample Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy (>15% Zn)	Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-271	3.3.1- 093	A
					Selective Leaching (B2.1.21)	VII.G.A-47	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C2.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C2.AP-221a	3.3.1- 006	A
			Raw Water (Potable) (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	A
		Steel	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
			Raw Water (Potable) (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.G.A-532	3.3.1- 193	A
				Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-270	3.3.1- 088	A, 1

Table 3.3.2-23 Auxiliary Systems - Chilled Water (Vital Loads) System - 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	Polymeric	Closed-Cycle Cooling Water (Internal)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	None	None	G
			Condensation (External)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-797a	3.3.1- 263	A, 3
		Steel	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
Pump Casing (chilled water)	Pressure Boundary	Gray Cast Iron	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.C2.AP-202	3.3.1- 045	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	A B
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
Sight Glass	Pressure Boundary	Glass	Air with Borated Water Leakage (External)	None	None	VII.J.AP-96	3.3.1- 117	A

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Expansion Joint	Pressure Boundary	Elastomer	Raw Water (Internal)	Hardening or Loss of Strength, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.G.AP-75	3.3.1- 085	A
				Loss of Material, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.G.AP-76	3.3.1- 096	A
		Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
Filter Body	Pressure Boundary	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A <u>B</u>
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Filter Body	Pressure Boundary	Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
Fire Hydrant	Pressure Boundary	Ductile Iron	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.AP-149	3.3.1- 063	B
			Soil (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.I.AP-198	3.3.1- 109	B
					Selective Leaching (B2.1.21)	VII.C1.A-02	3.3.1- 072	A B
		Gray Cast Iron	Air – Outdoor (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.AP-149	3.3.1- 063	B
			Air – Outdoor (Internal)	Loss of Material	Fire Water System (B2.1.16)	VII.G.AP-149	3.3.1- 063	B
Flow Element	Flow Restriction	Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping	Pressure Boundary	Ductile Iron (w. Cement 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)	VII.G.A-416	3.3.1- 138	B
				Loss of Material	Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks (B2.1.27)	VII.C1.A-415	3.3.1- 140	B
			Soil (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.G.A-414	3.3.1- 139	B
					Selective Leaching (B2.1.21)	VII.I.AP-198	3.3.1- 109	B
				Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.G.A-02	3.3.1- 072	A B
		Galvanized Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
		Stainless Steel	Air – Outdoor (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - 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	Raw Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-727	3.3.1- 134	A,2
					Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-400a	3.3.1- 127	B
Pump Casing (high pressure service water jockey)	Pressure Boundary	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
Pump Casing (high pressure service water)	Pressure Boundary	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Sprinkler Head	Pressure Boundary	Copper Alloy (>15% Zn)	Air – Outdoor (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Air – Outdoor (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.AP-66	3.3.1- 009	C
			Condensation (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Condensation (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	Ⓒ <u>D</u>
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
	Spray Pattern	Copper Alloy (>15% Zn)	Air – Outdoor (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Air – Outdoor (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Condensation (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Condensation (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Sprinkler Head	Structural Integrity	Copper Alloy (>15% Zn)	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.AP-66	3.3.1- 009	C
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.G.A-649	3.3.1- 197	A
			Raw Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-727	3.3.1- 134	A,2
					Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	C <u>D</u>
Strainer Body	Pressure Boundary	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A <u>B</u>
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
	Structural Integrity	Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Strainer Body	Structural Integrity	Stainless Steel	Raw Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-727	3.3.1- 134	A,2
Strainer Screen	Filtration	Stainless Steel	Raw Water (External)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-55	3.3.1- 066	B
Tank (elevated water storage)	Pressure Boundary	Steel	Air – Outdoor (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-412	3.3.1- 136	B
		Steel with Internal Coating/Lining	Raw Water (Internal)	Loss of Coating or Lining Integrity	Fire Water System (B2.1.16)	VII.C1.A-416	3.3.1- 138	E, 1
				Loss of Material	Fire Water System (B2.1.16)	VII.G.A-414	3.3.1- 139	E, 1
Valve Body	Pressure Boundary	Copper Alloy	Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.AP-197	3.3.1- 064	B
		Copper Alloy (>15% Zn)	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.AP-66	3.3.1- 009	A
			Condensation (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Copper Alloy (>15% Zn)	Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.AP-197	3.3.1- 064	B
		Ductile Iron	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
			Soil (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.I.AP-198	3.3.1- 109	B
					Selective Leaching (B2.1.21)	VII.C3.A-02	3.3.1- 072	A B
		Gray Cast Iron	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
			Soil (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.I.AP-198	3.3.1- 109	B
					Selective Leaching (B2.1.21)	VII.C3.A-02	3.3.1- 072	A B
		Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

Table 3.3.2-24 Auxiliary Systems - High Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy	Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Raw Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-727	3.3.1- 134	A,2
		Copper Alloy (>15% Zn)	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.AP-66	3.3.1- 009	A
			Condensation (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-727	3.3.1- 134	A,2
					Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B
		Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A

Table 3.3.2-25 Auxiliary Systems - Keowee Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Bolting	Structural Integrity	Stainless Steel	Condensation (External)	Cracking	Bolting Integrity (B2.1.9)	VII.I.A-426	3.3.1- 145	A
				Loss of Material	Bolting Integrity (B2.1.9)	VII.I.A-03	3.3.1- 012	A
				Loss of Preload	Bolting Integrity (B2.1.9)	VII.I.AP-124	3.3.1- 015	A
		Steel	Condensation (External)	Loss of Material	Bolting Integrity (B2.1.9)	VII.I.A-03	3.3.1- 012	A
				Loss of Preload	Bolting Integrity (B2.1.9)	VII.I.AP-124	3.3.1- 015	A
Heat Exchanger (equipment gallery air handling unit) Head	Structural Integrity	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.G.A-649	3.3.1- 197	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-183	3.3.1- 038	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
Heat Exchanger (equipment gallery air handling unit) Tubes	Structural Integrity	Copper Alloy	Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-179	3.3.1- 038	B,1

Table 3.3.2-25 Auxiliary Systems - Keowee Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (sodium hypochlorite metering)	Structural Integrity	Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1
Strainer Body	Structural Integrity	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.G.A-649	3.3.1- 197	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
Tank (chlorine)	Structural Integrity	Polymeric	Condensation (External)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-797a	3.3.1- 263	C
			Raw Water (Internal)	Cracking, Blistering	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-739	3.3.1- 210	C, 1

Table 3.3.2-26 Auxiliary Systems - Keowee Fire Detection/Protection System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Bolting	Structural Integrity	Steel	Condensation (External)	Loss of Material	Bolting Integrity (B2.1.9)	VII.I.A-03	3.3.1- 012	A
				Loss of Preload	Bolting Integrity (B2.1.9)	VII.I.AP-124	3.3.1- 015	A
Fire Hydrant	Pressure Boundary	Ductile Iron	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.AP-149	3.3.1- 063	B
			Soil (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.I.AP-198	3.3.1- 109	B
					Selective Leaching (B2.1.21)	VII.C1.A-02	3.3.1- 072	A B
		Gray Cast Iron	Air – Outdoor (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.AP-149	3.3.1- 063	B
			Air – Outdoor (Internal)	Loss of Material	Fire Water System (B2.1.16)	VII.G.AP-149	3.3.1- 063	B
Flow Element	Flow Restriction	Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-55	3.3.1- 066	B

Table 3.3.2-26 Auxiliary Systems - Keowee Fire Detection/Protection System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping	Pressure Boundary	Ductile Iron (w. Cement Lining)	Soil (External)	Loss of Material	Selective Leaching (B2.1.21)	VII.G.A-02	3.3.1- 072	A B
		Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-55	3.3.1- 066	B
		Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Condensation (Internal)	Loss of Material	Fire Water System (B2.1.16)	VII.G.AP-143	3.3.1- 089	B
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-400a	3.3.1- 127	B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
	Structural Integrity	Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.G.A-649	3.3.1- 197	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A

Table 3.3.2-26 Auxiliary Systems - Keowee Fire Detection/Protection System - 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	Raw Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-727	3.3.1- 134	A,1
					Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-400a	3.3.1- 127	B
Pump Casing (fire protection)	Pressure Boundary	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
Sprinkler Head	Pressure Boundary	Copper Alloy (>15% Zn)	Condensation (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Condensation (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
	Spray Pattern	Copper Alloy (>15% Zn)	Condensation (External)	Loss of Material	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B
			Condensation (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-403	3.3.1- 130	B

Table 3.3.2-26 Auxiliary Systems - Keowee Fire Detection/Protection System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Strainer Body	Pressure Boundary	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
Strainer Screen	Filtration	Stainless Steel	Raw Water (External)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-55	3.3.1- 066	B
Valve Body	Pressure Boundary	Copper Alloy	Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.AP-197	3.3.1- 064	B
		Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B

Table 3.3.2-26 Auxiliary Systems - Keowee Fire Detection/Protection System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Gray Cast Iron	Soil (External)	Loss of Material	Buried and Underground Piping and Tanks (B2.1.26)	VII.I.AP-198	3.3.1- 109	B
					Selective Leaching (B2.1.21)	VII.C1.A-02	3.3.1- 072	A B
		Stainless Steel	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-55	3.3.1- 066	B
		Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Fire Water System (B2.1.16)	VII.G.A-33	3.3.1- 064	B
	Structural Integrity	Steel	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.G.A-649	3.3.1- 197	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A

Table 3.3.2-28 Auxiliary Systems - Reactor Building Purge System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Ducting	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.AP-99a	3.3.1- 094	A
			Air – Indoor Uncontrolled (Internal)	Cracking	One-Time Inspection (B2.1.20)	VII.F1.A-781a	3.3.1- 094a	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.AP-99a	3.3.1- 094	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	C
Heating Coil (purge supply unit) Head	Structural Integrity	Gray Cast Iron	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-77	3.4.1- 015	A
					Selective Leaching (B2.1.21)	VII.A3.AP-31	3.3.1- 072	C <u>D</u>
					Water Chemistry (B2.1.2)	VIII.E.SP-77	3.4.1- 015	A
Heating Coil (purge supply unit) Tubes	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	C
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Condenser Unit (auxiliary building unit 3 battery room air handling unit) Tubes	Pressure Boundary	Copper Alloy	Gas (Internal)	None	None	VII.J.AP-9	3.3.1- 114	C
Cooling Coil (alternator air cooler) Head	Structural Integrity	Gray Cast Iron	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.A3.AP-189	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	C <u>D</u>
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
Cooling Coil (alternator air cooler) Tubes	Structural Integrity	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
Cooling Coil (automatic voltage regulating building air handling units) Head	Structural Integrity	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
		Gray Cast Iron	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.A3.AP-189	3.3.1- 046	A

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (automatic voltage regulating building air handling units) Head	Structural Integrity	Gray Cast Iron	Closed-Cycle Cooling Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	C D
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
Cooling Coil (automatic voltage regulating building air handling units) Tubes	Structural Integrity	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
Cooling Coil (auxiliary building ventilation air handling unit 0-13, 0-27, -29, -30, -31, -32, -36, -44, -45, -46, -47, -49) Head	Structural Integrity	Copper Alloy	Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (auxiliary building ventilation supply units) Head	Pressure Boundary	Gray Cast Iron	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	G D
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-183	3.3.1- 038	B
Cooling Coil (auxiliary building ventilation supply units) Tubes	Heat Transfer	Copper Alloy	Condensation (External)	Reduction of Heat Transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-419	3.3.1- 096a	A
			Raw Water (Internal)	Reduction of Heat Transfer	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-187	3.3.1- 042	B
	Pressure Boundary	Copper Alloy	Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-179	3.3.1- 038	B
Cooling Coil (cable room air handling units 1-34, 2-35, 3-11, 3-12) Fins	Heat Transfer	Aluminum	Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.F1.A-788a	3.3.1- 254	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.A-771a	3.3.1- 242	A

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (cable room air handling units 1-34, 2-35, 3-11, 3-12) Fins	Heat Transfer	Aluminum	Condensation (External)	Reduction of Heat Transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-419	3.3.1- 096a	C
Cooling Coil (cable room air handling units 1-34, 2-35, 3-11, 3-12) Head	Pressure Boundary	Copper Alloy	Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
		Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.A3.AP-189	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	C <u>D</u>
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
Cooling Coil (cable room air handling units 1-34, 2-35, 3-11, 3-12) Tubes	Heat Transfer	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Reduction of Heat Transfer	Closed Treated Water System (B2.1.12)	VII.C2.AP-205	3.3.1- 050	A

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (control room ventilation air handling units -13, -14) Head	Structural Integrity	Copper Alloy	Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
		Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.A3.AP-189	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	Ⓒ <u>D</u>
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
Cooling Coil (control room ventilation air handling units -13, -14) Tubes	Structural Integrity	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (equipment room air handling units) Fins	Heat Transfer	Aluminum	Condensation (External)	Reduction of Heat Transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-419	3.3.1- 096a	C
Cooling Coil (equipment room air handling units) Head	Pressure Boundary	Copper Alloy	Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
		Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.A3.AP-189	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	G D
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
Cooling Coil (equipment room air handling units) Tubes	Heat Transfer	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Reduction of Heat Transfer	Closed Treated Water System (B2.1.12)	VII.C2.AP-205	3.3.1- 050	A

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (penetration room air handling units) Head	Pressure Boundary	Copper Alloy	Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.E1.AP-203	3.3.1- 046	A
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
		Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VII.A3.AP-189	3.3.1- 046	A
					Selective Leaching (B2.1.21)	VII.C2.A-50	3.3.1- 072	⊖ D
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
Cooling Coil (penetration room air handling units) Tubes	Heat Transfer	Copper Alloy	Closed-Cycle Cooling Water (Internal)	Reduction of Heat Transfer	Closed Treated Water System (B2.1.12)	VII.C2.AP-205	3.3.1- 050	A
			Condensation (External)	Reduction of Heat Transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-419	3.3.1- 096a	A

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cooling Coil (spent fuel pool supply unit air handling units) Head	Structural Integrity	Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-183	3.3.1- 038	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	⊖ D
Cooling Coil (spent fuel pool supply unit air handling units) Tubes	Structural Integrity	Copper Alloy	Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	C
			Condensation (External)	None	None	VII.J.AP-144	3.3.1- 114	C
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-179	3.3.1- 038	B,1
Damper Housing	Pressure Boundary	Galvanized Steel	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
					Fire Protection (B2.1.15)	VII.G.A-789	3.3.1- 255	A

Table 3.3.2-29 Auxiliary Systems - Ventilation Systems - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Flexible Connection	Pressure Boundary	Elastomer	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.AP-113	3.3.1- 082	A
			Air – Indoor Uncontrolled (Internal)	Hardening or Loss of Strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E1.A-504	3.3.1- 085	A
Heating Coil (auxiliary building ventilation supply units) Head	Structural Integrity	Gray Cast Iron	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
					One-Time Inspection (B2.1.20)	VIII.E.SP-77	3.4.1- 015	A
					Selective Leaching (B2.1.21)	VII.A3.AP-31	3.3.1- 072	C D
					Water Chemistry (B2.1.2)	VIII.E.SP-77	3.4.1- 015	A
Heating Coil (auxiliary building ventilation supply units) Tubes	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	C

Table 3.3.2-30 Auxiliary Systems - Lube Oil System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Heat Exchanger (emergency feedwater pump turbine oil cooler) Tubes	Heat Transfer	Copper Alloy (>15% Zn)	Raw Water (Internal)	Reduction of Heat Transfer	Open-Cycle Cooling Water System (B2.1.11)	VII.H2.AP-187	3.3.1- 042	B
	Pressure Boundary	Copper Alloy (>15% Zn)	Lubricating Oil (External)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.H2.AP-133	3.3.1- 099	C
					One-Time Inspection (B2.1.20)	VII.H2.AP-133	3.3.1- 099	C
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-66	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-179	3.3.1- 038	B
Heat Exchanger (emergency feedwater pump turbine oil cooler) Tubesheet	Pressure Boundary	Copper Alloy (>15% Zn)	Lubricating Oil (External)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.H2.AP-133	3.3.1- 099	C
					One-Time Inspection (B2.1.20)	VII.H2.AP-133	3.3.1- 099	C
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-66	3.3.1- 072	A B

Table 3.3.2-30 Auxiliary Systems - Lube Oil System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Heat Exchanger (main turbine oil tank oil cooler) Head	Structural Integrity	Gray Cast Iron	Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-66	3.3.1- 072	A B
Heat Exchanger (main turbine oil tank oil cooler) Shell	Structural Integrity	Steel	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
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.H2.AP-131	3.3.1- 098	A
					One-Time Inspection (B2.1.20)	VII.H2.AP-131	3.3.1- 098	A
Heater Vessel (lube oil purifier heater)	Structural Integrity	Steel	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
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.E1.AP-127	3.3.1- 097	A
					One-Time Inspection (B2.1.20)	VII.E1.AP-127	3.3.1- 097	A
Piping	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.H1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.H1.AP-221a	3.3.1- 006	A
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.H2.AP-138	3.3.1- 100	A
					One-Time Inspection (B2.1.20)	VII.H2.AP-138	3.3.1- 100	A

Table 3.3.2-32 Auxiliary Systems - Keowee Lube Oil System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.C1.AP-133	3.3.1- 099	A
					One-Time Inspection (B2.1.20)	VII.C1.AP-133	3.3.1- 099	A
			Waste Water (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.A-473c	3.3.1- 160	A
				Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-272	3.3.1- 095	A, 1
					Selective Leaching (B2.1.21)	VII.E5.A-547	3.3.1- 072	A B
		Steel	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
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VII.C1.AP-127	3.3.1- 097	A
					One-Time Inspection (B2.1.20)	VII.C1.AP-127	3.3.1- 097	A

Table 3.3.2-37 Auxiliary Systems - Radiation Monitoring System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (1RIA-35 Sample)	Structural Integrity	Gray Cast Iron	Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B

Plant Specific Notes:

- 1 . Flow blockage due to fouling is not a concern for components that perform a structural integrity function.

Table 3.3.2-39 Auxiliary Systems - Station Sewage Disposal System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tank (sewage ejector surge)	Structural Integrity	Steel	Waste Water (Internal)	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
Tank (sewage ejector)	Structural Integrity	Gray Cast Iron	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			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
					Selective Leaching (B2.1.21)	VII.E5.A-547	3.3.1- 072	Ⓒ <u>D</u>
Valve Body	Structural Integrity	Gray Cast Iron	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
			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

Table 3.3.2-39 Auxiliary Systems - Station Sewage Disposal System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Gray Cast Iron	Waste Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.E5.A-547	3.3.1- 072	A <u>B</u>
		Polymeric	Air – Indoor Uncontrolled (External)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-797a	3.3.1- 263	A
			Waste Water (Internal)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.C1.A-797b	3.3.1- 263	A, 1
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Waste Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-278	3.3.1- 095	A, 1
			Waste Water >60°C (>140°F) (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.A-721	3.3.1- 155	A

Table 3.3.2-40 Auxiliary Systems - Keowee Turbine Sump Pump System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Orifice	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Waste Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-278	3.3.1- 095	A, 1
Piping	Pressure Boundary	Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Air – Outdoor (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Concrete (External)	None	None	VII.J.A-711	3.3.1- 166	A
			Waste Water (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.A-473c	3.3.1- 160	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.E5.A-547	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A

Table 3.3.2-40 Auxiliary Systems - Keowee Turbine Sump Pump System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Strainer Body	Pressure Boundary	Gray Cast Iron	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
			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	Selective Leaching (B2.1.21)	VII.E5.A-724	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-281	3.3.1- 091	A
Strainer Screen	Filtration	Stainless Steel	Waste Water (External)	Loss of Material, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-278	3.3.1- 095	A
Valve Body	Pressure Boundary	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Waste Water (Internal)	Loss of Material, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-272	3.3.1- 095	A
		Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A

Table 3.3.2-40 Auxiliary Systems - Keowee Turbine Sump Pump System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Copper Alloy (>15% Zn)	Air – Outdoor (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Waste Water (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.A-473c	3.3.1- 160	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.E5.A-547	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air – Outdoor (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Waste Water (Internal)	Loss of Material, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-278	3.3.1- 095	A
	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

Table 3.3.2-41 Auxiliary Systems - Vacuum System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Air Dryer (vacuum)	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A
Air Ejector (condensate steam)	Structural Integrity	Ductile Iron	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
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VII.A3.AP-31	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A

Table 3.3.2-41 Auxiliary Systems - Vacuum System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Air Ejector (condensate steam)	Structural Integrity	Gray Cast Iron	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
				Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VII.A3.AP-31	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A

Table 3.3.2-41 Auxiliary Systems - Vacuum System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Air Ejector (condensate steam)	Structural Integrity	Steel	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
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
Air Ejector (emergency steam)	Structural Integrity	Ductile Iron	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
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VII.A3.AP-31	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Gray Cast Iron	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

Table 3.3.2-41 Auxiliary Systems - Vacuum System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Air Ejector (emergency steam)	Structural Integrity	Gray Cast Iron	Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VII.A3.AP-31	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A
		Steel	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
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A

Table 3.3.2-41 Auxiliary Systems - Vacuum System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Moisture Separator (condensate steam air ejector blower)	Structural Integrity	Steel	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
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
Moisture Separator (RIA-40)	Structural Integrity	Gray Cast Iron	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VII.G.A-51	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A

Table 3.3.2-41 Auxiliary Systems - Vacuum System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Gray Cast Iron	Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.A3.A-439	3.3.1- 193	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VII.G.A-51	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A

Table 3.3.2-46 Auxiliary Systems - Refueling System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy (>15% Zn)	Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.F.SP-101	3.4.1- 016	A
					Selective Leaching (B2.1.21)	VII.C2.AP-32	3.3.1- 072	A B
					Water Chemistry (B2.1.2)	VIII.F.SP-101	3.4.1- 016	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.G.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.G.SP-87	3.4.1- 085	A

Plant Specific Notes:

1 . None.

Table 3.3.2-48 Auxiliary Systems - Condenser Circulating Water System - 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)	VII.C1.A-414	3.3.1- 139	B
Piping and Piping Components	Structural Integrity	Steel	Raw Water (Internal)	Cumulative Fatigue Damage	TLAA	VII.E1.A-34	3.3.1- 002	A,3
Pump Casing (chiller service water)	Structural Integrity	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
Pump Casing (condenser circulating water booster)	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B

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

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (condenser circulating water intake)	Pressure Boundary	Steel	Air – Outdoor (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-77	3.3.1- 078	A
			Raw Water (External)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Pump Casing (emergency feedwater pump turbine oil cooler)	Pressure Boundary	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Pump Casing (recirculating)	Structural Integrity	Gray Cast Iron	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

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

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (recirculating)	Structural Integrity	Gray Cast Iron	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
Pump Casing (standby shutdown facility auxiliary service water)	Pressure Boundary	Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Pump Casing (standby shutdown facility building sump)	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Waste Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-278	3.3.1- 095	A,1

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

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (unwatering)	Structural Integrity	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A <u>B</u>
Strainer Body	Pressure Boundary	Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
	Structural Integrity	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1

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

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Strainer Body	Structural Integrity	Gray Cast Iron	Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
		Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
Strainer Screen	Filtration	Stainless Steel	Raw Water (External)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
Tank (ball collector)	Structural Integrity	Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	D,1
Valve Body	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air – Outdoor (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

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

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Steel	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
			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, Flow Blockage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-281	3.3.1- 091	A
	Structural Integrity	Ductile Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B

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

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Gray Cast Iron	Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.I.A-734b	3.3.1- 205	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.I.A-761b	3.3.1- 232	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1
		Steel	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

Table 3.3.2-49 Auxiliary Systems - Low Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Filter Body	Pressure Boundary	Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
		Steel	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
				Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Filter Screen	Filtration	Stainless Steel	Raw Water (External)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B

Table 3.3.2-49 Auxiliary Systems - Low Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping (stored equipment)	Pressure Boundary	Steel	Air – Outdoor (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.F3.A-722	3.3.1- 157	A,3
Piping and Piping Components	Pressure Boundary	Stainless Steel	Raw Water (Internal)	Cumulative Fatigue Damage	TLAA	VII.E1.A-57	3.3.1- 002	A,2
		Steel	Raw Water (Internal)	Cumulative Fatigue Damage	TLAA	VII.E1.A-34	3.3.1- 002	A,2
	Structural Integrity	Steel	Raw Water (Internal)	Cumulative Fatigue Damage	TLAA	VII.E1.A-34	3.3.1- 002	A,2
Pump Casing (chiller condenser service water)	Pressure Boundary	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Pump Casing (low pressure service water)	Pressure Boundary	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A

Table 3.3.2-49 Auxiliary Systems - Low Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (low pressure service water)	Pressure Boundary	Gray Cast Iron	Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Sight Glass	Structural Integrity	Glass	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-48	3.3.1- 117	A
			Raw Water (Internal)	None	None	VII.J.AP-50	3.3.1- 117	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1
Strainer Body	Pressure Boundary	Steel	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B

Table 3.3.2-49 Auxiliary Systems - Low Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Steel	Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-11	3.3.1- 115	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B,1
		Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B
		Ductile Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A

Table 3.3.2-49 Auxiliary Systems - Low Pressure Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Ductile Iron	Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B,1
					Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A
			Condensation (External)	Cracking	One-Time Inspection (B2.1.20)	VII.I.A-734b	3.3.1- 205	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.I.A-761b	3.3.1- 232	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1
		Steel	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Condensation (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A

Table 3.3.2-50 Auxiliary Systems - Protected Service Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Filter Body	Pressure Boundary	Gray Cast Iron	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
		Steel	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VII.I.A-79	3.3.1- 009	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
Filter Screen	Filtration	Stainless Steel	Raw Water (External)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
Flow Element	Flow Restriction	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Air with Borated Water Leakage (External)	None	None	VII.J.AP-18	3.3.1- 120	A

Table 3.3.2-52 Auxiliary Systems - Keowee Turbine Generator Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Heat Exchanger (generator air cooler) Waterbox	Pressure Boundary	Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	D
Piping	Pressure Boundary	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B
		Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A

Table 3.3.2-52 Auxiliary Systems - Keowee Turbine Generator Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Piping	Pressure Boundary	Stainless Steel	Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
		Steel	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
			Concrete (External)	None	None	VII.J.AP-282	3.3.1- 112	A
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-400a	3.3.1- 127	B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
	Structural Integrity	Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B, 1
					Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

Table 3.3.2-52 Auxiliary Systems - Keowee Turbine Generator Cooling Water System - 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	Stainless Steel	Air – Indoor Uncontrolled (External)	Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1
		Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-400a	3.3.1- 127	B
						VII.C1.AP-194	3.3.1- 037	B,1
Strainer Body	Pressure Boundary	Gray Cast Iron	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-51	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A

Table 3.3.2-52 Auxiliary Systems - Keowee Turbine Generator Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Strainer Body	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
Strainer Screen	Filtration	Stainless Steel	Raw Water (External)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
Valve Body	Pressure Boundary	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-144	3.3.1- 114	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B
		Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B
				Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B
		Copper Alloy (>8% Al)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VII.I.A-405a	3.3.1- 132	A
			Raw Water (Internal)	Cracking	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-473b	3.3.1- 160	B

Table 3.3.2-52 Auxiliary Systems - Keowee Turbine Generator Cooling Water System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Pressure Boundary	Copper Alloy (>8% Al)	Raw Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VII.C1.A-47	3.3.1- 072	A B
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-196	3.3.1- 034	B
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B
		Steel	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
			Raw Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
				Loss of Material, Flow Blockage	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-194	3.3.1- 037	B
	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VII.C1.AP-209a	3.3.1- 004	A
				Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.AP-221a	3.3.1- 006	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.A-54	3.3.1- 040	B,1

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
Heat Exchanger (condensate booster pump oil cooler) Head	Structural Integrity	Copper Alloy (>15% Zn)	Closed-Cycle Cooling Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VIII.F.SP-29	3.4.1- 033	Ⓒ Ⓓ
Heat Exchanger (condensate cooler) Head	Structural Integrity	Steel	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)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.A.S-432	3.4.1- 081	A
				Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VIII.E.SP-146	3.4.1- 019	B,1
Heat Exchanger (condensate cooler) Shell	Structural Integrity	Steel	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)	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
Heat Exchanger (final sample cooler, hotwell / polishing demin discharge) Shell	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	C

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
Piping and Piping Components	Pressure Boundary	Steel	Treated Water >60°C (>140°F) (Internal)	Cumulative Fatigue Damage	TLAA	VIII.D1.S-11	3.4.1- 001	A,3
	Structural Integrity	Stainless Steel	Treated Water (Internal)	Wall Thinning	Flow-Accelerated Corrosion (B2.1.8)	VIII.D1.S-408	3.4.1- 060	A,3
			Treated Water >60°C (>140°F) (Internal)	Cumulative Fatigue Damage	TLAA	VII.E1.A-57	3.3.1- 002	A,3
		Steel	Treated Water (Internal)	Wall Thinning	Flow-Accelerated Corrosion (B2.1.8)	VIII.D1.S-16	3.4.1- 005	A,3
						VIII.D1.S-408	3.4.1- 060	A,3
			Treated Water >60°C (>140°F) (Internal)	Cumulative Fatigue Damage	TLAA	VIII.D1.S-11	3.4.1- 001	A,3
Pump Casing (auxiliary boiler feed)	Structural Integrity	Gray Cast Iron	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)	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-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A

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
Pump Casing (condensate return tank)	Structural Integrity	Gray Cast Iron	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)	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-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Casing (condensate storage tank)	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.E.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.E.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.E.SP-88	3.4.1- 011	A

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
Pump Casing (feedwater pump seal injection)	Structural Integrity	Gray Cast Iron	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)	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-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Casing (hotwell sump)	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-6	3.4.1- 054	A
			Waste Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-272	3.3.1- 095	C,1
Pump Casing (polishing demineralizer backwash sump)	Structural Integrity	Gray Cast Iron	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
			Waste Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.E5.A-785	3.3.1- 193	A

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
Pump Casing (polishing demineralizer backwash sump)	Structural Integrity	Gray Cast Iron	Waste Water (Internal)	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
					Selective Leaching (B2.1.21)	VII.E5.A-724	3.3.1- 072	A B
Pump Casing (polishing demineralizer backwash)	Structural Integrity	Ductile Iron	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)	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-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Casing (polishing demineralizer holding)	Structural Integrity	Ductile Iron	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)	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-73	3.4.1- 014	A

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
Pump Casing (polishing demineralizer holding)	Structural Integrity	Ductile Iron	Treated Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Casing (polishing demineralizer precoat)	Structural Integrity	Gray Cast Iron	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)	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-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Casing (sample holding tank)	Structural Integrity	Gray Cast Iron	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)	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-73	3.4.1- 014	A

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
Pump Casing (sample holding tank)	Structural Integrity	Gray Cast Iron	Treated Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Discharge Head (hotwell)	Structural Integrity	Steel	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 Material	One-Time Inspection (B2.1.20)	VIII.E.SP-73	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Sight Glass	Pressure Boundary	Glass	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-33	3.4.1- 055	A
			Treated Water (Internal)	None	None	VIII.I.SP-35	3.4.1- 055	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.E.SP-87	3.4.1- 085	A

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
Sight Glass	Pressure Boundary	Stainless Steel	Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.E.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.E.SP-88	3.4.1- 011	A
	Structural Integrity	Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VIII.H.S-454	3.4.1- 106	A
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B2.1.25)	VIII.E.SP-92	3.4.1- 043	A
					One-Time Inspection (B2.1.20)	VIII.E.SP-92	3.4.1- 043	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.F.SP-101	3.4.1- 016	A
					Selective Leaching (B2.1.21)	VIII.E.SP-55	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.F.SP-101	3.4.1- 016	A
		Glass	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-33	3.4.1- 055	A
			Lubricating Oil (Internal)	None	None	VIII.I.SP-10	3.4.1- 055	A
			Treated Water (Internal)	None	None	VIII.I.SP-35	3.4.1- 055	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A

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
Trap Body	Structural Integrity	Steel	Treated Water (Internal)	Loss of Material	Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Valve Body	Pressure Boundary	Gray Cast Iron	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
				Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.S-432	3.4.1- 081	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.E.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.E.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.E.SP-88	3.4.1- 011	A

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
Valve Body	Pressure Boundary	Steel	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)	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-73	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-6	3.4.1- 054	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.F.SP-101	3.4.1- 016	A
					Water Chemistry (B2.1.2)	VIII.F.SP-101	3.4.1- 016	A
		Gray Cast Iron	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)	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-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A <u>B</u>

Table 3.4.2-2 Steam and Power Conversion Systems - Feedwater System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (turbine driven emergency feedwater)	Pressure Boundary	Steel	Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-73	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Sight Glass	Structural Integrity	Copper Alloy (>15% Zn)	Air – Indoor Uncontrolled (External)	Cracking	External Surfaces Monitoring of Mechanical Components (B2.1.23)	VIII.H.S-454	3.4.1- 106	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.F.SP-101	3.4.1- 016	A
					Selective Leaching (B2.1.21)	VIII.E.SP-55	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.F.SP-101	3.4.1- 016	A
		Glass	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-33	3.4.1- 055	A
			Air with Borated Water Leakage (External)	None	None	VIII.I.SP-67	3.4.1- 055	A
			Treated Water (Internal)	None	None	VIII.I.SP-35	3.4.1- 055	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A

Table 3.4.2-3 Steam and Power Conversion Systems - Heater Drain System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Heat Exchanger (E heater drain pump oil cooler) Head	Structural Integrity	Copper Alloy (>15% Zn)	Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VIII.E.SP-8	3.4.1- 027	C
					Selective Leaching (B2.1.21)	VIII.F.SP-29	3.4.1- 033	C D
Heat Exchanger (E heater drain pump seal water cooler) Shell	Structural Integrity	Steel	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
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VIII.E.S-23	3.4.1- 025	A
Heat Exchanger (moisture separator drain tank demineralizer) Head	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	C
				Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.A-770a	3.3.1- 241	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-80	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.E.SP-80	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.F.SP-85	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.F.SP-85	3.4.1- 011	A

Table 3.4.2-3 Steam and Power Conversion Systems - Heater Drain System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Heat Exchanger (moisture separator drain tank demineralizer) Shell	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	C
				Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.A-770a	3.3.1- 241	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VIII.E.SP-117	3.4.1- 019	B,1
Heat Exchanger (moisture separator drain tank pump seal water cooler) Shell	Structural Integrity	Gray Cast Iron	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
				Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VII.C1.A-532	3.3.1- 193	A
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B2.1.11)	VII.C1.AP-183	3.3.1- 038	B,1
					Selective Leaching (B2.1.21)	VIII.A.SP-28	3.4.1- 033	C <u>D</u>
Heat Exchanger (sample cooler) Shell	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	C
				Loss of Material	One-Time Inspection (B2.1.20)	VII.F1.A-770a	3.3.1- 241	A
			Closed-Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water System (B2.1.12)	VIII.E.S-25	3.4.1- 026	A

Table 3.4.2-3 Steam and Power Conversion Systems - Heater Drain System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Pump Casing (E heater drain)	Structural Integrity	Steel	Treated Water (Internal)	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-73	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Casing (heater drain sump)	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-6	3.4.1- 054	A
			Waste Water (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.24)	VII.E5.AP-272	3.3.1- 095	C,1
Pump Casing (moisture separator reheater drain)	Structural Integrity	Gray Cast Iron	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)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.S-432	3.4.1- 081	A
					One-Time Inspection (B2.1.20)	VIII.E.SP-73	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
Pump Head (D heater drain)	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A

Table 3.4.2-3 Steam and Power Conversion Systems - Heater Drain System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Copper Alloy	Treated Water (Internal)	Loss of Material	Water Chemistry (B2.1.2)	VIII.F.SP-101	3.4.1- 016	A
		Gray Cast Iron	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)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.S-432	3.4.1- 081	A
					One-Time Inspection (B2.1.20)	VIII.E.SP-73	3.4.1- 014	A
				Loss of Material	Selective Leaching (B2.1.21)	VIII.E.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.E.SP-73	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.E.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.E.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.E.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.E.SP-88	3.4.1- 011	A

Table 3.4.2-7 Steam and Power Conversion Systems - Auxiliary Steam System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Valve Body	Structural Integrity	Gray Cast Iron	Treated Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VIII.A.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A
		Steel	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)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.A.S-432	3.4.1- 081	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A

Table 3.4.2-10 Steam and Power Conversion Systems - Plant Heating System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Strainer Body	Structural Integrity	Gray Cast Iron	Treated Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VIII.A.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Steel	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VIII.H.S-30	3.4.1- 004	A
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.A.S-432	3.4.1- 081	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
Trap Body	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A

Table 3.4.2-10 Steam and Power Conversion Systems - Plant Heating System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Trap Body	Pressure Boundary	Stainless Steel	Treated Water >60°C (>140°F) (Internal)	Cracking	Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A
	Structural Integrity	Copper Alloy	Air – Indoor Uncontrolled (External)	None	None	VIII.I.SP-6	3.4.1- 054	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.A.SP-101	3.4.1- 016	A
					Water Chemistry (B2.1.2)	VIII.A.SP-101	3.4.1- 016	A
		Gray Cast Iron	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
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	VIII.H.S-30	3.4.1- 004	A
			Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.A.S-432	3.4.1- 081	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A
					Selective Leaching (B2.1.21)	VIII.A.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	A
		Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A

Table 3.4.2-12 Steam and Power Conversion Systems - Steam Seal System - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Damper Housing (steam packing exhaust fan)	Structural Integrity	Ductile Iron	Treated Water (Internal)	Loss of Material	Selective Leaching (B2.1.21)	VIII.A.SP-27	3.4.1- 033	A B
					Water Chemistry (B2.1.2)	VIII.B1.SP-74	3.4.1- 014	C
Desuperheater	Structural Integrity	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-87	3.4.1- 085	A
			Treated Water >60°C (>140°F) (Internal)	Cracking	One-Time Inspection (B2.1.20)	VIII.B1.SP-88	3.4.1- 011	A
					Water Chemistry (B2.1.2)	VIII.B1.SP-88	3.4.1- 011	A
		Steel	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
		Steel	Treated Water (Internal)	Long-Term Loss of Material	One-Time Inspection (B2.1.20)	VIII.A.S-432	3.4.1- 081	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.B1.SP-74	3.4.1- 014	A

ATTACHMENT 2

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

CLARIFICATION OF IWF AGING MANAGEMENT PROGRAM

Clarification of IWF Aging Management Program

(TRP-43)

Affected SLRA Sections:

SLRA Table 3.5.1
SLRA Appendix A2-30
SLRA Table A6.0-1
SLRA Appendix B2.1.30

SLRA Page Numbers:

3-1346
A-32
A-33
A-96
B-209
B-210
B-212

Description of Change:

Revised the description of the program to clarify that no Class MC components exist at Oconee and there are no vibration isolator elements for IWF components at Oconee. Revised the discussion for Item 3.5.1-086 to state that this is not used and point to Item 3.5.1- 081 that is used to manage this aging effect. Revised OE section to include additional OE to demonstrate how the IWF program manages aging.

Included periodic evaluations of inaccessible areas of supports that are encased in grout or covered by insulation. Added ASTM F2280 as a type of bolt to take preventive actions for storage, lubricants, and stress corrosion potential.

- Revised Enhancement 1 to include grout and supports covered by insulation in the examples.
- Revised Enhancement 2 to include ASTM F2280 bolting to align with the preventive actions described in NUREG-2191 for the program.

SLRA Table 3.5.1, Item 3.5.1-086 (page 3-1346) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-086	Structural bolting	Loss of material due to general, pitting, crevice corrosion	AMP XI.S3, "ASME Section XI, Subsection IWF"	No	Not applicable. ONS has no in-scope stainless steel structural bolting exposed to air outdoor that is managed by the ASME Section XI, Subsection IWF (B2.1.30) program in Containments, Structures, and Component Supports. The associated NUREG-2191 aging items are not used. <u>Not used. Galvanized steel structural bolting is evaluated using NUREG-2191 rows for steel structural bolting. Refer to Item Number 3.5.1-081. The associated NUREG-2191 aging items are not used.</u>

SLRA Appendix A2.30 (page A-32) is revised as follows:

A2.30 ASME XI, Subsection IWF

Program Description

The *ASME Section XI, Subsection IWF* AMP is an existing condition monitoring program that manages loss of material, cracking, loss of preload, and loss of mechanical function for supports of Class 1, 2, and 3 components. There are no Class MC components at ONS. There are no vibration isolator elements for any components in the scope of this program. This program consists of periodic visual examinations of piping and component supports for signs of degradation, evaluation, and corrective actions. Supports for Class 1, 2, and 3 piping and component supports are selected for examination per the requirements of ASME Code, Section XI, Subsection IWF. Acceptance standards are specified in ASME Code, Section XI, Subsection IWF, Article IWF-3400. If a component support does not meet the acceptance standards of IWF-3400 but is electively repaired to as new condition, the sample is increased or modified to include another support that is representative of the remaining population of supports that were not repaired. The scope of the inspection for supports is based on class and total population as defined in Table IWF-2500-1. Inspections that reveal indications or relevant conditions that are unacceptable are entered in the corrective actions program.

SLRA Appendix A2.30 (page A-33) is revised as follows:

A2.30 ASME XI, Subsection IWF

Enhancements

The *ASME Section XI, Subsection IWF* AMP will be enhanced to:

1. Perform periodic evaluations of the acceptability of inaccessible areas of supports (e.g., portions of supports encased in concrete or grout, buried underground, portions of supports covered by insulation, or encapsulated by guard pipe), when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to inaccessible areas of supports. Perform these evaluations once every ten years during the SPEO. (Element 1).
2. Procedures will be revised to specify that for structural bolting consisting of ASTM A325, ASTM F1852, ASTM F2280, and/or ASTM A490, the preventive ~~preventative~~ actions for storage, lubricants, and stress corrosion cracking potential discussed in Section 2 of RCSC (Research Council for Structural Connections) publication, "*Specification for Structural Joints Using ASTM A325 or A490 Bolts*," will be used (Element 2).

Table A6.0-1: Subsequent License Renewal Commitments

30	ASME Section XI, Subsection IWF program	<p>The ASME Section XI, Subsection IWF AMP is an existing program that will be enhanced to:</p> <ol style="list-style-type: none">1. Perform periodic evaluations of the acceptability of inaccessible areas of supports (e.g., portions of supports encased in concrete <u>or grout</u>, buried underground, <u>portions of supports covered by insulation</u>, or encapsulated by guard pipe), when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to inaccessible areas of supports. Perform these evaluations once every ten years during the SPEO.2. Procedures will be revised to specify that for structural bolting consisting of ASTM A325, ASTM F1852, <u>ASTM F2280</u>, and/or ASTM A490, the <u>preventive</u> preventative actions for storage, lubricants, and stress corrosion cracking potential discussed in Section 2 of RCSC (Research Council for Structural Connections) publication, “<i>Specification for Structural Joints Using ASTM A325 or A490 Bolts</i>,” will be used.3. Procedures will be revised to specify that whenever replacement of bolting is required, bolting material, installation torque or tension, and use of lubricants and sealants will be in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339.4. Perform a one-time inspection within five years prior to entering the SPEO of an additional 5% of the sample populations for Class 1, 2, and 3 piping supports. The additional supports will be selected from the remaining population of IWF piping supports and will include components that are most susceptible to age-related degradation.	B2.1.30	<p>Program enhancements for SLR will be implemented and a one-time inspection of an additional 5% of the sample size specified in Table IWF-2500-1 for Class 1, 2, and 3 piping supports is conducted within 5 years prior to the SPEO, and is to be completed prior to the SPEO. Other enhancements are completed 6 months prior to the SPEO or no later than the last refueling outage prior to the SPEO.</p>
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SLRA Appendix B2.1.30 (page B-209) is revised as follows:

B2.1.30 ASME XI, SUBSECTION IWF

Program Description

The *ASME Section XI, Subsection IWF* AMP is an existing condition monitoring program that manages loss of material, cracking, loss of preload, and loss of mechanical function for supports of Class 1, 2, and 3 piping components. There are no Class MC components at ONS. There are no vibration isolator elements for any components in the scope of this program.

Procedures will include preventive actions to ensure bolting integrity for replacement and maintenance activities by specifying proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting. For structural bolting consisting of ASTM A325, ASTM A490, ASTM F1852, ASTM F2280, and/or ASTM F2280 bolts, the preventive actions for storage, lubricant selection, and bolting and coating material selection discussed in Section 2 of the Research Council for Structural Connections publication, "*Specification for Structural Joints Using High-Strength Bolts*," will be used.

SLRA Appendix B2.1.30 (page B-210) is revised as follows:

B2.1.30 ASME XI, SUBSECTION IWF

Enhancements

The following enhancements will be implemented in the following program elements: Scope of Program (Element 1), Preventive Actions (Element 2), Detection of Aging Effects (Element 4), and Monitoring and Trending (Element 5):

1. Perform periodic evaluations of the acceptability of inaccessible areas of supports (e.g., portions of supports encased in concrete or grout, buried underground, portions of supports covered by insulation, or encapsulated by guard pipe), when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to inaccessible areas of supports. Perform these evaluations once every ten years during the SPEO. (Element 1).
2. Procedures will be revised to specify that for structural bolting consisting of ASTM A325, ASTM F1852, ASTM F2280, and/or ASTM A490, the preventive ~~preventative~~ actions for storage, lubricants, and stress corrosion cracking potential discussed in Section 2 of Research Council for Structural Connections publication, "*Specification for Structural Joints Using ASTM A325 or A490 Bolts*," will be used (Element 2).

Operating Experience

6. In March of 2014, while performing a VT-3 in-service inspection on the Borated Water Storage Tank, corrosion was identified on the bottom section of the tank and all anchor bolts had heavy rust and corrosion with material loss. Four of the anchor bolts had areas of degradation measuring 1/8". Engineering performed an inspection of tank and tank supports (anchor bolts) and determined the condition of the tank and anchors were acceptable for continued service. The amount of corrosion was very small compared to the overall dimensions of the anchor bolts. There was no material loss on the tank. The areas of corrosion were cleaned, prepared for coating, and re-coated to prevent additional corrosion.
7. In April of 2020, a VT-3 visual examination of the Borated Water Storage Tank supports, identified that some of the support members exhibited areas of coatings degradation and corrosion with some material wastage. Eight of the supports exhibiting the worst degradation due to corrosion were cleaned and had coatings removed to expose bare metal to show the extent of the degraded supports. The amount of degradation noted made this a relevant condition per ASME Section XI, IWF and resulted in the examination being unacceptable. Engineering performed additional inspections and measured bolt diameters to determine the amount of overall material loss. The as-found conditions were compared to original design and analysis of the Borated Water Storage Tank and supports, and the material loss was determined to be acceptable. The anchorage capacity of the anchor bolts remains adequate to resist documented design loads. The remaining anchor bolts were cleaned and had their surface prepared for re-coating. All anchor bolts were re-coated to prevent additional corrosion.
8. In November of 2019, a VT-3 visual examination of the component support for the high pressure injection system, revealed minor corrosion around the edges of the support base plate. There was also evidence of boron on the floor surrounding the support base plate and potential for borated water to penetrate beneath the base plate and potentially corrode the baseplate and associated anchor bolting. Engineering evaluated the corrosion and determined the support loads are all downward (i.e., the anchor bolts are not in tension) and pipe movements are very minor, therefore, no shear loads. The minor corrosion will have no impact on this support performing its design function. Additional actions were taken to clean up the boric acid and re-inspect the baseplate. No additional degradation was identified. The component support was clean and re-coated to prevent further corrosion.

ATTACHMENT 3

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

REMOVED SEISMIC GAP FILLER MATERIAL DISCUSSIONS
AND REVISED STRUCTURES MONITORING AGING
MANAGEMENT PROGRAM

Removed Seismic Gap Filler Material Discussions and Revised Structures Monitoring Aging Management Program

(TRP-46 and TRP-47)

Affected SLRA Sections:

SLRA Section 2.4.1
SLRA Section 2.4.8.2
SLRA Appendix A2.33
SLRA Appendix B2.1.33
SLRA Table 2.4.8-2
SLRA Table 3.3.1
SLRA Table 3.5.2-22
SLRA Table 3.5.2-23
SLRA Table A6.0-1

SLRA Page Numbers:

2-287	3-1449	A-37	A-104	B-226
2-340	3-1450	A-38	B-222	
2-342	3-1455	A-98	B-223	
2-343	A-35	A-102	B-224	
3-472	A-36	A-103	B-225	

Description of Changes:

Removed seismic gap filler materials as a bulk commodity subject to aging management as they do not perform a license renewal intended function. Table 3.3.1 Item 3.3.1-111 was revised to state that ONS does not have new fuel storage racks. Revised Table 3.5.2-22 which added stainless steel wear plates. Revised the Structures Monitoring Program in Section A2.33, Table A6.0-1, and Section B2.1.33 which added wear plates to the program scope, manage cracking due to stress corrosion cracking of stainless steel components, and loss of material due to wear for wear plates. Removed discussion related to increasing the inspection frequency from 5 years to 10 years from Appendix A and B. The program aligns with the GALL recommendation for a 5-year inspection frequency.

Revised Enhancement 1 to the Structures Monitoring Program to include the Keowee Breaker Vault in the scope of the program. Revised enhancement 3 for program simplicity. Revised Enhancement 9.e to align with GALL recommendations. Revised Enhancement 12 which clarified the acceptance criteria for vibration isolators, bearing pads, structural sealants, and seismic joint fillers. Added Enhancement 18 to the Structures Monitoring Program which clarified that any inspections that do not meet acceptance criteria will be entered into the corrective action program to track the resolution of the issue before the component's intended function is lost due to degradation.

SLRA Section 2.4.1 (page 2-287) is revised as follows:

2.4.1 AUXILIARY BUILDING

System Evaluation Boundaries

The evaluation boundary for the auxiliary building includes the foundation, internal structural members, external walls and roof. Also included are the spent fuel pool, spent fuel storage racks, battery racks, auxiliary building cranes, doors, metal siding, masonry block walls, and fiber reinforced polymer. The low pressure injection room sumps and cover plates, in addition to waste tanks stainless steel lined cover slabs, are within the evaluation boundary of the auxiliary building.

The piping penetrations, electrical penetrations, heating and ventilation penetrations, ~~seismic gap material (cork)~~ and fire barriers (fire seals, fire stops, fire wraps, coatings) are addressed as bulk commodities in [Section 2.4.8](#). Cable trays and conduit, electrical panels, equipment component supports (including the fuel transfer tube support), grout, louver frames, building drains, and pipe piles are also excluded from the evaluation boundaries as these structural components are addressed as bulk commodities in [Section 2.4.8](#).

SLRA Section 2.4.8. (page 2-340) is revised as follows:

2.4.8.2 Miscellaneous Structural Commodities

System Description

Building and structures within the scope of SLR contain miscellaneous structural commodities that are within the scope of SLR and are subject to AMR.

The following miscellaneous structural commodities have been identified as being within the scope of SLR and subject to AMR.

- Concrete Elements (Valve Pits, Yard Foundations, and Transformer Equipment Pads)
- Drains/Curbs
- Electrical Enclosures
- Fire Barrier - Penetration Seals
- Grout/Concrete for Equipment Anchorage
- Penetration Sleeves and Seals, including Louvers
- Piles, Pipe Piles, Foundation Dowels
- Seismic Gap Filler Material and Covers
- Vibrations Isolators

The concrete elements consist of the foundations for the borated water storage tank superstructure, elevated water storage tank, microwave building, transformer pads for the Keowee main step-up transformer and ONS CT1, CT2 and CT3 transformers, the Unit 3 6.9 kV switchgear and condenser circulating water valve pits (yard foundations, valve pits, and transformer equipment pads).

Drains/curbs include buildings that have either a roof drain system or gutters and downspouts for precipitation which connect to the yard drain system or which drain to the surface. Also included are curbs that are used to direct flow.

Electrical enclosures include bus duct and switchgear enclosures (including the Unit 3 6.9 kV switchgear enclosure), electrical panels and cabinets, junction, terminal, and pull boxes. The electrical panels and cabinets contain supports for electrical components located inside the enclosure.

Fire barriers are located in safety and non-safety buildings to protect equipment within the scope of SLR from fire. ~~Cork is installed in the seismic gap between the reactor and auxiliary buildings. Cork is considered a fire barrier in the east and west penetration room (of each unit). The cork is covered with a fire and water resistant caulking material. The NRC has accepted this cork as a fire barrier and has exempted it from testing and rating requirements normally required for fire barriers.~~ Armaflex is a flexible insulation material which is installed in penetrations in the floor and ceiling of east and west penetration rooms (of each unit) for pressure boundary conditions. The NRC has accepted Armaflex as a fire barrier and has exempted it from testing and rating requirements normally required for fire barriers.

SLRA Section 2.4.8.2, (page 2-342) is revised as follows:

2.4.8.3 Miscellaneous Structural Commodities

System Evaluation Boundaries

The evaluation boundary for miscellaneous structural commodities includes the concrete elements (valve pits, yard foundations, and transformer pads), drain/curbs, electrical enclosures, fire barriers, grout, penetration seals, penetration sleeves, piles, seismic gap filler material and covers, and vibration isolators in the buildings and structures that are within the scope of SLR.

SLRA Table 2.4.8-2 (page 2-343) is revised as follows:

Table 2.4.8-2 Miscellaneous Structural Commodities

Structural Component	Intended Function
Penetration Seals	Flood Barrier
Penetration Sleeves	Structural Support
Piles	Structural Support
Seismic Gap Covers	Shelter, Protection
Seismic Gap Filler Material	Fire Barrier Shelter, Protection
Vibration Isolator	Structural Support

SLRA Table 3.3.1 (page 3-472) 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
3.3.1-111	Steel structural steel exposed to air - indoor uncontrolled	Loss of material due to general, pitting, crevice corrosion	AMP XI.S6, “Structures Monitoring”	No	Not applicable. <u>ONS does not have new fuel storage racks.</u> Structural steel is treated as a Civil / Structural commodity and addressed in <u>Section 3.5.</u> The associated NUREG-2191 aging items are not used.

SLRA Table 3.5.2-22 (page 3-1449) is revised as follows:

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Wear Plate	SP	<u>Stainless Steel</u>	<u>Air (External)</u>	<u>Loss of Material, Cracking</u>	<u>Structures Monitoring (B2.1.33)</u>	<u>III.B4.T-37b</u>	<u>3.5.1- 100</u>	<u>C</u>
				<u>Loss of Material</u>	<u>Structures Monitoring (B2.1.33)</u>	<u>None</u>	<u>None</u>	<u>H, 6</u>
			<u>Air with Borated Water Leakage (External)</u>	<u>None</u>	<u>None</u>	<u>III.B4.TP-4</u>	<u>3.5.1- 098</u>	<u>C, 5</u>
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B4.TP-43	3.5.1- 092	C
						None	None	H, 6
			<u>Air with Borated Water Leakage (External)</u>	<u>Loss of Material</u>	<u>Boric Acid Corrosion (B2.1.4)</u>	<u>III.B4.T-25</u>	<u>3.5.1-089</u>	<u>C,5</u>

SLRA Table 3.5.2-22 (page 3-1450) is revised as follows:

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191Item	NUREG- 2192 Table 1	Notes
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Plant Specific Notes:

- 1. Steel elements include support members, bearing plates, base plates, connections, instrument racks and structural frames.
- 2. Aluminum Elements include support members and cable trays.
- 3. Stainless Steel elements includes support members, bearing plates, base plates, connections, instrument racks and structural frames.
- 4. Subject component is the fuel transfer tube support.
- 5. Air with Borated Water Leakage Environment is for components in the Auxiliary Building, Reactor Building and Borated Water Storage Tank Superstructure.
- 6. Loss of material due to wear will be managed for wear plates.

SLRA Table 3.5.2-23 (page 3-1455) is revised as follows:

Table 3.5.2-23 Containments, Structures, and Component Supports - Miscellaneous Structural Commodities - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Penetration Seals	FLD	Elastomer, Rubber and Other Similar Materials	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A
Penetration Sleeve	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A,4
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B4.T-25	3.5.1- 089	A,5
Piles	SS	Steel	Groundwater/Soil (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-219	3.5.1- 079	C,2,3
Seismic Gap Cover	SP	Elastomer, Rubber and Other Similar Materials	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A
			Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
Seismic Gap Filler Material	FB; SP	Cork	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	None	None	F
		Elastomer	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A
Vibration Isolator	SS	Non-Metallic (e.g., Rubber)	Air – Indoor Uncontrolled (External)	Reduction or Loss of Isolation Function	Structures Monitoring (B2.1.33)	III.B4.TP-44	3.5.1- 094	A

SLRA Appendix A2.33 (page A-35) is revised as follows:

A2.33 Structures Monitoring

Program Description

The *Structures Monitoring* AMP is an existing condition monitoring program that consists of periodic visual inspection and monitoring of the condition of concrete and steel structures, structural components, component supports, and structural commodities to ensure that aging degradation (such as those described in ACI 349.3R, ACI 201.1R, SEI/ASCE 11, and other documents) will be detected, the extent of degradation determined and evaluated, and corrective actions taken prior to loss of intended functions. Structures are monitored on an interval of a nominal five years. ~~The interval may be increased to a nominal ten-year frequency with appropriate justification based on the structure, environment and related inspections.~~ Inspections also include seismic joint fillers, elastomeric materials; and reinforcement of masonry walls, and periodic evaluation of groundwater chemistry and opportunistic inspections for the condition of below grade concrete.

Quantitative results (measurements) and qualitative information from periodic inspections are trended with sufficient detail, such as photographs and surveys for the type, severity, extent, and progression of degradation, to ensure that corrective actions can be taken prior to a loss of intended function. The acceptance criteria are derived from applicable consensus codes and standards. For concrete structures, the program includes personnel qualifications and quantitative evaluation criteria of ACI 349.3R.

SLRA Appendix A2.33 (pages A-35 and A-36) is revised as follows:

Enhancements

The *Structures Monitoring* AMP will be enhanced to:

1. Add the following structures to the scope of the program:
 - a. Microwave House Structure
 - b. Technical Support Building cable vault
 - c. 100kv Structure
 - d. Protected Service Water Building
 - e. Protected Service Water Duct Banks
 - f. Borated Water Storage Tank Superstructure
 - g. Health Physics Office Building
 - h. Administration Building
 - i. Keowee Breaker Vault
2. Procedures will be revised to specify that structural components inspected include structural bolting, anchor bolts and embedments, supports and bracings associated with masonry walls, pipe whip restraints and jet impingement shields, transmission towers, panels and other enclosures, racks, sliding surfaces, sump and pool liners, wear plates, electrical cable trays and conduits, tube tracks, electrical duct banks, manholes, doors, penetration seals, and other elastomeric materials.
3. Expand the monitoring and evaluation of raw water and ground water chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year), from locations that are representative of the groundwater in contact with structures within the scope of SLR:
 - ~~a. Enter adverse results, which exceed water chemistry criteria, into the corrective action program. As part of the corrective actions, if aggressive groundwater is identified that might affect structures in scope for SLR, perform additional water testing at additional locations and perform soil testing in order to confirm the extent, severity, and potential aging mechanisms resulting from the aggressive groundwater/soil.~~
 - ~~b. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below grade concrete, including the potential for further degradation due to the aggressive groundwater, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed aggressive groundwater/soil.~~
 - ~~c. Develop the initial engineering evaluations prior to the SPEO. Develop follow-up engineering evaluations on an interval not to exceed five years.~~
 - ~~d. If aggressive groundwater and soil is identified, at a minimum, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to aggressive groundwater/soil.~~
 - ~~e. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI-349.3R second tier criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventative actions, additional evaluations, and future inspections~~

SLRA Appendix A2.33 (page A-37) is revised as follows:

9. Develop a new implementing procedure or revise an existing implementing procedure to address aging management of inaccessible areas exposed to potentially aggressive groundwater/soil environment that will include the following:
 - a. Monitor raw water and ground water chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year), from locations that are representative of the groundwater in contact with structures within the scope of SLR.
 - b. Enter adverse results, which exceed water chemistry criteria, into the corrective action program. As part of the corrective actions, if aggressive groundwater is identified that might affect structures in scope for SLR, perform additional water testing at additional locations and perform soil testing in order to confirm the extent, severity, and potential aging mechanisms resulting from the aggressive groundwater/ soil.
 - c. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for further degradation due to the aggressive groundwater, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to aggressive groundwater/soil.
 - d. Develop the initial engineering evaluations prior to the SPEO. Develop follow-up engineering evaluations on an interval not to exceed five years.
 - e. If aggressive groundwater ~~and~~ or soil is identified, at a minimum, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to aggressive groundwater/ soil.
 - f. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R second tier criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventative actions, additional evaluations, and future inspections.

SLRA Appendix A2.33 (page A-38) is revised as follows:

12. Expand the program to monitor elastomeric vibration isolators and bearing pads, structural sealants, and seismic joint fillers for cracking, loss of material, and hardening. Supplement visual inspection of elastomeric elements with tactile inspection to detect hardening, if the intended function is suspect. Establish acceptance criteria for elastomeric pads and vibration isolation elements, as no loss of material, cracking, or hardening that can lead to reduction or loss of isolation or support function. Establish acceptance criteria for structural sealants, and seismic joint fillers, as no loss of material, cracking, or hardening that can lead to loss of ~~isolation or support function~~ sealing and resulting leakage that could lead to a loss of intended function.
17. Clarify that loose bolts and nuts are not acceptable unless accepted by engineering evaluation.
18. Inspection results that do not meet the acceptance criteria are entered into the corrective action program and are evaluated by engineering. Conditions that are not repaired are projected to the next scheduled inspection to ensure that the component will continue to perform its' intended function. If inspection results cannot be projected to the next scheduled inspection, then the inspection frequency is adjusted to ensure that a loss of the component's intended function does not occur prior to the next scheduled inspection.
19. Expand the program to monitor wear plates for indications of significant loss of material due to wear. Establish acceptance criteria for wear plates as no significant loss of material due to wear that could result in a loss of intended function, as required by design.

SLRA Table A6.0-1 (page A-98) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
33	<i>Structures Monitoring</i> program	<p>The <i>Structures Monitoring</i> AMP is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Add the following structures to the scope of the program: <ol style="list-style-type: none"> a. Microwave House Structure b. Technical Support Building Cable Vault c. 100 kV Structure d. Protected Service Water Building e. Protected Service Water Duct Banks f. Borated Water Storage Tank Superstructure g. HP Office Building h. Administration Building i. <u>Keowee Breaker Vault</u> 2. Procedures will be revised to specify that structural components inspected include structural bolting, anchor bolts and embedments, supports and bracings associated with masonry walls, pipe whip restraints and jet impingement shields, transmission towers, panels and other enclosures, racks, sliding surfaces, sump and pool liners, <u>wear plates</u>, electrical cable trays and conduits, tube tracks, electrical duct banks, manholes, doors, penetration seals, and other elastomeric materials. 	B2.1.33	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

Table A6.0-1, page A-102 is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments (part of Commitment 9)

#	Program	Commitment	AMP	Implementation
33	<i>Structures Monitoring</i> program	<ul style="list-style-type: none"> c. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for further degradation due to the aggressive groundwater, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to aggressive groundwater/soil. d. Develop the initial engineering evaluations prior to the SPEO. Develop follow-up engineering evaluations on an interval not to exceed five years. e. If aggressive groundwater and <u>or</u> soil is identified, at a minimum, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to aggressive groundwater/soil. f. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R second tier criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventative actions, additional evaluations, and future inspections. 	B2.1.33	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

SLRA Table A6.0-1 (page A-103) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
33	<i>Structures Monitoring program</i>	12. Expand the program to monitor elastomeric vibration isolators and bearing pads, structural sealants, and seismic joint fillers for cracking, loss of material, and hardening. Supplement visual inspection of elastomeric elements with tactile inspection to detect hardening, if the intended function is suspect. Establish acceptance criteria, for elastomeric pads and vibration isolation elements, <u>as no loss of material, cracking, or hardening that can lead to reduction or loss of isolation or support function.</u> <u>Establish acceptance criteria for</u> structural sealants, and seismic joint fillers, as no loss of material, cracking, or hardening that can lead to loss of isolation or support function <u>sealing and resulting leakage that could lead to a loss of intended function.</u>	B2.1.33	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

SLRA Table A6.0-1 (page A-104) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
33	Structures Monitoring program	<u>18. Inspection results that do not meet the acceptance criteria are entered into the corrective action program and are evaluated by engineering. Conditions that are not repaired are projected to the next scheduled inspection to ensure that the component will continue to perform its' intended function. If inspection results cannot be projected to the next scheduled inspection, then the inspection frequency is adjusted to ensure that a loss of the component's intended function does not occur prior to the next scheduled inspection.</u> <u>19. Expand the program to monitor wear plates for indications of significant loss of material due to wear. Establish acceptance criteria for wear plates as no significant loss of material due to wear that could result in a loss of intended function, as required by design.</u>	B2.1.33	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

SLRA Section B.2.1.33 (page B-222) is revised as follows:

B2.1.33 STRUCTURES MONITORING

Program Description

The *Structures Monitoring* AMP is an existing condition monitoring program that consists of periodic visual inspection and monitoring the condition of concrete and steel structures, structural components, component supports, and structural commodities to ensure that aging degradation (such as those described in ACI 349.3R, ACI 201.1R, SEI/ASCE 11, and other documents) will be detected, the extent of degradation determined and evaluated, and corrective actions taken prior to loss of intended functions. Quantitative results (measurements) and qualitative information from periodic inspections are trended with sufficient detail, such as photographs and surveys for the type, severity, extent, and progression of degradation, to ensure that corrective actions can be taken prior to a loss of intended function. The acceptance criteria are derived from applicable consensus codes and standards. For concrete structures, the program includes personnel qualifications and quantitative evaluation criteria of ACI 349.3R. Structures are monitored on an interval of a nominal five years. ~~The interval may be increased to a nominal 10-year frequency with appropriate justification based on the structure, environment and related inspections.~~ There are provisions for more frequent inspections when conditions are observed that have a potential for impacting an intended function. Unacceptable conditions, when found, are evaluated or corrected in accordance with the corrective action program. The monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent significant age related degradation to ensure there is no loss of intended function.

The *Structures Monitoring* AMP was developed to implement the requirements of 10 CFR 50.65 and is based on NUMARC 93-01, "*Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*," and Regulatory Guide 1.160, "*Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*." The program includes elements of the *Masonry Walls* (B2.1.32) program and *Inspection of Water-Control Structures Associated with Nuclear Power Plants* (B2.1.34) program.

Concrete structures are inspected for indications of deterioration and distress including evidence of leaching, loss of material, cracking, and a loss of bond, as defined in ACI 201.1R. Steel and stainless steel components are inspected for cracking due to stress corrosion cracking and loss of material due to corrosion. Wear plates are additionally inspected for loss of material due to wear. Inspections also include seismic joint fillers, elastomeric materials; and fiber reinforced polymers and steel bracings associated with masonry walls. The program also includes provisions for periodic testing and assessment of groundwater chemistry and opportunistic inspections of accessible below grade concrete structures.

Applicable components within the scope of this program include, but are not limited to: bolting, concrete anchors and embedments, concrete components, decking and siding, doors and door seals, ductbanks, external surfaces of bus enclosures (metallic ducting) and bus enclosure structural supports, expansion and seismic joints, foundations, hatches, hazard barriers, metal components such as louvers, miscellaneous steel, penetrations seals and sleeves, piles, pipe whip restraints and jet impingement shields, shielding, steel components, wear plates, steel liners, supports, panels, racks, cabinets, enclosures, cable trays, conduits, wire way gutters, and tubing track.

SLRA Appendix B.2.1.33 (pages B-223 and 224) is revised as follows:

Enhancements

The following enhancements will be implemented in the following program elements: Scope of Program (Element 1), Preventive Actions (Element 2), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4), Monitor and Trending (Element 5), and Acceptance Criteria (Element 6).

1. Add the following structures to the scope of the program (Element 1):
 - a) Microwave House Structure
 - b) Technical Support Building cable vault
 - c) 100kv Structure
 - d) Protected Service Water Building
 - e) Protected Service Water Duct Banks
 - f) Borated Water Storage Tank Superstructure
 - g) Health Physics Office Building
 - h) Administration Building
 - i) Keowee Breaker Vault
2. Procedures will be revised to specify that structural components inspected include structural bolting, anchor bolts and embedments, supports and bracings associated with masonry walls, pipe whip restraints and jet impingement shields, transmission towers, panels and other enclosures, racks, sliding surfaces, sump and pool liners, wear plates, electrical cable trays and conduits, tube tracks, electrical duct banks, manholes, doors, penetration seals, and other elastomeric materials (Element 1).

SLRA Appendix B.2.1.33 (page B-224) is revised as follows:

3. Expand the monitoring and evaluation of raw water and ground water chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year), from locations that are representative of the groundwater in contact with structures within the scope of SLR (Element 1):
 - a) ~~Enter adverse results, which exceed water chemistry criteria, into the corrective action program. As part of the corrective actions, if aggressive groundwater is identified that might affect structures in scope for SLR, perform additional water testing at additional locations and perform soil testing in order to confirm the extent, severity, and potential aging mechanisms resulting from the aggressive groundwater/ soil.~~
 - b) ~~Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below grade concrete, including the potential for further degradation due to the aggressive groundwater, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed aggressive groundwater/soil.~~
 - c) ~~Develop the initial engineering evaluations prior to the SPEO. Develop follow-up engineering evaluations on an interval not to exceed five years.~~
 - d) ~~If aggressive groundwater and soil is identified, at a minimum, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to aggressive groundwater/ soil.~~
 - e) ~~If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R second tier criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventative actions, additional evaluations, and future inspections.~~

SLRA Appendix B.2.1.33 (page B-225) is revised as follows:

9. Develop a new implementing procedure or revise an existing implementing procedure to address aging management of inaccessible areas exposed to potentially aggressive groundwater/soil environment that will include the following (Element 2, 3, and 4):
 - a) Monitor raw water and ground water chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year), from locations that are representative of the groundwater in contact with structures within the scope of SLR.
 - b) Enter adverse results, which exceed water chemistry criteria, into the corrective action program. As part of the corrective actions, if aggressive groundwater is identified that might affect structures in scope for SLR, perform additional water testing at additional locations and perform soil testing in order to confirm the extent, severity, and potential aging mechanisms resulting from the aggressive groundwater/ soil.
 - c) Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for further degradation due to the aggressive groundwater, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to aggressive groundwater/soil.
 - d) Develop the initial engineering evaluations prior to the SPEO. Develop follow-up engineering evaluations on an interval not to exceed five years.
 - e) If aggressive groundwater ~~and~~ or soil is identified, at a minimum, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to aggressive groundwater/ soil.
 - f) If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R second tier criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventative actions, additional evaluations, and future inspections.

SLRA Appendix B.2.1.33 (page B226) is revised as follows:

12. Expand the program to monitor elastomeric vibration isolators and bearing pads, structural sealants, and seismic joint fillers for cracking, loss of material, and hardening. Supplement visual inspection of elastomeric elements with tactile inspection to detect hardening, if the intended function is suspect. Establish acceptance criteria for elastomeric pads and vibration isolation elements, as no loss of material, cracking, or hardening that can lead to reduction or loss of isolation or support function. Establish acceptance criteria for structural sealants, and seismic joint fillers, as no loss of material, cracking, or hardening that can lead to loss of isolation or support function sealing and resulting leakage that could lead to a loss of intended function. (Element 3, 4, and 6)
17. Clarify that loose bolts and nuts are not acceptable unless accepted by engineering evaluation. (Element 6)
18. Inspection results that do not meet the acceptance criteria are entered into the corrective action program and are evaluated by engineering. Conditions that are not repaired are projected to the next scheduled inspection to ensure that the component will continue to perform its' intended function. If inspection results cannot be projected to the next scheduled inspection, then the inspection frequency is adjusted to ensure that a loss of the component's intended function does not occur prior to the next scheduled inspection. (Element 4 and 5)
19. Expand the program to monitor wear plates for indications of significant loss of material due to wear. Establish acceptance criteria for wear plates as no significant loss of material due to wear that could result in a loss of intended function, as required by design. (Element 3 and 6)

ATTACHMENT 4

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

FIBER REINFORCED POLYMER EXCEPTION FOR SIX-YEAR
INSPECTION FREQUENCY

Fiber Reinforced Polymer exception for six-year inspection frequency

(TRP-45 and TRP-46)

Affected SLRA Sections:

SLRA Table 3.5.2-1	SLRA Table 3.5.2-10	SLRA Table 3.5.2-18
SLRA Table 3.5.2-2	SLRA Table 3.5.2-11	SLRA Table 3.5.2-20
SLRA Table 3.5.2-3	SLRA Table 3.5.2-12	SLRA Table 3.5.2-21
SLRA Table 3.5.2-4	SLRA Table 3.5.2-13	SLRA Table 3.5.2-22
SLRA Table 3.5.2-5	SLRA Table 3.5.2-14	SLRA Table 3.5.2-23
SLRA Table 3.5.2-7	SLRA Table 3.5.2-15	SLRA Table B2-1
SLRA Table 3.5.2-8	SLRA Table 3.5.2-16	SLRA Appendix B2.1.33
SLRA Table 3.5.2-9	SLRA Table 3.5.2-17	

SLRA Page Numbers:

3-1354 thru 3-1360	3-1398 thru 3-1400	3-1429 thru 3-1432
3-1362 thru 3-1364	3-1401 thru 3-1403	3-1433 thru 3-1435
3-1366	3-1404 thru 3-1406	3-1437 thru 3-1439
3-1368 thru 3-1370	3-1407 thru 3-1410	3-1440 thru 3-1441
3-1374	3-1411 thru 3-1412	3-1442
3-1375	3-1414 thru 3-1417	3-1445 thru 3-1446
3-1377 thru 3-1381	3-1418 thru 3-1420	3-1448 thru 3-1449
3-1382 thru 3-1386	3-1422 thru 3-1424	3-1451 thru 3-1455
3-1390	3-1425 thru 3-1427	B-17
3-1993 thru 3-1396	3-1428	B-223

Description of Change:

The *Structures Monitoring* AMP, as described in SLRA Appendix B, is revised to describe an exception to NUREG-2191 recommendations regarding the inspection frequency for the fiber reinforced polymer. NUREG -2191 recommends a five-year inspection frequency and ONS is taking exception for this to a six-year frequency to align with current inspection activities associated with the fiber-reinforced polymer inspections.

In addition, the standard consistency note assigned to numerous Aging Management Review line items is revised due to the addition of an exception to the *Structures Monitoring* Aging Management Program. Standard consistency note A is changed to B and standard consistency note C is changed to D for Aging Management Review line items crediting the *Structures Monitoring* Aging Management Program.

SLRA Table B2-1 (page B-17) is revised as follows:

Table B2-1 ONS Program Consistency with NUREG-2191 Program

NUREG-2191 Program	Appendix B Reference	Existing or New	Program has NUREG-2191 Enhancements	Program has Exceptions to NUREG-2191
10 CFR Part 50, Appendix J	B2.1.31	Existing		
Masonry Walls	B2.1.32	Existing	X	
Structures Monitoring	B2.1.33	Existing	X	X
Inspection of Water Control Structures Associated with Nuclear Power Plants	B2.1.34	Existing	X	
Protective Coating Monitoring and Maintenance	B2.1.35	Existing	X	
Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	B2.1.36	Existing	X	

SLRA Appendix B2.1.33 (page B-223) is revised as follows:

B2.1.33 STRUCTURES MONITORING

Exception to NUREG-2191

None

Program Element Affected: Detection of Aging Effects (Element 4)

1. NUREG-2191, Section XI.S6 states that in general, all structures are monitored on an interval not to exceed 5 years. A fiber reinforced polymer has been applied to portions of the masonry walls on the west side of each units Auxiliary building. The inspection and testing of the fiber reinforced polymer is conducted on a six-year frequency, and includes visual inspection of the fiber reinforced polymer and mortar joints, and adhesion lift-off testing on control panels.

Justification for Exception 1

A fiber reinforced polymer has been applied to portions of the masonry walls on the west side of each units Auxiliary building. The fiber reinforced polymer is subjected to a benign environment of ambient temperature and humidity conditions associated with the local climate. The polymer is shielded from sunlight and adverse weather conditions by metal siding. The fiber reinforced polymer is not exposed to high temperature gas or liquid or significant radiation levels. The inspection of the fiber reinforced polymer is every third outage (six years) per unit. The inspection includes visual inspection of the fiber reinforced polymer, visual inspection of mortar joints along the bottom edge of the fiber reinforced polymer strengthened masonry walls, and adhesion pull-off testing of control panels.

The frequency for the inspection of the fiber reinforced polymer was reviewed and approved by the NRC as part of License Amendment Request authorizing a change to the Updated Final Safety Analysis report allowing the use of fiber reinforced polymer on masonry walls for the mitigation of differential pressure created by high winds (ML11164A257). The frequency for the inspection was described as being on the following schedule: “at each unit's outage cycle for the first 6 years from 2012 through 2017, then, if justified based on no observed FRP degradation, transition to every-other outage cycle for the next 4 years from 2018 through 2021, then, if justified based on continued no observed FRP degradation, transition to every third outage cycle thereafter from 2022 until end of license in July 2034.”

The visual inspections and adhesion testing of the fiber reinforced polymer constitutes a more thorough and robust inspection of the fiber reinforced polymer system than the visual inspection of the Structures Monitoring program. If no degradation is noted to the fiber reinforced polymer, mortar joints, or during the adhesion pull-off testing as ONS enters the subsequent period of operation, the continued frequency of every third outage, or six years, per unit, shall remain sufficient for the subsequent period of extended operation.

SLRA Markups

For the SLRA Tables below, the Standard consistency note 'A' is changed to 'B' and standard consistency note 'C' is changed to 'D' for the Aging Management Review line items crediting the *Structures Monitoring* Aging Management Program.

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B1.1.T-25	3.5.1- 089	A
Battery Rack	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B3.T-25	3.5.1- 089	A
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Concrete Elements	FB; FLD; HS; MB; PB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	FB; FLD; HS; MB; PB; SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air (External)	Cracking, Loss of Material	Fire Protection (B2.1.15)	VII.G.A-90	3.3.1- 060	A,1
					Structures Monitoring (B2.1.33)	VII.G.A-90	3.3.1- 060	A B,1
			Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-27	3.5.1- 065	A B,1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B
Concrete Elements (Accessible)	FB; FLD; HS; MB; PB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	FB; FLD; HS; MB; PB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	FB; FLD; HS; MB; PB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
			Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	FB; FLD; HS; MB; PB; SP; SS	Concrete	Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Concrete Hatches	FB; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B
						III.A3.TP-25	3.5.1- 054	A B
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Cumulative Fatigue Damage	TLAA	VII.B.A-06	3.3.1- 001	A
				Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C
Doors	FB; FLD; PB; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air (External)	Loss of Material	Fire Protection (B2.1.15)	VII.G.A-21	3.3.1- 059	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Fiber Reinforced Polymer	SS	Fiber Reinforced Polymer	Air – Outdoor (External)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	Structures Monitoring (B2.1.33)	None	None	J
Lead Shield Support	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Masonry Wall	FB; SS; SP	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A,6
		Masonry Walls	Air (External)	Cracking	Fire Protection (B2.1.15)	VII.G.A-626	3.3.1- 179	A,6
					Masonry Walls (B2.1.32)	VII.G.A-626	3.3.1- 179	A,6

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Metal Siding	FB; PB; SP;	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Spent Fuel Pool Liner Plates	PB; SP; SS	Stainless Steel	Air with Borated Water Leakage (External)	None	None	III.B1.2.TP-4	3.5.1- 098	A
			Concrete (External)	None	None	VII.J.AP-19	3.3.1- 202	C
			Treated Borated Water (External)	Cracking, Loss of Material	Structures Monitoring (B2.1.33)	III.A5.T-14	3.5.1- 078	A B,7
					Water Chemistry (B2.1.2)	III.A5.T-14	3.5.1- 078	A
Spent Fuel Storage Rack	SP; SS	Stainless Steel	Treated Borated Water (External)	Loss of Material	One-Time Inspection (B2.1.20)	VII.A2.A-99	3.3.1- 125	A
					Water Chemistry (B2.1.2)	VII.A2.A-99	3.3.1- 125	A
			Treated Borated Water >60°C (>140°F) (External)	Cracking	One-Time Inspection (B2.1.20)	VII.A2.A-97	3.3.1- 124	A
					Water Chemistry (B2.1.2)	VII.A2.A-97	3.3.1- 124	A

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Stainless Steel Elements	SP; SS	Stainless Steel	Air with Borated Water Leakage (External)	None	None	III.B5.TP-4	3.5.1- 098	A,3
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B,2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B,2
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C,2
Sump	SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,5
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,5
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,5
		Stainless Steel	Air with Borated Water Leakage (External)	None	None	III.B5.TP-4	3.5.1- 098	A,5
			Concrete (External)	None	None	VII.J.AP-19	3.3.1- 202	C,5

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchorage/ Embedments/ Attachments	PB; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	10 CFR 50, Appendix J (B2.1.31)	II.A1.CP-35	3.5.1- 035	A, 2
						II.A1.CP-98	3.5.1- 005	A, 1
					ASME Section XI, Subsection IWE (B2.1.28)	II.A1.CP-35	3.5.1- 035	A, 2
						II.A1.CP-98	3.5.1- 005	A, 1
					Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
						III.B5.TP-43	3.5.1- 092	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C
Bolting (Pressure Retaining)	PB	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	ASME Section XI, Subsection IWE (B2.1.28)	II.A3.CP-148	3.5.1- 031	A
				Loss of Preload	10 CFR 50, Appendix J (B2.1.31)	II.A3.CP-150	3.5.1- 030	A
					ASME Section XI, Subsection IWE (B2.1.28)	II.A3.CP-150	3.5.1- 030	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-248	3.5.1- 080	A B

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Preload	Structures Monitoring (B2.1.33)	III.A4.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-274	3.5.1- 082	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A4.TP-261	3.5.1- 088	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C
Buttresses	SS; SP; MB; HS	Concrete	Air – Outdoor (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-33	3.5.1- 019	A, 2
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-68	3.5.1- 021	A, 2
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-87	3.5.1- 016	A, 2
				Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-31	3.5.1- 018	A, 2
			Soil (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-67	3.5.1- 012	A,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	II.A1.CP-101	3.5.1- 001	A B,1

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Buttresses	SS; SP; MB; HS	Concrete	Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-97	3.5.1- 023	A,1
				Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-147	3.5.1- 011	A,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-102	3.5.1- 014	A,1
						II.A1.CP-32	3.5.1- 020	A, 2
Concrete Elements	FLD; HS; MB; PB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A4.TP-28	3.5.1- 067	A B,6
						III.A4.T-35	3.5.1- 097	I,10
	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	None	None	III.A4.TP-114	3.5.1- 048	I,11
Concrete Elements (Accessible)	FLD; HS; MB; PB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A4.TP-25	3.5.1- 054	A B,6
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A4.TP-26	3.5.1- 066	A B,6
Concrete Elements (Inaccessible)	FLD; HS; MB; PB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A4.TP-204	3.5.1- 043	A B,6

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cylinder Walls	SS; SP; FB; MB; HS	Concrete	Air – Outdoor (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-33	3.5.1- 019	A, 2
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-68	3.5.1- 021	A, 2
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-87	3.5.1- 016	A, 2
				Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-31	3.5.1- 018	A, 2
				None	None	II.A1.CP-34	3.5.1- 003	I,5
			Soil (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-67	3.5.1- 012	A,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	II.A1.CP-101	3.5.1- 001	A, B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-97	3.5.1- 023	A,1
				Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-147	3.5.1- 011	A,1

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Dome	SS; SP; MB; HS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-31	3.5.1- 018	A, 2
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-32	3.5.1- 020	A, 2
Doors	FLD; PB; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-302	3.5.1- 077	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Floor	SS; SP; MB; HS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-33	3.5.1- 019	A,2,7
						II.A1.CP-67	3.5.1- 012	A,1,7
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-68	3.5.1- 021	A,2,7
						II.A1.CP-97	3.5.1- 023	A,1,7
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-100	3.5.1- 024	A,1,7
						II.A1.CP-87	3.5.1- 016	A,2,7

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Foundation Slab	SS; SP; MB; HS	Concrete	Air – Outdoor (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-33	3.5.1- 019	A, 2
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-68	3.5.1- 021	A, 2
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-87	3.5.1- 016	A, 2
				Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-31	3.5.1- 018	A, 2
			Soil (External)	Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-67	3.5.1- 012	A,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	II.A1.CP-101	3.5.1- 001	A, <u>B</u> ,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-97	3.5.1- 023	A,1
				Loss of Material (Spalling, Scaling), Cracking	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-147	3.5.1- 011	A,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-102	3.5.1- 014	A,1

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Foundation Slab	SS; SP; MB; HS	Concrete	Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.CP-32	3.5.1- 020	A, 2
				Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	II.A1.C-07	3.5.1- 002	A B, 1
Lead Shield Support	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-302	3.5.1- 077	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Liner; Liner Anchors; Integral Attachments	PB; SS; HS	Steel	Air – Indoor Uncontrolled (External)	Cumulative Fatigue Damage	TLAA	II.A3.C-13	3.5.1- 009	A
				Loss of Material	10 CFR 50, Appendix J (B2.1.31)	II.A1.CP-35	3.5.1- 035	A, 2
						II.A1.CP-98	3.5.1- 005	A, 1
					ASME Section XI, Subsection IWE (B2.1.28)	II.A1.CP-35	3.5.1- 035	A, 2
						II.A1.CP-98	3.5.1- 005	A, 1
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C
Masonry Wall	SP; SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A5.T-12	3.5.1- 070	A

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Service Level I Coatings	MCI	Coatings	Air – Indoor Uncontrolled (External)	Loss of Coating or Lining Integrity	Protective Coating Monitoring and Maintenance (B2.1.35)	II.A3.CP-152	3.5.1- 034	A
						III.A4.TP-301	3.5.1- 073	A
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-302	3.5.1- 077	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
	SS	Stainless Steel	Air – Indoor Uncontrolled (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B5.T-37b	3.5.1- 100	A B,3
			Air with Borated Water Leakage (External)	None	None	III.B5.TP-4	3.5.1- 098	A,3
		Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-302	3.5.1- 077	A B
		Steel (with Stainless Steel Cladding)	Air – Indoor Uncontrolled (External)	Cracking, Loss of Material	Structures Monitoring (B2.1.33)	III.B5.T-37b	3.5.1- 100	A B,4
			Air with Borated Water Leakage (External)	None	None	III.B5.TP-4	3.5.1- 098	A,4
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.C-10	3.5.1- 032	A
					Secondary Shield Wall Tendon Surveillance Program (B4.1)	II.A1.C-10	3.5.1- 032	E,9

Table 3.5.2-2 Containments, Structures, and Component Supports - Reactor Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG- 2192 Table 1	Notes
Tendon Anchorage	SS	Steel	Air – Outdoor (External)	Loss of Material	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.C-10	3.5.1- 032	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A,9
Tendon Wire	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	ASME Section XI, Subsection IWL (B2.1.29)	II.A1.C-10	3.5.1- 032	A
					Secondary Shield Wall Tendon Surveillance Program (B4.1)	II.A1.C-10	3.5.1- 032	E,9
				Loss of Prestress	Secondary Shield Wall Tendon Surveillance Program (B4.1)	II.A1.C-11	3.5.1- 008	E,9
					TLAA	II.A1.C-11	3.5.1- 008	A,12
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A,9
Unit Vent	GR	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-302	3.5.1- 077	E , D
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A4.TP-302	3.5.1- 077	E , D
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A

Table 3.5.2-3 Containments, Structures, and Component Supports - Turbine Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG- 2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B5.TP-43	3.5.1- 092	A, B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A, B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A, B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A, B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A, B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A, B
Concrete Elements	FB; FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A, B, 1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A, B, 1
			Air (External)	Cracking, Loss of Material	Fire Protection (B2.1.15)	VII.G.A-90	3.3.1- 060	A, 1
					Structures Monitoring (B2.1.33)	VII.G.A-90	3.3.1- 060	A, B, 1

Table 3.5.2-3 Containments, Structures, and Component Supports - Turbine Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	FB; FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-27	3.5.1- 065	A, B, 1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A, B, 1
Concrete Elements (Accessible)	FB; FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A, B, 1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A, B, 1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A, B, 1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A, B, 1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A, B, 1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A, B, 1
Concrete Elements (Inaccessible)	FB; FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A, B, 1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A, B, 1

Table 3.5.2-3 Containments, Structures, and Component Supports - Turbine Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	FB; FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A, B, 1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A, B, 1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A, B, 1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A, B, 1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A, B, 1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A, B, 1
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Cumulative Fatigue Damage	TLAA	VII.B.A-06	3.3.1- 001	A
				Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A

Table 3.5.2-3 Containments, Structures, and Component Supports - Turbine Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
Doors	FB; FLD; MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air (External)	Loss of Material	Fire Protection (B2.1.15)	VII.G.A-21	3.3.1- 059	A
Masonry Wall	FB; SS; SP	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A,3
		Masonry Walls	Air (External)	Cracking	Fire Protection (B2.1.15)	VII.G.A-626	3.3.1- 179	A,3
					Masonry Walls (B2.1.32)	VII.G.A-626	3.3.1- 179	A,3
Metal Siding	SP	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Table 3.5.2-3 Containments, Structures, and Component Supports - Turbine Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steel Elements	SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations, sumps, pads and the concrete portion of the CT4 missile door.
2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders and embedded steel (including the portion in the CT4 missile door).
3. The Masonry Walls are internal to the building structure and are not subject to air - outdoor aging effects.

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B5.TP-43	3.5.1- 092	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Battery Rack	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Water – Flowing (External)	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-221	3.5.1- 083	A,7
				Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A3.TP-261	3.5.1- 088	E,7

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A3.TP-31	3.5.1- 046	E,1,8
Concrete Elements (Accessible)	MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	MB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A, B, 1
			Groundwater/S oil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-27	3.5.1- 065	A, B, 1
			Water – Flowing (External)	Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A3.TP-25	3.5.1- 054	E, 1, 8
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-38	3.5.1- 059	A, 1, 8
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A3.TP-24	3.5.1- 063	E, 1, 8
Concrete Elements (Inaccessible)	MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A, B, 1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A, B, 1
			Groundwater/S oil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A, B, 1

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	MB; SP; SS	Concrete	Groundwater/Soil (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Concrete Hatches	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B
						III.A3.TP-25	3.5.1- 054	A B
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
Doors	MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Masonry Wall	SP; SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A
Penstock, Power Tunnels, Spillway, Intake: Bolting (Structural)	SS	Stainless Steel	Air – Outdoor (External)	Loss of Material, Cracking	FERC Inspections of the Keowee Hydro Station	III.B2.T-37b	3.5.1- 100	E,6
				Loss of Preload	FERC Inspections of the Keowee Hydro Station	III.A6.TP-261	3.5.1- 088	E,6
		Steel	Air – Outdoor (External)	Loss of Material	FERC Inspections of the Keowee Hydro Station	III.A6.TP-221	3.5.1- 083	A,6

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
			Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2
Trash Rack Filter	F; SS	Stainless Steel	Air – Outdoor (External)	Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-261	3.5.1- 088	E,4,8
			Air (External)	Loss of Material, Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.B5.T-37b	3.5.1- 100	E,4,8
			Water – Flowing (External)	Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-261	3.5.1- 088	E,4,8
		Steel	Air – Outdoor (External)	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-221	3.5.1- 083	A,4,8
						III.B5.TP-43	3.5.1- 092	E,4,8

Table 3.5.2-5 Containments, Structures, and Component Supports - Electrical Related Structures - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Stainless Steel	Air – Indoor Uncontrolled (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B3.T-37b	3.5.1- 100	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B3.T-37b	3.5.1- 100	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Battery Rack	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B

Table 3.5.2-5 Containments, Structures, and Component Supports - Electrical Related Structures - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements (Accessible)	SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1

Table 3.5.2-5 Containments, Structures, and Component Supports - Electrical Related Structures - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A <u>B</u> ,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A <u>B</u> ,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A <u>B</u> ,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A <u>B</u> ,1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A <u>B</u> ,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A <u>B</u> ,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A <u>B</u> ,1
Doors	SP	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A <u>B</u>
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A <u>B</u>
Masonry Wall	SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A

Table 3.5.2-5 Containments, Structures, and Component Supports - Electrical Related Structures - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Metal Siding	SP	Aluminum	Air – Outdoor (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B3.T-37b	3.5.1- 100	C D
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
			Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B , 2
	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B , 2
Transmission Tower	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations, and pads.
2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders, and embedded steel.

Table 3.5.2-7 Containments, Structures, and Component Supports - Borated Water Storage Tank Superstructure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A8.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A8.TP-261	3.5.1- 088	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A8.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A8.TP-261	3.5.1- 088	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Concrete Elements	SS; MB	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	C D,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	C D,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-204	3.5.1- 043	A B,1

Table 3.5.2-7 Containments, Structures, and Component Supports - Borated Water Storage Tank Superstructure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	SS; MB	Concrete	Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A8.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	SS; MB	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-25	3.5.1- 054	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-25	3.5.1- 054	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A8.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	SS; MB	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A8.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A8.TP-29	3.5.1- 067	A B,1

Table 3.5.2-7 Containments, Structures, and Component Supports - Borated Water Storage Tank Superstructure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG- 2192 Table 1	Notes
Concrete Elements (Inaccessible)	SS; MB	Concrete	Groundwater/S oil (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A <u>B</u> , 1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A8.TP-204	3.5.1- 043	A <u>B</u> , 1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A8.TP-67	3.5.1- 047	A <u>B</u> , 1
Doors	MB; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A8.TP-302	3.5.1- 077	A <u>B</u>
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Steel Elements	SS; MB	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A8.TP-302	3.5.1- 077	A <u>B</u> , 2
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders and embedded steel.

Table 3.5.2-8 Containments, Structures, and Component Supports - Essential Siphon Vacuum Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1

Table 3.5.2-8 Containments, Structures, and Component Supports - Essential Siphon Vacuum Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
	SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
	SP; SS	Concrete	Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/S oil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1

Table 3.5.2-8 Containments, Structures, and Component Supports - Essential Siphon Vacuum Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/Soil (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Doors	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Metal Siding	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A2.TP-302	3.5.1- 077	A B
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders and embedded steel.

Table 3.5.2-9 Containments, Structures, and Component Supports - Intake Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A6.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A6.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A6.TP-261	3.5.1- 088	A B
			Water – Flowing (External)	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-221	3.5.1- 083	A
				Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-261	3.5.1- 088	E
Concrete Elements	SP; SS	Concrete	Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-220	3.5.1- 050	A B,1
	SP; SS	Concrete	Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A6.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.T-20	3.5.1- 056	A,1
				Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1

Table 3.5.2-9 Containments, Structures, and Component Supports - Intake Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-25	3.5.1- 054	A, B, 1
	SP; SS	Concrete	Air – Outdoor (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-38	3.5.1- 059	A, 1
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-37	3.5.1- 061	A, 1
	SP; SS	Concrete	Water – Flowing (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-38	3.5.1- 059	A, 1
	SP; SS	Concrete	Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-37	3.5.1- 061	A, 1
Concrete Elements (Inaccessible)	SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-25	3.5.1- 054	A, B, 1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A6.TP-104	3.5.1- 065	A, B, 1
	SP; SS	Concrete	Groundwater/S oil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-220	3.5.1- 050	A, B, 1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A6.TP-104	3.5.1- 065	A, B, 1

Table 3.5.2-9 Containments, Structures, and Component Supports - Intake Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG- 2192 Table 1	Notes
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/ Soil (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A6.TP-107	3.5.1- 067	A B,1
	SP; SS	Concrete	Groundwater/ Soil (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-110	3.5.1- 049	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-220	3.5.1- 050	A B,1
	SP; SS	Concrete	Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A6.TP-109	3.5.1- 051	A B,1
Steel Elements	SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders and embedded steel.

Table 3.5.2-10 Containments, Structures, and Component Supports - Protected Service Water Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Battery Rack	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1

Table 3.5.2-10 Containments, Structures, and Component Supports - Protected Service Water Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	FLD; MB; SP; SS	Concrete	Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1

Table 3.5.2-10 Containments, Structures, and Component Supports - Protected Service Water Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
Doors	FLD; MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B

Table 3.5.2-10 Containments, Structures, and Component Supports - Protected Service Water Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG- 2192 Table 1	Notes
Doors	FLD; MB; SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	FLD; MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

- 1 . Concrete Elements include beams, columns, walls, slabs, curbs, foundations, and pads.
- 2 . Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders, and embedded steel.

Table 3.5.2-11 Containments, Structures, and Component Supports - Protected Service Water Conduit Duct Banks - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-11 Containments, Structures, and Component Supports - Protected Service Water Conduit Duct Banks - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/S oil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Steel Elements	FLD; MB; SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Table 3.5.2-12 Containments, Structures, and Component Supports - Standby Shutdown Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Battery Rack	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1

Table 3.5.2-12 Containments, Structures, and Component Supports - Standby Shutdown Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	FLD; MB; SP; SS	Concrete	Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
			Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1

Table 3.5.2-12 Containments, Structures, and Component Supports - Standby Shutdown Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A <u>B</u> ,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A <u>B</u> ,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A <u>B</u> ,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A <u>B</u> ,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A <u>B</u> ,1
Concrete Hatches	MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A <u>B</u>
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A

Table 3.5.2-12 Containments, Structures, and Component Supports - Standby Shutdown Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG- 2192 Table 1	Notes
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
Doors	FLD; MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Roof Membrane	SP	Elastomer , Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	FLD; MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations, and pads.
2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders, and embedded steel.

Table 3.5.2-13 Containments, Structures, and Component Supports - Radwaste Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A <u>B</u>
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A <u>B</u>
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A <u>B</u>
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A <u>B</u>
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A <u>B</u>
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A <u>B</u>
Concrete Elements	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A <u>B</u> ,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A <u>B</u> ,1
			Air – Outdoor (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A <u>B</u> ,1

Table 3.5.2-13 Containments, Structures, and Component Supports - Radwaste Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
Concrete Elements (Accessible)	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1

Table 3.5.2-13 Containments, Structures, and Component Supports - Radwaste Facility - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/Soil (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Doors	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Masonry Wall	SP; SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Table 3.5.2-14 Containments, Structures, and Component Supports - Trenches - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-14 Containments, Structures, and Component Supports - Trenches - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1

Table 3.5.2-14 Containments, Structures, and Component Supports - Trenches - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steel Elements	FLD; MB; SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B,2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations, and pads.
2. Steel elements include beams, columns, baseplates, bracing, platforms, grating, decking, ladders, and embedded steel.

Table 3.5.2-15 Containments, Structures, and Component Supports - Technical Support Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-15 Containments, Structures, and Component Supports - Technical Support Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1

Table 3.5.2-15 Containments, Structures, and Component Supports - Technical Support Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steel Elements	FLD; MB; SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
2. Steel elements include beams, columns, baseplates, bracing, platforms, grating, decking, ladders and embedded steel.

Table 3.5.2-16 Containments, Structures, and Component Supports - Elevated Water Storage Tank Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A <u>B</u>
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A <u>B</u>
Steel Elements	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A <u>B</u> ,1

Plant Specific Notes:

- 1 . Steel elements include the cylindrical tank support shaft, anchor chair, and plate assemblies.

Table 3.5.2-17 Containments, Structures, and Component Supports - Microwave House Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
	SP; SS	Concrete	Air – Outdoor (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-17 Containments, Structures, and Component Supports - Microwave House Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
	SP; SS	Concrete	Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
	SP; SS	Concrete	Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
Concrete Elements (Accessible)	SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1

Table 3.5.2-17 Containments, Structures, and Component Supports - Microwave House Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	SP; SS	Concrete	Groundwater/S oil (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Doors	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Metal Siding	SP	Aluminum	Air – Outdoor (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B3.T-37b	3.5.1- 100	C D
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B

Table 3.5.2-17 Containments, Structures, and Component Supports - Microwave House Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steel Elements	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A <u>B</u> , 2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A <u>B</u> , 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations, and pads.
2. Steel elements include beams, columns, baseplates, bracing, platforms, grating, decking, ladders, and embedded steel.

Table 3.5.2-18 Containments, Structures, and Component Supports - Manholes - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-31	3.5.1- 046	A B,1
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-18 Containments, Structures, and Component Supports - Manholes - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	FLD; MB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	FLD; MB; SP; SS	Concrete	Groundwater/S oil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1

Table 3.5.2-18 Containments, Structures, and Component Supports - Manholes - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steel Elements	FLD; MB; SP; SS	Steel	Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
2. Steel elements include beams, columns, baseplates, bracing, platforms, grating, decking, ladders and embedded steel.

Table 3.5.2-20 Containments, Structures, and Component Supports - Health Physics Office Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A B
Concrete Elements	SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
Concrete Elements (Accessible)	SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1

Table 3.5.2-20 Containments, Structures, and Component Supports - Health Physics Office Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	SS	Concrete	Groundwater/S oil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				None	None	III.A3.TP-108	3.5.1- 042	I,1,3
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1

Table 3.5.2-20 Containments, Structures, and Component Supports - Health Physics Office Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Doors	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B
Metal Siding	SP	Aluminum	Air – Outdoor (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B3.T-37b	3.5.1- 100	C D
Roof Membrane	SP	Elastomer, Rubber and Other Similar Materials	Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	A B
Steel Elements	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A B, 2

Plant Specific Notes:

1. Concrete Elements include the footers and slabs.
2. Steel elements includes support members, bearing plates, base plates and connections
3. The concrete is not subject to loss of material (spalling, scaling) and cracking due to freeze-thaw. See Further Evaluation 3.5.2.2.2.1.1.

Table 3.5.2-21 Containments, Structures, and Component Supports - Administration Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
Concrete Elements (Accessible)	SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A B,1

Table 3.5.2-21 Containments, Structures, and Component Supports - Administration Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	SS	Concrete	Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	SS	Concrete	Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				None	None	III.A3.TP-108	3.5.1- 042	I,1,2
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Masonry Wall	SP; SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A

Plant Specific Notes:

1. Concrete Elements include the foundation.
2. The concrete is not subject to loss of material (spalling, scaling) and cracking due to freeze-thaw. See Further Evaluation 3.5.2.2.2.1.1.

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Aluminum Elements	SS	Aluminum	Air (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B2.T-37b	3.5.1- 100	A, B, 2
						III.B3.T-37b	3.5.1- 100	A, B, 2
						III.B4.T-37b	3.5.1- 100	A, B, 2
						III.B5.T-37b	3.5.1- 100	A, B, 2
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B2.TP-43	3.5.1- 092	A, B
						III.B3.TP-43	3.5.1- 092	A, B
						III.B4.TP-43	3.5.1- 092	A, B
						III.B5.TP-43	3.5.1- 092	A, B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B2.T-25	3.5.1- 089	A, 5
						III.B3.T-25	3.5.1- 089	A, 5
						III.B4.T-25	3.5.1- 089	A, 5
						III.B5.T-25	3.5.1- 089	A, 5
ASME Piping: Anchorage	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.2.T-24	3.5.1- 091	A
						III.B1.2.TP-226	3.5.1- 081	A
				Loss of Preload	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.2.TP-229	3.5.1- 087	A

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
ASME Piping: Support members	SS	Steel	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B1.2.T-25	3.5.1- 089	A,5
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B2.TP-248	3.5.1- 080	A B
						III.B3.TP-248	3.5.1- 080	A B
						III.B4.TP-248	3.5.1- 080	A B
						III.B5.TP-248	3.5.1- 080	A B
				Loss of Preload	Structures Monitoring (B2.1.33)	III.B2.TP-261	3.5.1- 088	A B
						III.B3.TP-261	3.5.1- 088	A B
						III.B4.TP-261	3.5.1- 088	A B
						III.B5.TP-261	3.5.1- 088	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B2.T-25	3.5.1- 089	A,1,5
						III.B3.T-25	3.5.1- 089	A,1,5
						III.B4.T-25	3.5.1- 089	A,1,5
						III.B5.T-25	3.5.1- 089	A,1,5
Conduit	SP	Aluminum	Air (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B2.T-37b	3.5.1- 100	A B
		PVC	Air – Indoor Uncontrolled (External)	None	None	VII.J.AP-268	3.3.1- 119	C

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Conduit	SP	PVC	Concrete (External)	None	None	VII.J.A-709	3.3.1- 184	C
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B2.TP-43	3.5.1- 092	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B2.TP-43	3.5.1- 092	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B2.T-25	3.5.1- 089	A,5
			Concrete (External)	None	None	VII.J.AP-282	3.3.1- 112	C
RCS Support: Anchorage	SS	High-Strength Steel	Air (External)	Cracking	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.1.TP-41	3.5.1- 068	A
		Stainless Steel	Air (External)	Cracking, Loss of Material	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.1.T-36b	3.5.1- 099	A
			Air with Borated Water Leakage (External)	None	None	III.B1.1.TP-4	3.5.1- 098	A
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.1.T-24	3.5.1- 091	A
						III.B1.1.TP-226	3.5.1- 081	A
				Loss of Preload	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.1.TP-229	3.5.1- 087	A
				Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B1.1.T-25	3.5.1- 089	A,5

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
RCS Support: Support members	SS	Steel	Air – Indoor Uncontrolled (External)	Cumulative Fatigue Damage (Only if CLB fatigue analysis exists)	TLAA	III.B1.1.T-26	3.5.1- 053	A
				Loss of Material	ASME Section XI, Subsection IWF (B2.1.30)	III.B1.1.T-24	3.5.1- 091	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B1.1.T-25	3.5.1- 089	A,5
Stainless Steel Elements	SS	Stainless Steel	Air (External)	Loss of Material, Cracking	Structures Monitoring (B2.1.33)	III.B2.T-37b	3.5.1- 100	A B,3
						III.B3.T-37b	3.5.1- 100	A B,3
						III.B4.T-37b	3.5.1- 100	A B,3
						III.B5.T-37b	3.5.1- 100	A B,3
			Air with Borated Water Leakage (External)	None	None	III.B2.TP-4	3.5.1- 098	A,3
						III.B3.TP-4	3.5.1- 098	A,3
						III.B4.TP-4	3.5.1- 098	A,3
						III.B5.TP-4	3.5.1- 098	A,3
Steel Elements	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B2.TP-43	3.5.1- 092	A B,1
						III.B3.TP-43	3.5.1- 092	A B,1
						III.B4.TP-43	3.5.1- 092	A B,1

Table 3.5.2-22 Containments, Structures, and Component Supports - Component Supports - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steel Elements	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B5.TP-43	3.5.1- 092	A, B, 1
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B2.TP-43	3.5.1- 092	A, B, 1
						III.B3.TP-43	3.5.1- 092	A, B, 1
						III.B4.TP-43	3.5.1- 092	A, B, 1
						III.B5.TP-43	3.5.1- 092	A, B, 1
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B2.T-25	3.5.1- 089	A, 1, 5
						III.B3.T-25	3.5.1- 089	A, 1, 5
						III.B4.T-25	3.5.1- 089	A, 1, 5
						III.B5.T-25	3.5.1- 089	A, 1, 5
Wear Plate	SP	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B4.TP-43	3.5.1- 092	C, D
						None	None	H
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B4.T-25	3.5.1- 089	C, 5

Table 3.5.2-23 Containments, Structures, and Component Supports - Miscellaneous Structural Commodities - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B,1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
Concrete Elements (Accessible)	SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B,1
			Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-27	3.5.1- 065	A B,1
			Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B,1
Concrete Elements (Inaccessible)	SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
			Groundwater/Soil (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-204	3.5.1- 043	A B,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-212	3.5.1- 065	A B,1

Table 3.5.2-23 Containments, Structures, and Component Supports - Miscellaneous Structural Commodities - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Inaccessible)	SS	Concrete	Groundwater/S oil (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-29	3.5.1- 067	A B,1
				Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-108	3.5.1- 042	A B,1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A B,1
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-67	3.5.1- 047	A B,1
Drains/ Curbs	DF	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A B
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B

Table 3.5.2-23 Containments, Structures, and Component Supports - Miscellaneous Structural Commodities - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Drains/ Curbs	DF	Concrete	Air – Outdoor (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A B
			Water – Flowing (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A B
				Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B2.1.33)	III.A3.TP-24	3.5.1- 063	A B
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	Ⓔ D
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	Ⓔ D
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B2.T-25	3.5.1- 089	A,5
Electrical Enclosure	SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A B
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B3.T-25	3.5.1- 089	A,5
Fire Barriers - Penetration Seals	FB	Cerafiber Bulk, Cerafiber Blanket, Cerafoam, Pyrocrete, Mineral Wool, 3M Putty	Air (External)	Loss of Material, Cracking or Delamination, Change in Material Properties, Separation	Fire Protection (B2.1.15)	VII.G.A-807	3.3.1- 269	A

Table 3.5.2-23 Containments, Structures, and Component Supports - Miscellaneous Structural Commodities - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Fire Barriers - Penetration Seals	FB	Elastomer, Rubber and Other Similar Materials	Air (External)	Hardening, loss of strength, or shrinkage	Fire Protection (B2.1.15)	VII.G.A-19	3.3.1- 057	A
		Grout	Air (External)	Cracking, Loss of Material	Fire Protection (B2.1.15)	VII.G.A-90	3.3.1- 060	A
					Structures Monitoring (B2.1.33)	VII.G.A-90	3.3.1- 060	A B
Grout	SS	Grout	Air – Indoor Uncontrolled (External)	Reduction in Concrete Anchor Capacity	Structures Monitoring (B2.1.33)	III.B1.1.TP-42	3.5.1- 055	A B
						III.B1.2.TP-42	3.5.1- 055	A B
						III.B2.TP-42	3.5.1- 055	A B
						III.B3.TP-42	3.5.1- 055	A B
						III.B4.TP-42	3.5.1- 055	A B
						III.B5.TP-42	3.5.1- 055	A B
			Air – Outdoor (External)	Reduction in Concrete Anchor Capacity	Structures Monitoring (B2.1.33)	III.B1.2.TP-42	3.5.1- 055	A B
						III.B2.TP-42	3.5.1- 055	A B
						III.B3.TP-42	3.5.1- 055	A B
						III.B4.TP-42	3.5.1- 055	A B
						III.B5.TP-42	3.5.1- 055	A B

Table 3.5.2-23 Containments, Structures, and Component Supports - Miscellaneous Structural Commodities - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Penetration Seals	FLD	Elastomer, Rubber and Other Similar Materials	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	<u>A</u> <u>B</u>
Penetration Sleeve	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	<u>A</u> <u>B</u> ,4
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B4.T-25	3.5.1- 089	A,5
Piles	SS	Steel	Groundwater/Soil (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-219	3.5.1- 079	<u>C</u> <u>D</u> , 2, 3
Seismic Gap Cover	SP	Elastomer, Rubber and Other Similar Materials	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	<u>A</u> <u>B</u>
			Air – Outdoor (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	<u>A</u> <u>B</u>
		Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	<u>A</u> <u>B</u>
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	<u>A</u> <u>B</u>
Seismic Gap Filler Material	FB; SP	Cork	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	None	None	F
		Elastomer	Air – Indoor Uncontrolled (External)	Loss of Sealing	Structures Monitoring (B2.1.33)	III.A6.TP-7	3.5.1- 072	<u>A</u> <u>B</u>
Vibration Isolator	SS	Non-Metallic (e.g., Rubber)	Air – Indoor Uncontrolled (External)	Reduction or Loss of Isolation Function	Structures Monitoring (B2.1.33)	III.B4.TP-44	3.5.1- 094	<u>A</u> <u>B</u>

ATTACHMENT 5

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

UPDATED TO ADDRESS STEEL OR STAINLESS STEEL
COMPONENTS IN A CONCRETE ENVIRONMENT

Updated to Address steel or stainless steel components in a concrete environment

(TRP-85)

Affected SLRA Sections:

SLRA Section 3.1.2.2.15

SLRA Table 3.1.1

SLRA Page Numbers:

3-37

3-73

Description of Change:

The evaluation in Section 3.1.2.2.15 should be revised as follows: “[3.1.1-105], [3.1.1-115] – There are no steel or stainless steel piping or piping components exposed to concrete in the ONS Reactor Coolant System.”

SLRA Table 3.1.1 (Item 3.1.1-105) should be revised to include the following statement in the discussion: “Not applicable. ONS has no steel piping, piping components exposed to concrete in the Reactor Vessel, Internals, and Reactor Coolant System. The associated NUREG-2191 aging items are not used.”

SLRA Section 3.1.2.2.15 (page 3-37) is revised as follows:

3.1.2.2.15 Loss of Material Due to General, Crevice or Pitting Corrosion and Cracking Due to Stress Corrosion Cracking

Evaluation

[3.1.1-105], [3.1.1-115] – There are no steel or stainless steel piping or piping components exposed to concrete in the ONS Reactor Coolant System.

SLRA Table 3.1.1 (page 3-73) is revised as follows:

Table 3.1.1 Summary of Aging Management Programs for Reactor Vessel, Internals, and Reactor Coolant System Evaluated in Chapter IV of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1-102	Stainless steel fuel supports and control rod drive assemblies control rod drive housing exposed to reactor coolant	Cracking due to stress corrosion cracking, IGSCC	AMP XI.M9, "BWR Vessel Internals," and AMP XI.M2, "Water Chemistry"	No	Not applicable- BWR only
3.1.1-103	Stainless steel, nickel alloy reactor internal components exposed to reactor coolant and neutron flux	Cracking due to stress corrosion cracking, IGSCC, IASCC	AMP XI.M9, "BWR Vessel Internals," and AMP XI.M2, "Water Chemistry"	Yes (SRP-SLR Section 3.1 2 2.12)	Not applicable- BWR only
3.1.1-104	Nickel alloy reactor vessel internal components exposed to reactor coolant and neutron flux	Cracking due to IGSCC	AMP XI.M9, "BWR Vessel Internals," and AMP XI.M2, "Water Chemistry"	No	Not applicable- BWR only
3.1.1-105	Steel piping, piping components exposed to concrete	None	None	Yes (SRP-SLR Section 3.1 2 2.15)	Not applicable. ONS has no stainless steel piping, piping components exposed to concrete in the Reactor Vessel, Internals, and Reactor Coolant System. The associated NUREG-2191 aging items are not used.
3.1.1-106	Nickel alloy piping, piping components exposed to air with borated water leakage	None	None	No	Consistent with NUREG-2191.
3.1.1-107	Stainless steel piping, piping components exposed to gas, air with borated water leakage	None	None	No	Consistent with NUREG-2191.

ATTACHMENT 6

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

CORRECTED STANDARD INDUSTRY NOTES FOR AGING
MANAGEMENT EVALUATION OF STEAM GENERATORS

Corrected Standard Industry Notes for Aging Management Evaluation of Steam Generators

(TRP-73)

Affected SLRA Sections:

SLRA Table 3.1.2-4

SLRA Page Numbers:

3-193
3-196
3-198
3-199
3-200
3-201
3-203
3-204
3-205

Description of Change:

For the bullet item below, the environment was corrected to show Steam instead of Treated Water which will align with the GALL-SLR line item used.

- [page 3-193] Cumulative fatigue damage of steel auxiliary feedwater nozzle inlet header exposed internally to treated water, however, the environments for the cited Aging Management Review item are secondary feedwater and steam

For the bullet item below, the environment of Secondary Feedwater is the same as Treated Water for the Steam Generator components. A plant specific note was added to Aging Management Review line item IV.D2.R-31 to clarify that the environments are the same.

- [page 3-199] Loss of material of steel secondary manway and handhole opening covers exposed internally to secondary feedwater, however, the Aging Management Review items cited are for treated water or steam, and steam generator components: shell assembly

For all bullet line items below, Note A was revised to Note C to match to the applicable line item:

- [page 3-196] Loss of material of steel main feedwater nozzle inlet headers exposed internally to secondary feedwater, however, the Aging Management Review item cited is for steam generator components: shell assembly
- [page 3-198] Cracking of steel (with stainless steel cladding) primary nozzles exposed internally to reactor coolant, however, the Aging Management Review item cited is for primary side components: upper and lower heads and tube sheet welds
- [page 3-199] Loss of material of steel secondary manway and handhold opening covers exposed externally to uncontrolled indoor air, however, the Aging Management Review item cited is for piping and piping components
- [page 3-199] Cumulative fatigue damage of steel secondary manway and handhold opening covers exposed internally to secondary feedwater, however, the Aging Management Review item cited is for steam generator components: top head; steam nozzle and safe end; upper and lower shell; feedwater and auxiliary feedwater nozzle and safe end; feedwater impingement plate and support

- [page 3-200] Loss of material of steel secondary side nozzles (vent, drain, and instrumentation) exposed internally to secondary feedwater, however, the Aging Management Review item cited is for steam generator components: shell assembly
- [page 3-200] Loss of material of steel shell assembly exposed externally to uncontrolled indoor air, however, the Aging Management Review item cited is for piping and piping components
- [page 3-201] Loss of material of steel steam outlet nozzle exposed internally to steam, however, the Aging Management Review item cited is for steam generator components: shell assembly
- [page 3-201] Cumulative fatigue damage of nickel alloy tube plugs exposed externally to reactor coolant, however, the Aging Management Review item cited is for tubes and sleeves
- [page 3-201] Loss of material of nickel alloy tube plugs exposed externally to reactor coolant, however, the Aging Management Review item cited is for piping, piping components; flanges; heater sheaths and sleeves; penetrations; thermal sleeves; nonreactor vessel shells, heads, nozzles, nozzle safe ends; welds
- [page 3-201] Cumulative fatigue damage of steel tube support plate assembly (spacers, nuts, keys, and wedges) exposed externally to secondary feedwater, however, the Aging Management Review item cited is for steam generator components: top head; steam nozzle and safe end; upper and lower shell; feedwater and auxiliary feedwater nozzle and safe end; feedwater impingement plate and support
- [page 3-201] Loss of material of steel tube support plate assembly (spacers, nuts, keys, and wedges) exposed externally to secondary feedwater, however, the Aging Management Review item cited is for steam generator: tube bundle wrapper and associated supports and mounting hardware
- [page 3-203] Loss of material of nickel alloy tubes exposed internally to reactor coolant , however, the Aging Management Review cited is for piping, piping components; flanges; heater sheaths and sleeves; penetrations; thermal sleeves; nonreactor vessel shells, heads, nozzles, nozzle safe ends; welds
- [page 3-203] Loss of material of steel tubesheet exposed externally to secondary feedwater, however, the Aging Management Review item cited is for steam generator: tube bundle wrapper and associated supports and mounting hardware
- [page 3-203] Loss of material of steel with nickel alloy cladding tubesheet exposed externally to uncontrolled indoor air, however, the Aging Management Review item cited is for steel piping and piping components
- [page 3-204] Cumulative fatigue damage of nickel alloy tube-to-tube sheet welds exposed internally to reactor coolant, however, the Aging Management Review item cited is for tubes and sleeves
- [page 3-204] Cracking of nickel alloy tube-to-tube sheet welds exposed externally to secondary feedwater, however, the Aging Management Review item cited is for tubes and sleeves
- [page 3-204] Loss of material of nickel alloy tube-to-tube sheet welds exposed externally to secondary feedwater, however, the Aging Management Review item cited is for tubes and sleeves
- [page 3-205] Cumulative fatigue damage of steel (with stainless steel cladding) upper and lower heads exposed internally to reactor coolant, however, the Aging Management Review item cited is for once- through steam generator components: primary side nozzles, safe ends, welds

The following SLRA Table 3.1.2-4 line items for tube support plate assemblies (support rod and tube support plates) were corrected to align with GALL-SLR line item IV.D1.RP-384 for cracking:

- Cracking of stainless steel tube support plate assembly (support rod) exposed externally to secondary feedwater, however, no NUREG-2191 item or NUREG-2192 Table 1 are cited
- Cracking of stainless steel tube support plate assembly (tube support plates) exposed externally to secondary feedwater, however, no NUREG-2191 item or NUREG-2192 Table 1 are cited

In addition, the Note E was changed to Note C for these items to match to IV.D1.RP-384.

SLRA Table 3.1.2-4 (page 3-193) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Auxiliary Feedwater and Main Feedwater Closure Bolting	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Bolting Integrity (B2.1.9)	IV.D2.RP-166	3.1.1- 064	A
				Loss of Preload	Bolting Integrity (B2.1.9)	IV.D2.RP-46	3.1.1- 067	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
Auxiliary Feedwater Nozzle Flanges	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	VIII.H.S-452b	3.4.1- 104	A
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.H.S-451b	3.4.1- 103	A
			Air with Borated Water Leakage (External)	None	None	IV.E.RP-05	3.1.1- 107	A
			<u>Steam (Internal)</u>	<u>Cumulative Fatigue Damage</u>	<u>TLAA</u>	<u>IV.C2.R-18</u>	<u>3.1.1- 005</u>	<u>C</u>
			Treated Water (Internal)	Cracking	One-Time Inspection (B2.1.20)	None	None	A
					Water Chemistry (B2.1.2)	None	None	A
				<u>Cumulative Fatigue Damage</u>	<u>TLAA</u>	<u>IV.C2.R-18</u>	<u>3.1.1- 005</u>	<u>C</u>
				Loss of Material	One-Time Inspection (B2.1.20)	VIII.G.SP-87	3.4.1- 085	A
					Water Chemistry (B2.1.2)	VIII.G.SP-87	3.4.1- 085	A

SLRA Table 3.1.2-4 (page 3-196) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Main Feedwater Nozzle Inlet Headers	Pressure Boundary	Steel	Secondary Feedwater (Internal)	Cumulative Fatigue Damage	TLAA	IV.D2.R-33	3.1.1- 005	A
				Loss of Material	One-Time Inspection (B2.1.20)	IV.D2.RP-153	3.1.1- 083	A C
					Water Chemistry (B2.1.2)	IV.D2.RP-153	3.1.1- 083	A C
				Wall Thinning	Flow-Accelerated Corrosion (B2.1.8)	IV.D2.R-38	3.1.1- 061	A
Main Feedwater Nozzle Spray Plates	Pressure Boundary	Nickel Alloy	Secondary Feedwater (External)	Cracking	One-Time Inspection (B2.1.20)	IV.D2.R-36	3.1.1- 078	A
					Water Chemistry (B2.1.2)	IV.D2.R-36	3.1.1- 078	A
				Cumulative Fatigue Damage	TLAA	IV.D2.R-46	3.1.1- 002	C
				Loss of Material	One-Time Inspection (B2.1.20)	None	None	F
					Water Chemistry (B2.1.2)	None	None	F
Main Feedwater Spray Nozzle Flanges	Pressure Boundary	Stainless Steel	Air – Indoor Uncontrolled (External)	Cracking	One-Time Inspection (B2.1.20)	V.A.EP-103b	3.2.1- 007	C
				Loss of Material	One-Time Inspection (B2.1.20)	IV.C2.R-452a	3.1.1- 136	C
			Air with Borated Water Leakage (External)	None	None	IV.E.RP-05	3.1.1- 107	A

SLRA Table 3.1.2-4 (page 3-198) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Primary Manway and Inspection Opening Covers and Backing Plates	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1-124	A C
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1-049	A
Primary Nozzles	Pressure Boundary	Steel (with Stainless Steel Cladding)	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1-124	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1-049	A
			Reactor Coolant (Internal)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.D2.RP-47	3.1.1-042	A C
					Water Chemistry (B2.1.2)	IV.D2.RP-47	3.1.1-042	A C
				Cumulative Fatigue Damage	TLAA	IV.D2.R-222	3.1.1-008	A
				Loss of Material	Water Chemistry (B2.1.2)	IV.C2.RP-23	3.1.1-088	A
Secondary Manway and Handhole Opening Bolting	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Bolting Integrity (B2.1.9)	IV.D2.RP-166	3.1.1-064	A
				Loss of Preload	Bolting Integrity (B2.1.9)	IV.D2.RP-46	3.1.1-067	A

SLRA Table 3.1.2-4 (page 3-199) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Secondary Manway and Handhole Opening Bolting	Pressure Boundary	Steel	Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
Secondary Manway and Handhole Opening Covers	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1- 124	A <u>C</u>
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
			Secondary Feedwater (Internal)	Cumulative Fatigue Damage	TLAA	IV.D2.R-33	3.1.1- 005	A <u>C</u>
				Loss of Material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.D2.R-31	3.1.1- 044	A, <u>1</u>
					One-Time Inspection (B2.1.20)	IV.D2.RP-153	3.1.1- 083	A
					Water Chemistry (B2.1.2)	IV.D2.RP-153	3.1.1- 083	A
Secondary Side Nozzles (vent, drain, and instrumentation)	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1- 124	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
			Secondary Feedwater (Internal)	Cumulative Fatigue Damage	TLAA	IV.D2.R-33	3.1.1- 005	A

SLRA Table 3.1.2-4 (page 3-200) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Secondary Side Nozzles (vent, drain, and instrumentation)	Pressure Boundary	Steel	Secondary Feedwater (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	IV.D2.RP-153	3.1.1- 083	A <u>C</u>
					Water Chemistry (B2.1.2)	IV.D2.RP-153	3.1.1- 083	A <u>C</u>
Shell Assembly	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1- 124	A <u>C</u>
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
			Secondary Feedwater (Internal)	Cumulative Fatigue Damage	TLAA	IV.D2.R-33	3.1.1- 005	A
				Loss of Material	One-Time Inspection (B2.1.20)	IV.D2.RP-153	3.1.1- 083	A
					Water Chemistry (B2.1.2)	IV.D2.RP-153	3.1.1- 083	A
Steam Outlet Nozzle	Pressure Boundary	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1- 124	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
			Steam (Internal)	Cumulative Fatigue Damage	TLAA	IV.D2.R-33	3.1.1- 005	A

SLRA Table 3.1.2-4 (page 3-201) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Steam Outlet Nozzle	Pressure Boundary	Steel	Steam (Internal)	Loss of Material	One-Time Inspection (B2.1.20)	IV.D2.RP-153	3.1.1- 083	A <u>C</u>
					Water Chemistry (B2.1.2)	IV.D2.RP-153	3.1.1- 083	A <u>C</u>
				Wall Thinning	Flow Accelerated Corrosion (B2.1.8)	IV.D2.R-38	3.1.1-061	A
Tube Plugs	Pressure Boundary	Nickel Alloy	Reactor Coolant (External)	Cracking	Steam Generators (B2.1.10)	IV.D2.R-40	3.1.1- 070	A
					Water Chemistry (B2.1.2)	IV.D2.R-40	3.1.1- 070	A
				Cumulative Fatigue Damage	TLAA	IV.D2.R-46	3.1.1- 002	A <u>C</u>
				Loss of Material	Water Chemistry (B2.1.2)	IV.C2.RP-23	3.1.1- 088	A <u>C</u>
Tube Support Plate Assembly (spacers, nuts, keys, and wedges)	Structural Support	Steel	Secondary Feedwater (External)	Cumulative Fatigue Damage	TLAA	IV.D2.R-33	3.1.1- 005	A <u>C</u>
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.RP-162	3.1.1- 072	A <u>C</u>
					Water Chemistry (B2.1.2)	IV.D2.RP-162	3.1.1- 072	A <u>C</u>
Tube Support Plate Assembly (support rods)	Structural Support	Stainless Steel	Secondary Feedwater (External)	Cracking	Steam Generators (B2.1.10)	None IV.D1.RP-384	None 3.1.1-071	E <u>C</u>

SLRA Table 3.1.2-4 (page 3-203) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tubes	Pressure Boundary	Nickel Alloy	Reactor Coolant (Internal)	Cracking	Water Chemistry (B2.1.2)	IV.D2.R-44	3.1.1- 070	A
				Cumulative Fatigue Damage	TLAA	IV.D2.R-46	3.1.1- 002	A
				Loss of Material	Water Chemistry (B2.1.2)	IV.C2.RP-23	3.1.1- 088	A C
			Secondary Feedwater (External)	Cracking	Steam Generators (B2.1.10)	IV.D2.R-442	3.1.1- 125	A
						IV.D2.R-47	3.1.1- 069	A
					Water Chemistry (B2.1.2)	IV.D2.R-47	3.1.1- 069	A
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.RP-233	3.1.1- 077	A
Tubesheet	Pressure Boundary	Steel	Secondary Feedwater (External)	Loss of Material	Steam Generators (B2.1.10)	IV.D2.RP-162	3.1.1- 072	A C
					Water Chemistry (B2.1.2)	IV.D2.RP-162	3.1.1- 072	A
		Steel with Nickel Alloy Cladding	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	IV.C2.R-431	3.1.1- 124	A C
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A

SLRA Table 3.1.2-4 (page 3-204) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tubesheet	Pressure Boundary	Steel with Nickel Alloy Cladding	Reactor Coolant (Internal)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.D2.RP-47	3.1.1- 042	A C
					Water Chemistry (B2.1.2)	IV.D2.RP-47	3.1.1- 042	A C
				Cumulative Fatigue Damage	TLAA	IV.D2.R-222	3.1.1- 008	C
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.R-440	3.1.1- 127	A
					Water Chemistry (B2.1.2)	IV.D2.R-440	3.1.1- 127	A
Tube-to-Tube Sheet Welds	Structural Support	Nickel Alloy	Reactor Coolant (External)	Cracking	Water Chemistry (B2.1.2)	IV.D2.RP-185	3.1.1- 025	A
			Reactor Coolant (Internal)	Cracking	Steam Generators (B2.1.10)	IV.D2.RP-185	3.1.1- 025	A
				Cumulative Fatigue Damage	TLAA	IV.D2.R-46	3.1.1- 002	A C
				Loss of Material	Water Chemistry (B2.1.2)	IV.C2.RP-23	3.1.1- 088	A
			Secondary Feedwater (External)	Cracking	Steam Generators (B2.1.10)	IV.D2.R-47	3.1.1- 069	A C
					Water Chemistry (B2.1.2)	IV.D2.R-47	3.1.1- 069	A C
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.RP-233	3.1.1- 077	A C

SLRA Table 3.1.2-4 (page 3-205) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Upper and Lower Heads	Pressure Boundary	Steel (with Stainless Steel Cladding)	Air – Indoor Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B2.1.23)	V.E.E-44	3.2.1- 040	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	IV.D2.R-17	3.1.1- 049	A
			Reactor Coolant (Internal)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.D2.RP-47	3.1.1- 042	A
					Water Chemistry (B2.1.2)	IV.D2.RP-47	3.1.1- 042	A
				Cumulative Fatigue	TLAA	IV.D2.R-222	3.1.1- 008	A
				Damage				C
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.R-440	3.1.1- 127	A
					Water Chemistry (B2.1.2)	IV.C2.RP-23	3.1.1- 088	A
						IV.D2.R-440	3.1.1- 127	A

Plant Specific Notes:

1. The environment of Secondary Feedwater is considered the same as Treated Water for the Steam Generator components.

ATTACHMENT 7

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

IDENTIFIED COMPONENT SUPPORTS, ANCHOR BOLTS,
WELDS IN GROUPS B1.1, B1.2, and B1.3 EVALUATED IN
FATIGUE TLAAS

Identified Component Supports, Anchor Bolts, Welds in Groups B1.1, B1.2 and B1.3
Evaluated in Fatigue TLAAs

(TRP-143)

Affected SLRA Sections:

SLRA Section 3.5.2.2.2.5
SLRA Table 3.5.1

SLRA Page Numbers:

3-1319
3-1338

Description of Change:

Section 3.5.2.2.2.5 will be revised to say, "Not applicable. The evaluation of fatigue for component supports in Group B1.1 are addressed in SLRA Section 3.1.2.2.1. There are no component supports that contain TLAA for Groups B1.2 and B1.3."

SLR-SRP Table 1 Item 3.5.1-053 (SLRA Table 3.5.1) will be revised to the following, "Not applicable. The evaluation of fatigue for component supports in Group B1.1 was aligned to SRP Items 3.1.1-004 and 3.1.1-005. There are no component supports in Groups B1.2 and B1.3 that contain Time-Limited Aging Analyses. The associated NUREG-2191 aging items are not used."

SLRA Section 3.5.2.2.2.5 (page 3-1319) is revised as follows:

3.5.2.2.2.5 Cumulative Fatigue Damage

NUREG-2192

Evaluations involving time-dependent fatigue, cyclical loading, or cyclical displacement of component support members, anchor bolts, and welds for Groups B1.1, B1.2, and B1.3 component supports are TLAAAs as defined in 10 CFR 54.3 only if a CLB fatigue analysis exists. TLAAAs are required to be evaluated in accordance with 10 CFR 54.21(c). The evaluation of this TLAA is addressed in Section 4.3, "Metal Fatigue Analysis," and/or Section 4.7, "Other Plant-Specific Time-Limited Aging Analyses," of this SRP-SLR. For plant-specific cumulative usage factor calculations, the method used is appropriately defined and discussed in the applicable TLAAAs.

Evaluation

~~[3.5.1-053] – The evaluation of fatigue for component support members, anchor bolts, and welds for Groups B1.1, B1.2, and B1.3 component supports are TLAAAs as defined in 10 CFR 54.3, and is addressed in SLRA Section 4.3, "Metal Fatigue".~~ Not applicable. The evaluation of fatigue for component supports in Group B1.1 are addressed in SLRA Section 3.1.2.2.1. There are no component supports that contain TLAA for Groups B1.2 and B1.3.

SLRA Table 3.5.1 (page 3-1338) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-051	Groups 6: concrete (inaccessible areas): exterior above- and below-grade; foundation; interior slab	Increase in porosity and permeability; loss of strength due to leaching of calcium hydroxide and carbonation	Plant-specific aging management program, or AMP XI.S6, "Structures Monitoring" enhanced as necessary	Yes (SRP-SLR 3.5.2.2.2.3.3)	Consistent with NUREG- 2191. See further evaluation in Section 3.5.2.2.2.3 .
3.5.1-052	Groups 7, 8 -steel components: tank liner	Cracking due to SCC; Loss of material due to pitting and crevice corrosion	Plant-specific AMP	Yes (SRP-SLR 3.5.2.2.2.4)	Not applicable. ONS has no stainless steel tank liners in the scope of subsequent license renewal. The associated NUREG-2191 aging items are not used.
3.5.1-053	Support members; welds; bolted connections; support anchorage to building structure	Cumulative fatigue damage due to cyclic loading (Only if CLB fatigue analysis exists)	TLAA, SRP-SLR Section 4.3 "Metal Fatigue," and/or Section 4.7 "Other Plant-Specific Time-Limited Aging Analyses"	Yes (SRP-SLR Section 3.5.2.2.2.5)	Consistent with NUREG- 2191. The evaluation of fatigue for component support members, anchor bolts, and welds for Groups B1.1, B1.2, and B1.3 component supports is a TLAA as defined in 10 CFR 54.3, and is addressed in SLRA Section 4.3. See further evaluation in Section 3.5.2.2.2.5. <u>Not applicable. The evaluation of fatigue for component supports in Group B1.1 are addressed in SLRA Section 3.1.2.2.1. There are no component supports that contain TLAA for Groups B1.2 and B1.3. The associated NUREG-2191 aging items are not used.</u>
3.5.1-054	All groups except 6: concrete (accessible areas): all	Cracking due to expansion from reaction with aggregates	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG- 2191.

ATTACHMENT 8

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

UPDATED TO ADDRESS THE ENVIRONMENTALLY-ASSISTED
FATIGUE ANALYSIS FOR THE STEAM GENERATOR TUBE-
TO-TUBESHEET WELDS

Updated to Address the Environmentally-Assisted Fatigue Analysis for the Steam Generator Tube-to-Tubesheet Welds

(TRP-143.3)

Affected SLRA Section:

SLRA Table 3.1.2-4

SLRA Page Number:

3-204

Description of Change:

The Table 3.1.2-4 line item for Steam Generator Tube-to-Tubesheet Welds will be supplemented to include Cumulative Fatigue Damage as an aging effect for the Secondary Feedwater environment, which is managed as a TLAA.

After the SLRA is supplemented with this change, the SLRA will state that the Aging Management Review results for the Steam Generator Tube-to-Tubesheet Welds will show that the aging effect of Cumulative Fatigue Damage is managed as a TLAA. SLRA Section 4.3.2.3 states that the effects of fatigue on the intended functions of the steam generator components (including the tube-to-tubesheet welds) will be managed by the Fatigue Monitoring Aging Management Program.

SLRA Table 3.1.2-4 (page 3-204) is revised as follows:

Table 3.1.2-4 Reactor Vessel, Reactor Internals, and Reactor Coolant System - Steam Generators - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Tubesheet	Pressure Boundary	Steel with Nickel Alloy Cladding	Reactor Coolant (Internal)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.D2.RP-47	3.1.1- 042	A
					Water Chemistry (B2.1.2)	IV.D2.RP-47	3.1.1- 042	A
				Cumulative Fatigue Damage	TLAA	IV.D2.R-222	3.1.1- 008	C
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.R-440	3.1.1- 127	A
					Water Chemistry (B2.1.2)	IV.D2.R-440	3.1.1- 127	A
Tube-to-Tube Sheet Welds	Structural Support	Nickel Alloy	Reactor Coolant (External)	Cracking	Water Chemistry (B2.1.2)	IV.D2.RP-185	3.1.1- 025	A
			Reactor Coolant (Internal)	Cracking	Steam Generators (B2.1.10)	IV.D2.RP-185	3.1.1- 025	A
				Cumulative Fatigue Damage	TLAA	IV.D2.R-46	3.1.1- 002	A
				Loss of Material	Water Chemistry (B2.1.2)	IV.C2.RP-23	3.1.1- 088	A
			Secondary Feedwater (External)	Cracking	Steam Generators (B2.1.10)	IV.D2.R-47	3.1.1- 069	A
					Water Chemistry (B2.1.2)	IV.D2.R-47	3.1.1- 069	A
				<u>Cumulative Fatigue Damage</u>	<u>TLAA</u>	<u>IV.D2.R-46</u>	<u>3.1.1-002</u>	<u>A</u>
				Loss of Material	Steam Generators (B2.1.10)	IV.D2.RP-233	3.1.1- 077	A

ATTACHMENT 9

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

UPDATED OPERATING EXPERIENCE DISCUSSION AND
PROVIDED ADDITIONAL ENHANCEMENTS FOR
RECIRCULATING WATER SYSTEM

**Updated Operating Experience Discussion and Provided Additional Enhancements for
Recirculating Water System**

(TRP-21)

Affected SLRA Sections:

SLRA Appendix A2.12,
SLRA Appendix B2.1.12
SLRA Table A6.0-1

SLRA Page Numbers:

A-14
A-15
A-79
A-80
B-107
B-108
B-109
B-111
B-112

Description of Change:

Revises Sections A2.12 and B2.1.12 to remove corrosion coupon testing as an activity that is performed by the program.

Revises Sections A2.12, B2.1.12 and Table A6.0-1 to enhance the program to perform wall thickness measurements in both the Unit 1/2 and Unit 3 Recirculating Cooling Water Systems starting in the 10 year period prior to entering the SPEO.

Revises Section B2.1.12 for Recirculating Cooling Water System operating experience that identifies the need to enhance the Closed Treated Water Systems program.

SLRA Appendix A2.12 (page A-14) is revised as follows:

A2.12 Closed Treated Water Systems

Program Description

The *Closed Treated Water Systems* AMP is an existing program that manages cracking, loss of material, and reduction of heat transfer for components exposed to a closed treated water environment.

The *Closed Treated Water Systems* program is a mitigation program that also includes condition monitoring activities to monitor the effectiveness of the mitigation activities. The program consists of: (a) water treatment, including use of corrosion inhibitors, to modify the chemical composition of the water such that the effects of corrosion are minimized, (b) chemical testing to ensure water treatment maintains water chemistry within acceptable guidelines, and

(c) inspections to determine the presence or extent of degradation. The program ~~includes coupon testing to measure corrosion rates and~~ performs microbiological testing. The program uses EPRI guidelines for chemistry control of closed cooling water systems.

SLRA Appendix A2.12 (page A-15) is revised as follows:

Enhancements

5. Where practical, project the rate of any degradation until the next scheduled inspection or the end of the SPEO (whichever is shorter). Adjust the sampling bases (e.g., selection, size, frequency) as necessary based on the projections.
6. If subsequent inspections identify aging effects, the corrective action program will be used to determine the extent of condition and extent of cause to determine further extent of inspections. Perform additional inspections on all units with the same material, environment, and aging effect combinations and within the interval of the original inspection (e.g., refueling outage interval, 10-year inspection interval).
7. Supplemental volumetric examinations will be performed in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water System in locations where chemistry controls such as corrosion inhibitors or biocide treatments may not be effective at mitigating corrosion. Volumetric examinations will consist of initial baseline inspections in the 10 year period prior to entering the SPEO and follow-up inspections in order to establish wall loss rate. Baseline and follow-up inspections will be performed at 5 locations in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water Systems. The inspections will be performed at leading or bounding locations in these systems (e.g., low flow/stagnant areas, dead legs, or under sludge or slime deposits). Follow-up inspections will be performed at an interval based on the results of the baseline inspections, not to exceed 6 years (i.e., after the initial baseline inspections).

SLRA Table A6.0-1 (page A-79) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
12	<i>Closed Treated Water Systems</i> program	<p>The <i>Closed Treated Water Systems</i> AMP is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Perform condition monitoring using techniques (visual, surface, or volumetric) capable of detecting loss of material, cracking, and fouling as appropriate. Perform visual inspections for loss of material and fouling whenever the system boundaries of the closed treated water systems are opened. Perform surface or volumetric examinations when susceptible materials are inspected for cracking. 2. In each ten year period during the SPEO, perform sufficient number of inspections to ensure that the minimum representative sample of 20% of the population up to 17 inspections per unit is met. A population is defined as components having the same material, water treatment program and aging effect combination. Perform inspections on those components that are more likely to be susceptible to aging based on time in service and severity of operating conditions. 3. Perform additional inspections when inspections do not meet acceptance criteria. Perform at least 5 additional inspections for every inspection not meeting acceptance criteria or 20% of each applicable material, environment, and aging effect combination, whichever is less. 4. Provide additional guidance in procedures for inspections of non-ASME code components for items such as lighting, distance, offset, surface coverage, presence of protective coatings, and cleaning processes. 5. Where practical, project the rate of any degradation until the next scheduled inspection or the end of the SPEO (whichever is shorter). Adjust the sampling bases (e.g., selection, size, frequency) as necessary based on the projections. 	B2.1.12	<p>Program enhancements <u>1 through 6</u> for SLR will be implemented six months prior to the SPEO. <u>Program enhancement 7 baseline UT inspections will be implemented in the 10 years prior to entering the SPEO with follow-up UT inspections within 6 years after the baseline inspection.</u></p>

SLRA Table A6.0-1 (page A-80) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
		<p>6. If subsequent inspections identify aging effects, the corrective action program will be used to determine the extent of condition and extent of cause to determine further extent of inspections. Perform additional inspections on all units with the same material, environment, and aging effect combinations and within the interval of the original inspection (e.g., refueling outage interval, ten year inspection interval).</p> <p>7. <u>Supplemental volumetric examinations will be performed in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water System in locations where chemistry controls such as corrosion inhibitors or biocide treatments may not be effective at mitigating corrosion. Volumetric examinations will consist of initial baseline inspections in the 10 year period prior to entering the SPEO and follow-up inspections in order to establish wall loss rate. Baseline and follow-up inspections will be performed at 5 locations in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water Systems. The inspections will be performed at leading or bounding locations in these systems (e.g., low flow/stagnant areas, dead legs, or under sludge or slime deposits). Follow-up inspections will be performed at an interval based on the results of the baseline inspections, not to exceed 6 years (i.e., after the initial baseline inspections).</u></p>		

SLRA Appendix B2.1.12 (page B-107) is revised as follows:

B2.1.12 CLOSED TREATED WATER SYSTEM

Program Description

The *Closed Treated Water Systems* program is an existing program that manages the aging effects of cracking, loss of material and reduction in heat transfer. The program consists of: a) water treatment, including use of corrosion inhibitors, to modify the chemical composition of the water such that the effects of corrosion are minimized, b) chemical testing to ensure water treatment maintains water chemistry within acceptable guidelines, and c) inspections to determine the presence or extent of degradation. The program ~~includes coupon testing to measure corrosion rates and~~ performs microbiological testing. The program uses the guidance in EPRI Report 3002000590, "*Closed Cooling Water Chemistry Guideline*", as applicable.

SLRA Appendix B2.1.12 (page B-108) is revised as follows:

B2.1.12 CLOSED TREATED WATER SYSTEM

Program Description

The additional inspections will include inspections of components for the same material, environment, and aging effect combination from all three units. The additional inspections will be conducted within the interval (e.g., refueling outage interval, ten year inspection interval) in which the original inspection is conducted. Inspections and tests will be performed by personnel qualified in accordance with site procedures and programs to perform the specified task.

Inspections within the scope of ASME Code will follow procedures consistent with the ASME Code. Non-ASME Code inspection procedures will include guidance for items such as lighting, distance, offset, surface coverage, presence of protective coatings, and cleaning processes.

Supplemental volumetric examinations will be performed in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water System in locations where chemistry controls such as corrosion inhibitors or biocide treatments may not be effective at mitigating corrosion (e.g. low flow/stagnant areas, dead legs, or under sludge or slime deposits). Volumetric examinations consisting of baseline and follow-up inspections will be performed in order to establish wall loss rate.

SLRA Appendix B2.1.12 (page B-109) is revised as follows:

B2.1.12 CLOSED TREATED WATER SYSTEM

Enhancements

6. If subsequent inspections identify aging effects, the corrective action program will be used to determine the extent of condition and extent of cause to determine the further extent of inspections. Perform additional inspections on all units with the same material, environment, and aging effect combinations and within the interval of the original inspection (e.g., refueling outage interval, ten year inspection interval). (Element 7).
7. Supplemental volumetric examinations will be performed in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water System in locations where chemistry controls such as corrosion inhibitors or biocide treatments may not be effective at mitigating corrosion. Volumetric examinations will consist of initial baseline inspections in the 10 year period prior to entering the SPEO and follow-up inspections in order to establish wall loss rate. Baseline and follow-up inspections will be performed at 5 locations in both the Unit 1/2 and the Unit 3 Recirculating Cooling Water Systems. The inspections will be performed at leading or bounding locations in these systems (e.g., low flow/stagnant areas, dead legs, or under sludge or slime deposits). Follow-up inspections will be performed at an interval based on the results of the baseline inspections, not to exceed 6 years (i.e., after the initial baseline inspections). (Elements 3 and 4)

SLRA Appendix B2.1.12 (pages B-111 and B-112) is revised as follows:

B2.1.12 CLOSED TREATED WATER SYSTEM

Operating Experience

4. In August 2020, an AMP effectiveness review of license renewal aging management activities was performed, which included a detailed review of select AMPs and commitments. Although the *Closed Treated Water Systems* program is not an aging management program identified in [UFSAR Chapter 18](#), the program encompasses programs and aging management activities developed for the first license renewal. These [Chapter 18](#) programs and aging management activities include: *Chemistry Control* program ([UFSAR Section 18.3.2](#)) and the *Jacket Water Heat Exchanger* preventive maintenance activity ([UFSAR Section 18.3.17.9](#)). The AMP and preventive maintenance activity were evaluated against the performance criteria identified in NEI 14-12, "Aging Management Program Effectiveness." The review concluded that the *Chemistry Control* program and *Jacket Water Heat Exchanger* preventive maintenance activity are meeting the requirements of NEI 14-12. No gaps were identified by the effectiveness review.

This effectiveness review provides objective evidence that current programs and activities encompassed by the Closed Treated Water Systems program are effectively managing aging and meeting all current LR commitments. This provides reasonable assurance that ongoing program effectiveness will continue in the SPEO.

5. In August 2003, ammonia concentration in the Unit 1/2 Recirculating Cooling Water System exceeded specification. Following actions such as performing feed and bleed operation and biocide additions to successfully bring ammonia within specification, ammonia subsequently increased again. Further investigations were undertaken to determine the source of the increasing ammonia in the system. The source was attributed to sessile bacteria located underneath deposits in the system. Corrective actions focused on cleaning the Unit 1/2 Recirculating Cooling Water Heat Exchangers during the replacement of the heat exchanger tubes and periodic microbiocide treatment for managing the bacteria population.

Following the above events, an INPO Assist Visit for Closed Cooling Systems was conducted in December 2005. The result of this visit identified several actions taken to remedy the bacteria problem in the Unit 1/2 Recirculating Cooling Water System:

- The Unit 1/2 Recirculating Cooling Water heat exchangers and surge tank were determined to be likely locations for sludge deposits due to low flow regions in these components. Mechanical cleaning was performed on the heat exchangers in an attempt to remove sludge deposits; however, due to configuration issues mechanical cleaning was marginally effective. Mechanical cleaning of the surge tank could not be performed since a shutdown of all three units would be required.
- UT measurements were taken on the Unit 1/2 Recirculating Cooling Water heat exchangers to determine if there was damage due to presence of bacteria under sludge buildup. Even though the wall thickness measurement met ASME code requirements, these measurements indicated an apparent corrosion rate higher than the corrosion rates determined from corrosion coupon tests cited above in OE example 1.

A review of ammonia data from 2005 through July 2021 for the Oconee closed treated water systems showed occurrences of increasing ammonia above specifications in both the Unit 1/2 Recirculating Water and the Unit 3 Recirculating Water systems. The Unit 1/2 Recirculating Water System showed repeated cycles whereby ammonia would increase above specifications and subsequently reduced back within specification following feed and bleed operations. Ammonia trending of other closed treated water systems are presently within specification, indicating no active bacteria problems.

In November 2020, a failure of a ¾" Recirculating Water System elbow on the 1D2 Heater Drain Pump occurred. Subsequent metallurgical analysis determined that the elbow was constructed of gray cast iron instead of malleable iron or carbon steel as permitted by the piping specifications. Nine other fittings from the 1D1 and 1D2 Heater Drain Pumps were sent off for analysis as part of extent of condition to determine their material composition, all of which were found to be malleable iron. However, all the malleable iron fittings displayed some level of internal corrosion, which was not expected based on the material composition of the fitting and the molybdate concentration of the Recirculating Water System. Corrective actions were in progress at the time this OE example was identified.

OE example 5 demonstrates that chemical treatments such as biocide additions and corrosion inhibitors may not be effective in mitigating corrosion in low flow/stagnant areas of the Recirculating Cooling Water System. Therefore, the Closed Treated Water System requires additional enhancements to require volumetric examinations to ensure the program is effective at managing aging in these locations.

The above examples of OE provide objective evidence that the aging management activities and methods being implemented by the *Closed Treated Water Systems* AMP, with enhancements, will be effective in managing aging effects prior to loss of intended function for the SPEO.

ATTACHMENT 10

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

REVISED SBO RECOVERY PATH FIGURE 2.1.3-1

Revised SBO Recovery Path Figure 2.1.3-1

(Oconee SLRA Site Audit and Operating Experience Audit Electrical Review)

Affected SLRA Sections:

SLRA Section 2.1.3.4

SLRA Figure 2.1.3-1

SLRA Page Number:

2-12

2-14

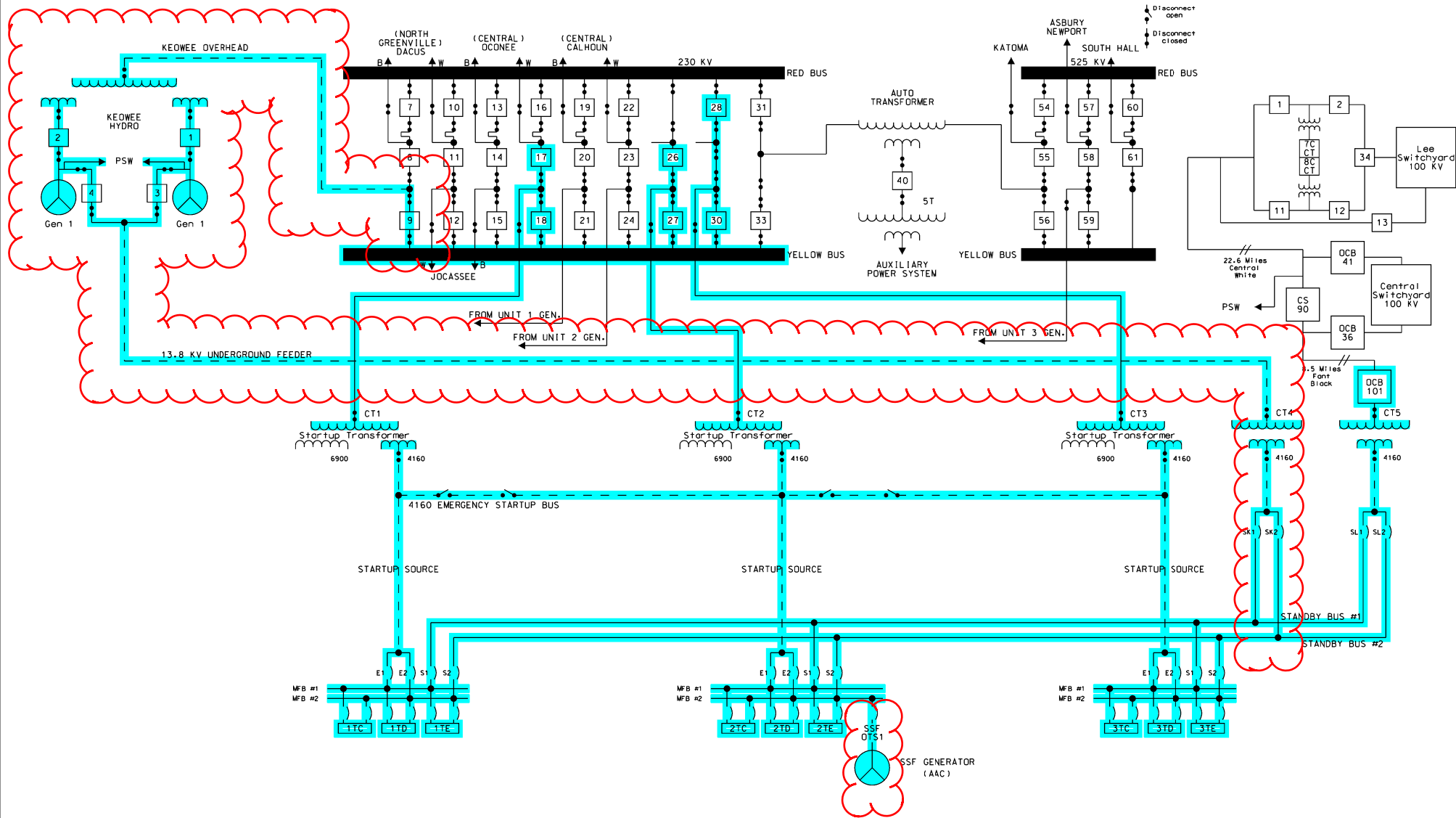
Description of Changes:

This Supplement revision of SBO Recovery Path Figure 2.1.3-1 expands the internal title and the blue highlighting of a portion of the circuits to include the Safety-Related onsite power system and Alternate AC source. The Figure legend is revised to denote that blue highlighting indicates in the scope of SLR. Changes to the figure are indicated by red cloud. A sentence referring to the Figure legend in Section 2.1.3.4 is deleted since the revised Figure legend is self-explanatory.

SLRA Section 2.1.3.4 (page 2-12) is revised as follows:

See [Figure 2.1.3-1](#) for a simplified electrical diagram of the offsite and onsite power sources, switching stations (switchyards), plant electrical distribution systems required for SBO recovery and the alternate AC source (standby shutdown facility). The 230 kV and 525 kV switchyards have two electrical buses designated as Red and Yellow. PCBs connect the two buses in a breaker-and-a-half configuration to allow removal of a PCB from service without deenergizing the circuit. ~~The blue highlighting indicates Station Blackout recovery paths.~~

SB0 Offsite Recovery Paths, Alternate AC Source and Safety-Related Onsite Power System



In SLR Scope

ATTACHMENT 11

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

REVISED ENVIRONMENT FOR AUXILIARY AND TURBINE
BUILDINGS MASONRY WALLS

Revised Environment for Auxiliary and Turbine Buildings Masonry Walls

(TRP-45)

Affected SLRA Sections:

SLRA Table 3.5.1
SLRA Table 3.5.2-1
SLRA Table 3.5.2-4

SLRA Page Numbers:

3-1343
3-1358
3-1361
3-1386

Description of Change:

The SLRA noted that Masonry Walls were internal to building structures and were not subject to air-outdoor environment. The Aging Management Evaluation tables for Auxiliary Building and Keowee Hydro Station have been revised to state that Masonry Walls are exposed to an air-outdoor environment and identified the consequential aging effect.

SLRA Table 3-1343 (page 3-1343) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-070	Masonry walls: all	Cracking due to restraint shrinkage, creep, aggressive environment	AMP XI.S5, "Masonry Walls"	No	Consistent with NUREG-2191.
3.5.1-071	Masonry walls: all	Loss of material (spalling, scaling) and cracking due to freeze-thaw	AMP XI.S5, "Masonry Walls"	No	Not applicable. ONS has no masonry walls in an outdoor environment in the scope of Subsequent License Renewal. <u>Consistent with NUREG- 2191.</u>
3.5.1-072	Seals; gasket; moisture barriers (caulking, flashing, and other sealants)	Loss of sealing due to wear, damage, erosion, tear, surface cracks, other defects	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191.
3.5.1-073	Service Level I coatings	Loss of coating or lining integrity due to blistering, cracking, flaking, peeling, delamination, rusting, or physical damage	AMP XI.S8, "Protective Coating Monitoring and Maintenance"	No	Consistent with NUREG-2191.

SLRA Table 3.5.2-1 (page 3-1358) is revised as follows:

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	C
Doors	FB; FLD; PB; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
			Air (External)	Loss of Material	Fire Protection (B2.1.15)	VII.G.A-21	3.3.1- 059	A
			Air with Borated Water Leakage (External)	Loss of Material	Boric Acid Corrosion (B2.1.4)	III.B5.T-25	3.5.1- 089	A
Fiber Reinforced Polymer	SS	Fiber Reinforced Polymer	Air – Outdoor (External)	Hardening or Loss of Strength, Loss of Material, Cracking or Blistering	Structures Monitoring (B2.1.33)	None	None	J
Lead Shield Support	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
Masonry Wall	FB; SS; SP	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A,6
		Masonry Walls	Air (External)	Cracking	Fire Protection (B2.1.15)	VII.G.A-626	3.3.1- 179	A,6
					Masonry Walls (B2.1.32)	VII.G.A-626	3.3.1- 179	A,6
	<u>SS; SP</u>	<u>Masonry Walls</u>	<u>Air – Outdoor (External)</u>	<u>Loss of Material</u>	<u>Masonry Walls (B2.1.32)</u>	<u>III.A3.TP-34</u>	<u>3.5.1-071</u>	<u>A</u>
				<u>Cracking</u>	<u>Masonry Walls (B2.1.32)</u>	<u>III.A6.T-12</u>	<u>3.5.1- 070</u>	<u>A</u>

SLRA Table 3.5.2-1 (page 3-1361) is revised as follows:

Table 3.5.2-1 Containments, Structures, and Component Supports - Auxiliary Building - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
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Plant Specific Notes:

- 1. Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
- 2. Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders and embedded steel.
- 3. Stainless steel elements include fall restraint system.
- 4. None.
- 5. Sump includes the concrete sump and the stainless steel lined concrete cover for the low and high activity tanks.
- 6. ~~The Masonry Walls are internal to the building structure and are not subject to air—outdoor aging effects.~~ None.
- 7. The Structures Monitoring AMP is credited for monitoring the leak chase channels for liner leakage.

SLRA Table 3.5.2-1 (page 3-1386) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
Doors	MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
Masonry Wall	SP; SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A
	<u>SP; SS</u>	<u>Concrete Block</u>	<u>Air – Outdoor (External)</u>	<u>Loss of Material</u>	<u>Masonry Walls (B2.1.32)</u>	<u>III.A3.TP-34</u>	<u>3.5.1-071</u>	<u>A</u>
				<u>Cracking</u>	<u>Masonry Walls (B2.1.32)</u>	<u>III.A3.T-12</u>	<u>3.5.1- 070</u>	<u>A</u>
Penstock, Power Tunnels, Spillway, Intake: Bolting (Structural)	SS	Stainless Steel	Air – Outdoor (External)	Loss of Material, Cracking	FERC Inspections of the Keowee Hydro Station	III.B2.T-37b	3.5.1- 100	E,6
				Loss of Preload	FERC Inspections of the Keowee Hydro Station	III.A6.TP-261	3.5.1- 088	E,6
		Steel	Air – Outdoor (External)	Loss of Material	FERC Inspections of the Keowee Hydro Station	III.A6.TP-221	3.5.1- 083	A,6

ATTACHMENT 12

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

REVISED SECONDARY DRAWINGS FOR COOLANT
STORAGE SYSTEM

Revised Secondary Drawings for Coolant Storage System

(Scoping and Screening Results: mechanical systems)

Affected SLRA Sections:

SLRA Section 2.3.3.2.2

SLRA Page Numbers:

2-111

Description of Change:

Removed OSLRD-102A-2.3 and OSLRD-102A-3.3 from list of secondary drawings for the Coolant Storage following update of system boundaries consistent with drawing OSLRD-102A- 1.3.

SLRA Section 2.3.3.2.2 (page 2-111) is revised as follows:

2.3.3.2.2 Coolant Storage System

Secondary Drawings

- OSLRD-100A-1.2
- OSLRD-100A-2.2
- OSLRD-100A-3.2
- ~~OSLRD-102A-2.3~~
- ~~OSLRD-102A-3.3~~
- OSLRD-104A-1.1
- OSLRD-104A-3.1
- OSLRD-106A-1.1
- OSLRD-106A-1.2
- OSLRD-106A-2.1
- OSLRD-106A-2.2
- OSLRD-106A-3.1
- OSLRD-106A-3.2

ATTACHMENT 13

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

UPDATED SCREENING AND AGING MANAGEMENT REVIEW
OF WATER CONTROL STRUCTURES

Updated Screening and Aging Management Review of Water Control Structures

(TRP-46, TRP-47, Structural Scoping and Screening, Corrosion Structural, and On-site Audit)

Affected SLRA Sections:

SLRA Sections 2.4.4	SLRA Table 2.4.7-3
SLRA Sections 2.4.7.3	SLRA Table 3.5.1
SLRA Sections 3.5.2.1.4	SLRA Sections A2.34
SLRA Sections 3.5.2.1.6	SLRA Sections B2.1.34
SLRA Sections 3.5.2.1.9	SLRA Table 3.5.2-4
SLRA Sections 3.5.2.2.2.1	SLRA Table 3.5.2-6
SLRA Sections 3.5.2.2.2.4	SLRA Table 3.5.2-9
SLRA Tables 2.4.4-1	SLRA Table A6.0-1

SLRA Page Numbers:

2-302	3-1273	3-1337	3-1349	3-1384	3-1390	3-1406	B-236
2-303	3-1278	3-1338	3-1351	3-1386	3-1391	A-39	
2-313	3-1314	3-1342	3-1352	3-1387	3-1392	A-105	
2-314	3-1318	3-1347	3-1382	3-1388	3-1397	B-234	
3-1270	3-1336	3-1348	3-1383	3-1389	3-1405	B-235	

Description of Changes:

Provides additional clarifications and corrections with regards to the aging management of Keowee Dam and associated water control structures under FERC requirements in Tables 3.5.1, 3.5.2-4, 3.5.2-6, and 3.5.2-9 and Sections A2.34 and B2.1.34.

Adds the trash rack filter component type to the Condenser Circulating Water Intake Structure in Sections 2.4.7.3 and 3.5.2.1.9 and Tables 2.4.7.3 and 3.5.2-9. Updates associated NUREG-2192 Table 1 items in Table 3.5.1.

Revises aging management review of the Keowee Hydro Station (Table 3.5.2-4) and Condenser Circulating Water Intake Structure (Table 3.5.2-9) to include loss of material (spalling, scaling) and cracking due to freeze-thaw as aging effects requiring management for group 6 (water control structures) (NUREG-2192 item 3.5.1-060).

Revises Section A2.34 and B2.1.34 and Table A6.0-1 Item #34 to include coating material selection as discussed in Section 2 of the Research Council for Structural Connections (RCSC) publication "Specification for Structural Joints Using High-Strength Bolts" as preventive action to the Inspection of Water-Control Structures Associated with Nuclear Power Plants Program. The change also corrects the title of the RCSC publication.

Clarifies in Section B2.1.34 that for Enhancement #5 to the Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, the enhancement is applicable to program elements 3 and 6.

For consistency with other structures which have metal siding explicitly identified as subject to aging management, screening and aging management review results for the Keowee Hydro

Station in Tables 2.4.4-1 and 3.5.2-4 is revised to separate out metal siding from steel elements and add metal siding as its own unique structural component type. The Keowee Hydro Station evaluation boundaries in Section 2.4.4 is revised to include metal siding.

Revises Table 3.5.2-4 plant specific #4 to clarify the spillway sluice gates are included with trash rack filters.

Include justification for the low activity waste tank and high activity waste tank in the evaluation of item 3.5.1-052 and update corresponding line item in Table 3.5.1.

Deleted the Penstock, Power Tunnels, Spillway, Intake: Stainless Steel Elements component type from Table 2.4.4-1 and Table 3.5.2-4.

Revised SLRA Section 3.5.2.2.2.4 to delete the Penstock, Power Tunnels, Spillway, Intake: Stainless Steel Elements and simplify to state Keowee trash rack filters.

Revised Table 3.5.1, item number 3.5.1-100 to clarify the discussion for aging management of the Keowee trash rack filter. Item number 3.5.1-099 and 3.5.1-100 have been separated to clarify which AMP manages aging for the components (see supplement item 3 below for changes to item number 3.5.1-099).

Removed the stainless steel material from the Penstock, Power Tunnels, Spillway, Intake: Bolting (Structural) component type in Table 3.5.2-4.

Revised Table 3.5.1, line item 3.5.1-099 to specify ONS has no ASME Class 1, 2, 3 or MC aluminum component supports.

Revised Section 3.5.2.2.2.4 to separate item numbers 3.5.1-099 and 3.5.1-100 as individual items requiring evaluation to clarify which AMP manages aging for the components.

SLRA Section 2.4.4 (page 2-302) is revised as follows:

2.4.4 KEOWEE HYDRO STATION

System Evaluation Boundaries

The evaluation boundary for the Keowee hydro station includes the foundation, internal and external structural members, metal siding, and roof of the Keowee powerhouse, Keowee breaker vault and Keowee service building. The evaluation boundary also includes the foundation, structural members and trash racks of the Keowee intake structure. The battery racks in the Keowee service building and cranes and hoists at the Keowee powerhouse and Keowee intake structure are within the evaluation boundary. The Keowee penstock and power tunnels along with the spillway and Keowee intake structure are water controlling structures that are considered within the evaluation boundary for the Keowee hydro station.

The Keowee hydro station also includes a transmission tower that is evaluated with electrical structures in [Section 2.4.5](#). Cable trays and conduit, electrical panels, equipment component supports, grout, and building drains are excluded from the evaluation boundaries as these structural components are addressed as bulk commodities in [Section 2.4.8](#).

SLRA Table 2.4.4-1 (page 2-303) is revised as follows:

Table 2.4.4-1 Keowee Hydro Station

Structural Component	Intended Functions
Anchor	Structural Support
Battery Racks	Structural Support
Bolting (Structural)	Structural Support
Concrete Elements Concrete Elements (accessible) Concrete Elements (Inaccessible)	Missile Barrier Shelter, Protection Structural Support
Concrete Hatches	Shelter, Protection Structural Support
Cranes: Rails, Bridges, Structural Members, Structural Components	Structural Support
Cranes: Structural Bolting	Structural Support
Doors	Missile Barrier Shelter, Protection Structural Support
Masonry Block	Shelter, Protection Structural Support
<u>Metal Siding</u>	<u>Shelter, Protection</u>
Penstock, Power Tunnels, Spillway, Intake: Bolting (Structural)	Structural Support
Penstock, Power Tunnels, Spillway, Intake: Concrete Elements	Direct Flow Structural Support
Penstock, Power Tunnels, Spillway, Intake: Stainless Steel Elements	Structural Support

SLRA Section 2.4.7.3 (page 2-313) is revised as follows:

2.4.7.3 Intake Structure

System Description

The intake structure is a reinforced concrete structure located at the north end of the intake canal. The structure houses the pumps, supports the pump motors and the beginning sections of the condenser circulating water pipe. All steel surfaces not in contact with the concrete and subject to immersion are coated with metal primer. The trash rack filter is located at the front of the structure and at ~~At the back of~~ the structure is a utility trench rigidly attached to the intake structure and constructed of reinforced concrete.

SLRA Table 2.4.7-3 (page 2-314) is revised as follows:

Table 2.4.7-3 Intake Structure

Structural Component	Intended Function
Anchors	Structural Support
Bolting (structural)	Structural Support
Concrete Elements: Concrete Elements (accessible) Concrete Elements (inaccessible)	Shelter, Protection Structural Support
Steel Elements	Shelter, Protection Structural Support
<u>Trash Rack Filter</u>	<u>Filter</u> <u>Structural Support</u>

SLRA Section 3.5.2.1.4 (page 3-1270) is revised as follows:

3.5.2.1.4 Keowee Hydro Station

Aging Management Programs

The aging effects for components in the Keowee Hydro Station are managed by the following AMPs:

- * FERC Inspections of the Keowee Hydro Station
- * Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)
- * ~~Inspection of Water Control Structures Associated with Nuclear Power Plants (B2.1.34)~~
- * Masonry Walls (B2.1.32)
- * Structures Monitoring (B2.1.33)

SLRA Section 3.5.2.1.6 (page 3-1273) is revised as follows:

3.5.2.1.6 Earthen Embankments

Aging Management Programs

The aging effects for components in the Earthen Embankments are managed by the following AMPs:

- * FERC Inspections of the Keowee ~~Earthen Embankments~~ Hydro Station

SLRA Section 3.5.2.1.9 (page 3-1278) is revised as follows:

3.5.2.1.9 Intake Structure

Materials

Components in the Intake Structure are constructed of the following materials:

- * Concrete
- * Stainless Steel
- * Steel

Environments

Components in the Intake Structure are exposed to the following environments:

- * Air
- * Air – Outdoor
- * Groundwater/Soil
- * Soil
- * Water – Flowing

SLRA Section 3.5.2.2.2.1 (page 3-1314) is revised as follows:

3.5.2.2.2.1 Aging Management of Inaccessible Areas

Evaluation

[3.5.1-044], [3.5.1-046] – ONS does not rely on a dewatering system to lower site groundwater level. The *Structures Monitoring (B2.1.33)* program is relied upon to detect cracking and distortion due to increased stress levels from settlement, as well as reduction of foundation strength and cracking, due to differential settlement. ~~FERC Inspections of the Keowee hydro station have been substituted and will be used to manage cracking and distortion due to increased stress levels from settlement for~~ For the Keowee hydro station powerhouse, penstock, power tunnels, spillway and intake concrete exposed to soil environments the FERC Inspections of the Keowee Hydro Station is relied upon to detect cracking and distortion due to increased stress levels from settlement (See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station). ~~for the penstock, power tunnels, spillway and intake. Oconee did not use high-alumina cement in reactor containments; therefore, erosion of porous concrete subfoundations is not applicable.~~

SLRA Section 3.5.2.2.2.4 (page 3-1318) is revised as follows:

SLRA Section 3.5.2.2.2.4 Cracking Due to Stress Corrosion Cracking, and Loss of Material Due to Pitting and Crevice Corrosion

Evaluation

[3.5.1-052] – There are no stainless steel tank liners in the scope of SLR for ONS. The Low Activity Waste Tank and High Activity Waste Tank are stainless steel lined concrete cavities with a stainless steel lined slab. The top of the tank corresponds to the Auxiliary Building basement floor (EL. 758'). A failure of tank walls cannot cause a spatial interaction with safety-related equipment. The tank cover (which provides a spatial interaction barrier to pressurized piping and components in the tank) is evaluated as a structural component for SLR.

[3.5.1-099], A review of ONS OE has not identified pitting or crevice corrosion or cracking for stainless steel structural components exposed to air or condensation. ONS does not have aluminum supports for ASME Class 1, 2, 3 or MC components. The ASME Section XI, Subsection IWF (B2.1.30) program will manage the aging of stainless steel component supports to ensure that these components continue to perform their intended functions during the SPEO.

[3.5.1-100] – A review of ONS OE has not identified pitting or crevice corrosion or cracking for stainless steel or aluminum structural components exposed to air or condensation. The ~~ASME Section XI, Subsection IWF (B2.1.30) program~~ or Structures Monitoring (B2.1.33) program will manage the aging of stainless steel and aluminum component supports to ensure that these components continue to perform their intended functions during the SPEO, except as follows: Stainless steel components of the trash rack filter at the condenser circulating water intake structure will be managed by the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34) program. (2) ~~Stainless steel structural elements and bolting of the penstock, power tunnels, and spillway~~ The Keowee trash rack filters will be managed by the FERC Inspections of the Keowee hydro station (See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station).

SLRA Table 3.5.1 (page 3-1336) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-044	All Groups: concrete: all	Cracking and distortion due to increased stress levels from settlement	AMP XI.S6, "Structures Monitoring"	Yes (SRP-SLR Section 3.5.2.2.2.1.3)	Consistent with NUREG-2191, except that a different program is used for concrete elements of the Keowee Hydro Station <u>Powerhouse, Penstock, Power Tunnels, Intake and Spillway</u> . FERC Inspections of the Keowee Hydro Station is credited for aging management of these components. See further evaluation in Section 3.5.2.2.2.1 . See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.
3.5.1-046	Groups 1-3, 5, 7-9: concrete: foundation; subfoundation	Reduction of foundation strength and cracking due to differential settlement and erosion of porous concrete subfoundation	AMP XI.S6, "Structures Monitoring"	Yes (SRP-SLR 3.5.2.2.2.1.3)	Consistent with NUREG-2191, <u>except that a different program is used for concrete elements of the Keowee Hydro Station Powerhouse, Penstock, Power Tunnels, Intake and Spillway</u> . FERC Inspections of the Keowee Hydro Station is credited for aging management of these components. <u>The Structures Monitoring AMP is used for concrete elements</u> . See further evaluation in Section 3.5.2.2.2.1 . See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.

SLRA Table 3.5.1 (page 3-1337) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-050	Groups 6: concrete (inaccessible areas): all	Cracking due to expansion from reaction with aggregates	Plant-specific aging management program, or AMP XI.S6, "Structures Monitoring" enhanced as necessary	Yes (SRP-SLR 3.5.2.2.2.3.2)	Consistent with NUREG- 2191. ASR progression at the Keowee Dam spillway is monitored by the Dam Safety Surveillance and Monitoring Plan, which is implemented to meet the guidelines of FERC and is evaluated as part of the FERC Part 12D inspection (see Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station). See further evaluation in Section 3.5.2.2.2.3 .

SLRA Table 3.5.1 (page 3-1338) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-052	Groups 7, 8 - steel components: tank liner	Cracking due to SCC; Loss of material due to pitting and crevice corrosion	Plant-specific AMP	Yes (SRP-SLR 3.5.2.2.2.4)	Not applicable. ONS has no stainless steel tank liners in the scope of subsequent license renewal. The associated NUREG-2191 aging items are not used. <u>The Low Activity Waste Tank and High Activity Waste Tank are stainless steel lined concrete cavities with a stainless steel lined slab. The top of the tank corresponds to the Auxiliary Building basement floor (EL. 758'). A failure of tank walls cannot cause a spatial interaction with safety-related equipment. The tank cover (which provides a spatial interaction barrier to pressurized piping and components in the tank) is evaluated as a structural component for SLR.</u>

SLRA Table 3.5.1 (page 3-1342) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-065	Groups 1-3, 5, 7-9: concrete (inaccessible areas): below-grade exterior; foundation, Groups 1-3, 5, 7-9: concrete (accessible areas): below-grade exterior; foundation, Groups 6: concrete (inaccessible areas): all	Cracking; loss of bond; and loss of material (spalling, scaling) due to corrosion of embedded steel	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG- 2191, except that a different program is used for concrete (inaccessible areas) of the Keowee Hydro Station Powerhouse , Penstock, Power Tunnels, Intake and Spillway. FERC Inspections of the Keowee Hydro Station is credited for aging management of these components. See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.
3.5.1-066	Groups 1-5, 7, 9: concrete (accessible areas): interior and above-grade exterior	Cracking; loss of bond; and loss of material (spalling, scaling) due to corrosion of embedded steel	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG- 2191.
3.5.1-067	Groups 1-5, 7, 9: Concrete: interior; above-grade exterior, Groups 1-3, 5, 7-9 - concrete (inaccessible areas): below- grade exterior; foundation, Group 6: concrete (inaccessible areas): all	Increase in porosity and permeability; cracking; loss of material (spalling, scaling) due to aggressive chemical attack	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG- 2191, except that a different program is used for concrete (inaccessible areas) of the Keowee Hydro Station Penstock, Power Tunnels, Intake and Spillway. FERC Inspections of the Keowee Hydro Station is credited for aging management of these components. See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.

SLRA Table 3.5.1 (page 3-1347) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-088	Structural bolting	Loss of preload due to self-loosening	AMP XI.S6, “Structures Monitoring”	No	Consistent with NUREG-2191, except that a different program is used as follows: (1) The <i>Inspection of Water-Control Structures Associated with Nuclear Power Plants</i> (B2.1.34) program will be used to manage loss of preload due to self-loosening for submerged bolting at the Keowee Hydro Station and the <u>Condenser Circulating Water</u> Intake Structure. (2) FERC Inspections of the Keowee Hydro Station are crediting <u>credited</u> with aging management of structural bolting of the Keowee Hydro Station Penstock, Power Tunnels, <u>Intake</u> and Spillway. <u>See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.</u>

SLRA Table 3.5.1 (page 3-1348) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-092	Support members; welds; bolted connections; support anchorage to building structure	Loss of material due to general, pitting corrosion	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191, except that a different program is used for steel support members of the Trash Rack Filter. The <i>Inspection of Water- Control Structures Associated with Nuclear Power Plants</i> (B2.1.34) program will be used to manage loss of material due to general and pitting corrosion <u>at the Condenser Circulating Water Intake Structure and the FERC Inspections of the Keowee Hydro Station will be used to manage loss of material due to general, pitting corrosion at the Keowee Intake. of these components. See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.</u>

SLRA Table 3.5.1 (page 3-1349) is revised as follows

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-096	Group 6: concrete (accessible areas): all	Cracking due to expansion from reaction with aggregates	AMP XI.S7, “Inspection of Water-Control Structures Associated with Nuclear Power Plants”	No	Consistent with NUREG-2191, except that a different program is used for concrete (accessible areas) of the Keowee Hydro Station Penstock, Power Tunnels, Intake and Spillway. FERC Inspections of the Keowee Hydro Station are is credited for aging management of these components. See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.

SLRA Table 3.5.1 (page 3-1351) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-099	Aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion, cracking due to SCC	AMP XI.M32, "One-Time Inspection," AMP XI.S3, "ASME Section XI, Subsection IWF," or AMP XI.M36, "External Surfaces Monitoring of Mechanical Components"	Yes (SRP-SLR Section 3.5.2.2.2.4)	Consistent with NUREG-2191. The <i>ASME Section XI, Subsection IWF</i> program (B2.1.30) will manage the aging of stainless steel and aluminum component supports to ensure that these components continue to perform their intended functions during the subsequent period o extended operation. <u>ONS does not have aluminum ASME Class 1, 2, 3, or MC component supports.</u> See further evaluation in Section 3.5.2.2.2.4 .

SLRA Table 3.5.1 (page 3-1352) is revised as follows:

Table 3.5.1 Summary of Aging Management Programs for Containments, Structures and Component Supports Evaluated in Chapters II and III of the GALL-SLR Report

Item Number	Component	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1-100	Aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion, cracking due to SCC	AMP XI.M32, "One-Time Inspection," AMP XI.S6, "Structures Monitoring," or AMP XI.M36, "External Surfaces Monitoring of Mechanical Components"	Yes (SRP-SLR Section 3.5.2.2.2.4)	Consistent with NUREG-2191 except that a different program is used as follows: (1) Stainless steel components of the trash rack filter at the <u>condenser circulating water</u> intake structure will be managed by the <i>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</i> program. (2) Stainless steel structural elements and bolting of the Keowee Hydro Station Penstock, Power Tunnels, and Spillway <u>Keowee trash rack filters</u> will be managed by the FERC Inspections of the Keowee Hydro Station. See further evaluation in <u>Section 3.5.2.2.2.4. See Section B2.1.34 for additional details of the FERC Inspections of the Keowee Hydro Station.</u>

SLRA Table 3.5.2-4 (page 3-1382) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Anchor	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B5.TP-43	3.5.1- 092	A
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A
Battery Rack	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.B3.TP-43	3.5.1- 092	A
Bolting (Structural)	SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-248	3.5.1- 080	A
				Loss of Preload	Structures Monitoring (B2.1.33)	III.A3.TP-261	3.5.1- 088	A
			Water – Flowing (External)	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-224	3.5.1-083	A,7
				Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A3.TP-261	3.5.1-088	E,7

SLRA Table 3.5.2-4 (page 3-1383) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements	MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A,1
			Air – Outdoor (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-28	3.5.1- 067	A,1
			Soil (External)	Cracking, Distortion	Structures Monitoring (B2.1.33)	III.A3.TP-30	3.5.1- 044	A,1
			Water – Flowing (External)	Reduction in Foundation Strength, Cracking	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station</u> (B2.1.34)	III.A3.TP-31	3.5.1- 046	E,1,8
Concrete Elements (Accessible)	MB; SP; SS	Concrete	Air – Indoor Uncontrolled (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A,1
			Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-25	3.5.1- 054	A,1
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-26	3.5.1- 066	A,1

SLRA Table 3.5.2-4 (page 3-1384) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	MB; SP; SS	Concrete	Air – Outdoor (External)	Loss of Material (Spalling, Scaling), Cracking	Structures Monitoring (B2.1.33)	III.A3.TP-23	3.5.1- 064	A,1
			Groundwater/Soil (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Structures Monitoring (B2.1.33)	III.A3.TP-27	3.5.1- 065	A,1
			Water – Flowing (External)	Cracking	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A3.TP-25	3.5.1- 054	E,1,8
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-38	3.5.1- 059	A,1,8
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A3.TP-24	3.5.1- 063	E,1,8
				<u>Loss of Material (Spalling, Scaling), Cracking</u>	<u>FERC Inspections of the Keowee Hydro Station</u>	<u>III.A6.TP-36</u>	<u>3.5.1-060</u>	<u>A,1,8</u>

SLRA Table 3.5.2-4 (page 3-1386) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Cranes: Rails, Bridges, Structural Members, Structural Components	SS	Steel	Air (External)	Loss of Material, Wear, Deformation, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-07	3.3.1- 052	A
Cranes: Structural Bolting	SS	Steel	Air (External)	Loss of Preload, Loss of Material, Cracking	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.13)	VII.B.A-730	3.3.1- 199	A
Doors	MB; SP; SS	Steel	Air – Indoor Uncontrolled (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
			Air – Outdoor (External)	Loss of Material	Structures Monitoring (B2.1.33)	III.A3.TP-302	3.5.1- 077	A
Masonry Wall	SP; SS	Concrete Block	Air – Indoor Uncontrolled (External)	Cracking	Masonry Walls (B2.1.32)	III.A3.T-12	3.5.1- 070	A
<u>Metal Siding</u>	<u>SP</u>	<u>Steel</u>	<u>Air – Indoor Uncontrolled (External)</u>	<u>Loss of Material</u>	<u>Structures Monitoring (B2.1.33)</u>	<u>III.A3.TP-302</u>	<u>3.5.1- 077</u>	<u>A</u>
			<u>Air – Outdoor (External)</u>	<u>Loss of Material</u>	<u>Structures Monitoring (B2.1.33)</u>	<u>III.A3.TP-302</u>	<u>3.5.1- 077</u>	<u>A</u>
Penstock, Power Tunnels, Spillway, Intake: Bolting (Structural)	SS	Stainless Steel	Air – Outdoor (External)	Loss of Material, Cracking	FERC Inspections of the Keowee Hydro Station	III.B2.T-37b	3.5.1- 100	E,6
				Loss of Preload	FERC Inspections of the Keowee Hydro Station	III.A6.TP-264	3.5.1- 088	E,6
		Steel	Air – Outdoor (External)	Loss of Material	FERC Inspections of the Keowee Hydro Station	III.A6.TP-221	3.5.1- 083	A,6

SLRA Table 3.5.2-4 (page 3-1387) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Penstock, Power Tunnels, Spillway, Intake: Bolting (Structural)	SS	Steel	Air – Outdoor (External)	Loss of Preload	FERC Inspections of the Keowee Hydro Station	III.A6.TP-261	3.5.1-088	E,6
			Water – Flowing (External)	Loss of Material	Inspection of Water Control Structures Associated with Nuclear Power Plants FERC Inspections of the Keowee Hydro Station (B2.1.34)	III.A6.TP-221	3.5.1-083	A,7
				Loss of Preload	Inspection of Water Control Structures Associated with Nuclear Power Plants FERC Inspections of the Keowee Hydro Station (B2.1.34)	III.A6.TP-261	3.5.1-088	E,7
Penstock, Power Tunnels, Spillway, Intake: Concrete Elements	DF; SS	Concrete	Soil (External)	Cracking, Distortion	FERC Inspections of the Keowee Hydro Station	III.A6.TP-30	3.5.1-044	E,6
			Water – Flowing (External)	Loss of Material	Inspection of Water Control Structures Associated with Nuclear Power Plants FERC Inspections of the Keowee Hydro Station (B2.1.34)	III.A6.T-20	3.5.1-056	A,7
Penstock, Power Tunnels, Spillway, Intake: Concrete Elements (Accessible)	DF; SS	Concrete	Air – Outdoor (External)	Cracking	FERC Inspections of the Keowee Hydro Station	III.A6.T-34	3.5.1-096	E,6
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	FERC Inspections of the Keowee Hydro Station	III.A6.TP-38	3.5.1-059	A,6

SLRA Table 3.5.2-4 (page 3-1388) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Penstock, Power Tunnels, Spillway, Intake: Concrete Elements (Accessible)	DF; SS	Concrete	Air – Outdoor (External)	Increase in Porosity and Permeability, Loss of Strength	FERC Inspections of the Keowee Hydro Station	III.A6.TP-37	3.5.1- 061	A,6
			Water – Flowing (External)	Cracking	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.T-34	3.5.1- 096	A,7
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-38	3.5.1- 059	A,7
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-37	3.5.1- 061	A,7
Penstock, Power Tunnels, Spillway, Intake: Concrete Elements (Inaccessible)	DF; SS	Concrete	Groundwater/Soil (External)	Cracking	FERC Inspections of the Keowee Hydro Station	III.A6.TP-220	3.5.1- 050	E,6
				Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	FERC Inspections of the Keowee Hydro Station	III.A6.TP-104	3.5.1- 065	E,6

SLRA Table 3.5.2-4 (page 3-1389) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Penstock, Power Tunnels, Spillway, Intake: Concrete Elements (Inaccessible)	DF; SS	Concrete	Groundwater/Soil (External)	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	FERC Inspections of the Keowee Hydro Station	III.A6.TP-107	3.5.1- 067	E,6
				Loss of Material (Spalling, Scaling), Cracking	FERC Inspections of the Keowee Hydro Station	III.A6.TP-110	3.5.1- 049	E,6
			Water – Flowing (External)	Cracking	FERC Inspections of the Keowee Hydro Station	III.A6.TP-220	3.5.1- 050	E,6
				Increase in Porosity and Permeability, Loss of Strength	FERC Inspections of the Keowee Hydro Station	III.A6.TP-109	3.5.1- 051	E,6
Penstock, Power Tunnels, Spillway, Intake: Stainless Steel Elements	SS	Stainless Steel	Air – Outdoor (External)	Loss of Material, Cracking	FERC Inspections of the Keowee Hydro Station	III.B2.T-37b	3.5.1- 100	E,5,6
Penstock, Power Tunnels, Spillway, Intake: Steel Elements	DF; SS	Steel	Air – Outdoor (External)	Loss of Material	FERC Inspections of the Keowee Hydro Station	III.A6.TP-221	3.5.1- 083	C,3,6
			Concrete (External)	None	None	VII.J.AP-282	3.3.1- 112	A,3
			Water – Flowing (External)	Loss of Material	Inspection of Water Control Structures Associated with Nuclear Power Plants FERC Inspections of the Keowee Hydro Station (B2-1.34)	III.A6.TP-221	3.5.1- 083	C,3,7

SLRA Table 3.5.2-4 (page 3-1390) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Trash Rack Filter	F; SS	Stainless Steel Steel	Air – Outdoor (External)	Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-261	3.5.1- 088	E,4,8
			Air (External)	Loss of Material, Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.B5.T-37b	3.5.1- 100	E,4,8
			Water – Flowing (External)	Loss of Preload	Inspection of Water-Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-261	3.5.1- 088	E,4,8
			Air – Outdoor (External)	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-221	3.5.1- 083	A,4,8
						III.B5.TP-43	3.5.1- 092	E,4,8

SLRA Table 3.5.2-4 (page 3-1391) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Trash Rack Filter	F; SS	Steel	Air – Outdoor (External)	Loss of Preload	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-261	3.5.1- 088	E,4,8
			Water – Flowing (External)	Loss of Material	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-221	3.5.1- 083	A,4,8
				Loss of Preload	Inspection of Water Control Structures Associated with Nuclear Power Plants <u>FERC Inspections of the Keowee Hydro Station (B2.1.34)</u>	III.A6.TP-261	3.5.1- 088	E,4,8

SLRA Table 3.5.2-4 (page 3-1392) is revised as follows:

Table 3.5.2-4 Containments, Structures, and Component Supports - Keowee Hydro Station - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
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Plant Specific Notes:

1. Concrete Elements include beams, columns, walls, slabs, curbs, sumps, foundations and pads.
2. Steel elements include beams, columns, ~~metal siding~~, baseplates, bracing, stairs, platforms, grating, decking and ladders.
3. The Penstock, Power Tunnel, Spillway and Intake Steel Elements include beams, columns, tunnel steel liner and taintor gates.
4. Trash Rack Filter includes the structural members and structural bolting. Included with this component type is the spillway sluice gate.
5. ~~The Penstock, Power Tunnel, Spillway and Intake Stainless Steel Elements include beams, columns, framing and miscellaneous stainless steel members.~~ Not used.
6. The FERC Inspections of the Keowee Hydro Station (Dam) are the aging management program credited for the Powerhouse, Penstock, Power Tunnels, Spillway and Intake portions of the Keowee Hydro Station (Dam). Keowee is licensed by the Federal Energy Regulatory Commission (FERC). Screening and aging management review of the Powerhouse, Penstock, Power Tunnels, Spillway and Intake portions of the Keowee Hydro Station (Dam) were performed for the second period of extended operation based on current licensing basis established for Oconee in NUREG-1723, Safety Evaluation Report Related to the License Renewal of Oconee Nuclear Station, Units 1,2, and 3. The staff concluded as stated in paragraph 3.8.3.2.2 “Aging Management Program”, “Therefore, for earthen embankments, dams, and related structures identified as being subject to an AMR, the staff concludes that continued compliance with requirements of FERC into the license renewal period, by virtue of that agency’s authority and responsibility for ensuring that its regulated projects are constructed, operated, and maintained to protect life, health, and property, will constitute an acceptable dam AMP for the purposes of license renewal.” ONS will continue to comply with these FERC requirements during the second period of extended operation. See Section B2.1.34 for description of FERC inspection activities.
7. The Underwater Inspection and Penstock Inspection are ongoing aging management activities associated with the FERC Inspection of the Keowee Hydro Station and performed under the Inspection of Water Control Structures Associated With Nuclear Power Plants program are credited for the material, environment and aging effect combination. These inspection activities manage Keowee Dam structures and components that are underwater or are normally submerged and inaccessible for inspection during the Title 18 Part 12D Inspection by Independent Consultant. See Section B2.1.34 for description of FERC inspection activities.
8. The Underwater Inspection, which is associated with the FERC Inspections of the Keowee Hydro Station, ~~performed under the Inspection of Water Control Structures Associated With Nuclear Power Plants program~~ are credited for the material, environment and aging effect combination.

SLRA Table 3.5.2-6 (page 3-1397) is revised as follows:

Table 3.5.2-6 Containments, Structures, and Component Supports - Earthen Embankments - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Earthen Water Control Structures	SS	Various	Air – Outdoor (External)	Loss of Material, Loss of Form	FERC Inspections of the Keowee Earthen Embankments Hydro Station	III.A6.T-22	3.5.1- 058	A,1
			Water – Flowing (External)	Loss of Material, Loss of Form	FERC Inspections of the Keowee Earthen Embankments Hydro Station	III.A6.T-22	3.5.1- 058	A,1
			Water – Standing (External)	Loss of Material, Loss of Form	FERC Inspections of the Keowee Earthen Embankments Hydro Station	III.A6.T-22	3.5.1- 058	A,1

Plant Specific Notes:

1. The FERC Inspections of the Keowee Hydro Station (Dam) are the aging management program credited for the Earthen Embankments. Keowee is licensed by the Federal Energy Regulatory Commission (FERC). Screening and aging management review of the Earthen Embankments was performed for the second period of extended operation based on current licensing basis established for Oconee in NUREG-1723, Safety Evaluation Report Related to the License Renewal of Oconee Nuclear Station, Units 1,2, and 3. The staff concluded as stated in paragraph 3.8.3.2.2 “Aging Management Program”, “Therefore, for earthen embankments, dams, and related structures identified as being subject to an AMR, the staff concludes that continued compliance with requirements of FERC into the license renewal period, by virtue of that agency's authority and responsibility for ensuring that its regulated projects are constructed, operated, and maintained to protect life, health, and property, will constitute an acceptable dam AMP for the purposes of license renewal.” ONS will continue to comply with these FERC requirements during the second period of extended operation. [See Section B2.1.34 for a description of FERC Inspection activities.](#)

SLRA Table 3.5.2-9 (page 3-1405) is revised as follows:

Table 3.5.2-9 Containments, Structures, and Component Supports - Intake Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
Concrete Elements (Accessible)	SP; SS	Concrete	Air – Outdoor (External)	Cracking	Structures Monitoring (B2.1.33)	III.A6.TP-25	3.5.1- 054	A,1
	SP, SS	Concrete	Air – Outdoor (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-38	3.5.1- 059	A,1
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-37	3.5.1- 061	A,1
				<u>Loss of Material (Spalling, Scaling), Cracking</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-36</u>	<u>3.5.1-060</u>	<u>A,1</u>
	SP; SS	Concrete	Water – Flowing (External)	Cracking, Loss of Bond, Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-38	3.5.1- 059	A,1
	SP; SS	Concrete	Water – Flowing (External)	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)	III.A6.TP-37	3.5.1- 061	A,1
	<u>SP; SS</u>	<u>Concrete</u>	<u>Water – Flowing (External)</u>	<u>Loss of Material (Spalling, Scaling), Cracking</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-36</u>	<u>3.5.1-060</u>	<u>A,1</u>

SLRA Table 3.5.2-9 (page 3-1406) is revised as follows:

Table 3.5.2-9 Containments, Structures, and Component Supports - Intake Structure - Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect	Aging Management Program	NUREG-2191 Item	NUREG-2192 Table 1	Notes
<u>Trash Rack Filter</u>	<u>F; SS</u>	<u>Stainless Steel</u>	<u>Air – Outdoor (External)</u>	<u>Loss of Preload</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-261</u>	<u>3.5.1- 088</u>	<u>E,3</u>
			<u>Air (External)</u>	<u>Loss of Material, Cracking</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.B5.T-37b</u>	<u>3.5.1- 100</u>	<u>E,3</u>
			<u>Water – Flowing (External)</u>	<u>Loss of Preload</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-261</u>	<u>3.5.1- 088</u>	<u>E,3</u>
		<u>Steel</u>	<u>Air – Outdoor (External)</u>	<u>Loss of Material</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-221</u>	<u>3.5.1- 083</u>	<u>A,3</u>
						<u>III.B5.TP-43</u>	<u>3.5.1- 092</u>	<u>E,3</u>
				<u>Loss of Preload</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34))</u>	<u>III.A6.TP-261</u>	<u>3.5.1- 088</u>	<u>E,3</u>
			<u>Water – Flowing (External)</u>	<u>Loss of Material</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-221</u>	<u>3.5.1- 083</u>	<u>A,3</u>
				<u>Loss of Preload</u>	<u>Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.34)</u>	<u>III.A6.TP-261</u>	<u>3.5.1- 088</u>	<u>E,3</u>

Plant Specific Notes

- Concrete Elements include beams, columns, walls, slabs, curbs, foundations and pads.
- Steel elements include beams, columns, baseplates, bracing, stairs, platforms, grating, decking, ladders, and embedded steel.
- Trash Rack Filter includes the structural members and the structural bolting.

A2.34 Inspection of Water-Control Structures Associated with Nuclear Power Plants

Program Description

The aging management of the condenser circulating water discharge pipe, ~~Keowee intake and penstock, as well as portions of the Keowee powerhouse~~ and condenser circulating water intake structure are within the scope of the *Inspection of Water-Control Structures Associated with Nuclear Power Plants* AMP. The inspections are performed under the current Inspection program for civil engineering structures and components. Any enhancements described in this AMP apply to the *Structures Monitoring (A2.33)* program with respect to aging management activities associated with the condenser circulating water discharge pipe, ~~Keowee intake, and penstock, as well as portions of the Keowee powerhouse~~ and condenser circulating water intake structure, which are within the scope of this program.

The aging management of dams and dikes at Oconee is within the scope of the *Inspection of Water-Control Structures Associated with Nuclear Power Plants* AMP. Aging management is performed in accordance with the FERC five year inspection requirements. The inspections of dams and dikes within the scope of this program include inspections of the Keowee river dam; Keowee spillway and left abutment, Keowee intake, power tunnels, penstock and powerhouse; little river dam; little river dikes A, B, C, and D; and the Oconee intake canal dike, which are performed in accordance with the requirements contained in *Title 18 of the Code of Federal Regulations, Conservation of Power and Water Resources, Part 12, Safety of Water Power Projects and Project Works, Subpart D (Inspection by Independent Consultant)*. Aging management activities include: 1) visual inspections by a qualified independent consultant approved by FERC (i.e., the FERC Part 12D Inspection), and submittal of inspection reports with corrective actions that are approved by FERC; 2) visual inspections performed by the licensee of underwater areas of the tail race, intake bridge, intake structure and spillway and 3) visual inspections performed by the licensee of the penstock, power tunnel and draft tubes during dam outages. The inspections performed under the FERC five year inspection program have been approved by FERC and are the CLB for Oconee regarding aging management of these dams and dikes. Oconee will continue to comply with these FERC requirements during the SPEO. Specific corrective actions and confirmation of corrective actions are implemented in accordance with the corrective action program. The enhancements described in this AMP do not apply to those structures managed in accordance with FERC requirements.

Enhancements

The *Inspection of Water-Control Structures Associated with Nuclear Power Plants* AMP will be enhanced to:

1. Provide guidance for structural bolting consisting of ASTM A325, ASTM F1852, and/or ASTM A490, for storage, lubricants, bolting and coating material selection and the steps to minimize stress corrosion cracking potential discussed in Section 2 of RCSC (Research Council for Structural Connections) publication, "*Specification for Structural Joints Using ASTM A325 or A490 High-Strength Bolts*".
2. Provide guidance so that when replacement bolting is required, bolting and coating material, installation torque or tension, and use of lubricants and sealants will be in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339.
3. Provide guidance for proper specification of new high strength bolting and coating material and lubricant to prevent or mitigate degradation and failure of structural bolting in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339.

SLRA Table A6.0-1 (page A-105) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
34	<i>Inspection of Water Control Structures Associated With Nuclear Power Plants</i> program	<p>The <i>Inspection of Water Control Structures Associated With Nuclear Power Plants</i> AMP is an existing program that will be enhanced to:</p> <ol style="list-style-type: none">1. Provide guidance for structural bolting consisting of ASTM A325, ASTM F1852, and/or ASTM A490, for storage, lubricants, <u>bolting and coating material selection</u> and the steps to minimize stress corrosion cracking potential discussed in Section 2 of RCSC (Research Council for Structural Connections) publication, “<i>Specification for Structural Joints Using-ASTM A325 or A490 High-Strength Bolts</i>”.2. Provide guidance so that when replacement bolting is required, bolting <u>and coating</u> material, installation torque or tension, and use of lubricants and sealants will be in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339.3. Provide guidance for proper specification of new high strength bolting <u>and coating</u> material and lubricant to prevent or mitigate degradation and failure of structural bolting in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339.	B2.1.34	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

SLRA Appendix B2.1.34 (page B-234) is revised as follows:

Program Description

Structural components and commodities monitored under this program include steel bolting, ~~concrete anchors~~; concrete elements; ~~concrete~~ and steel elements of the condenser circulating water discharge pipe, ~~penstock, power tunnels, spillway,~~ and condenser circulating water intakes; ~~steel members~~; ~~as well as steel piles, sluice gates, and trash racks; and equipment supports and foundations.~~ Because of the plant design, there are no stand alone, external flood protection features that are in scope for SLR. The flood protection features are part of a structure, such as an exterior wall or earthen dam, which are in scope for SLR.

The program manages loss of material, loss of preload, cracking, loss of bond, loss of form, increase in porosity and permeability, and reduction of strength. Environments include outdoor air, groundwater/soil, and water flowing or standing.

RG 1.127 describes a basis acceptable to the NRC staff for developing an appropriate inservice inspection and surveillance program for dams, slopes, canals, and other water-control structures associated with emergency cooling water systems or flood protection of nuclear power plants. Instead of committing to RG 1.127, at Oconee, these types of structures are managed in accordance with the requirements of the FERC five year inspection requirements. The inspections of dams and dikes, within the scope of this program, include inspections of the Keowee river dam; Keowee spillway and left abutment, Keowee intake, power tunnels, penstock and powerhouse; little river dam; little river dikes A, B, C, and D; and the Oconee intake canal dike. These inspections are performed in accordance with the requirements contained in *Title 18 of the Code of Federal Regulations, Conservation of Power and Water Resources, Part 12, Safety of Water Power Projects and Project Works, Subpart D (Inspection by Independent Consultant)*. The SLR-GALL has determined that for dam inspection and maintenance, programs under the regulatory jurisdiction of the FERC or the U.S. Army Corps of Engineers, continued through the SPEO, are adequate for the purpose of aging management.

SLRA Appendix B2.1.34 (page B-235 and B-236) is revised as follows:

B2.1.34 INSPECTION OF WATER-CONTROL STRUCTURES ASSOCIATED WITH NUCLEAR POWER PLANTS

Program Description

Inspections of the Keowee river dam; little river dam; little river dikes a, b, c, and d; Oconee intake canal dike; Keowee spillway and left abutment, Keowee intake, power tunnels, penstock and powerhouse are performed in accordance with the requirements contained in 18 CFR Part 12, *Safety Of Water Power Projects And Project Works*. Specific corrective actions and confirmation are implemented in accordance with the corrective action program.

Enhancements

The following enhancements will be implemented in the following program elements: Preventive Actions (Element 2), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), and Acceptance Criteria (Element 6).

1. For structural bolting consisting of ASTM A325, ASTM F1852, and/or ASTM A490, provide guidance for storage, lubricants, bolting and coating material selection and the steps to minimize stress corrosion cracking potential discussed in Section 2 of Research Council for Structural Connections publication, "*Specification for Structural Joints Using ~~ASTM A325 or A490~~ High-Strength Bolts*". (Element 2)
2. Provide guidance so that when replacement bolting is required, bolting and coating material, installation torque or tension, and use of lubricants and sealants will be in accordance with the guidelines of EPRI NP-5769, EPRI TR- 104213, and the additional recommendations of NUREG-1339. (Element 2)
3. Provide guidance for proper specification of new high strength bolting and coating material and lubricant to prevent or mitigate degradation and failure of structural bolting in accordance with the guidelines of EPRI NP-5769, EPRI TR- 104213, and the additional recommendations of NUREG-1339. (Element 2)
4. Provide inspection and evaluation criteria for structural concrete using quantitative second tier criteria of Chapter 5 in ACI 349.3R. The program will be enhanced to incorporate monitoring for movements (e.g., settlement, heaving, and deflection), conditions at junctions with abutments and embankments, pattern cracking with darkened edges, the changes in material properties of increase in porosity and permeability, and loss of strength. (Element 3)
5. Expand the program to monitor accessible sliding surfaces for indications of significant loss of material due to wear or corrosion, and for accumulation of debris or dirt. Establish acceptance criteria for sliding surfaces as no significant loss of material due to wear or corrosion, and no debris or dirt that could restrict or prevent sliding of the surfaces, as required by design. (Elements 3 and 6)

ATTACHMENT 14

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

CLARIFIED SLRA SECTION 3.5.2.2.1.3 REGARDING
MOISTURE BARRIERS, BORATED WATER SPILLS AND
WATER PONDING

Clarified SLRA Section 3.5.2.2.1.3 regarding moisture barriers, borated water spills and water ponding

(TRP-41)

Affected SLRA Sections:

SLRA Sections 3.5.2.2.1.3
SLRA Appendix A2.28
SLRA Table A6.0-1
SLRA Appendix B2.1.28

Affected SLRA Page Numbers:

3-1308
A-30
A-31
A-94
B-199
B-200

Description of Change:

In Section 3.5.2.2.1.3, added discussion of moisture barrier degradation and how borated water spills and water ponding on the concrete floor is addressed such that no plant specific program is needed to manage aging. Added additional details to Section A2.28, Table A6.0-1, and B2.1.28, Enhancements 1 and 3.

SLRA Section 3.5.2.2.1.3 (Page 3-1308) is revised as follows:

Evaluation

[3.5.1-005], [3.5.1-035] –The ASME Section XI, Subsection IWE (B2.1.28) program manages aging of the steel liner of the concrete containment building. The ASME Section XI, Subsection IWE AMP inspects the moisture barrier at the location where the steel liner becomes embedded in concrete. The AMP also includes inspections in accessible areas, such as penetration sleeves/assemblies, and considerations for inaccessible areas if degradation is detected in accessible areas. The 10 CFR Part 50, Appendix J (B2.1.31) program manages loss of leak tightness, loss of sealing, and leakage through containment to assure that allowable leakage rate limits specified in the technical specifications are not exceeded. An evaluation of the acceptability of the inaccessible areas is completed whenever conditions are detected in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas. OE Operating experience associated with accessible areas from the ASME Section XI, Subsection IWE (B2.1.28) program has identified only minor indications of corrosion, which have been evaluated for continued service or otherwise addressed by the corrective action program. The Oconee Boric Acid Corrosion AMP (B2.1.4) minimizes exposure of susceptible materials to borated water by frequent monitoring of the locations where potential leakage could occur. Timely cleaning of leakage, spills, and any resulting water ponding on the concrete floor is accomplished. Repairs are made if leakage is detected per the corrective action program. A plant specific program to manage loss of material for inaccessible areas of steel (liner) components is not required.

SLRA Appendix A2.28 (page A-30) is further revised as follows:

Enhancements

The ASME Section XI, Subsection IWE AMP will be enhanced to:

1. Specify that for “high strength” structural bolting consisting of ASTM A325, ASTM F1852, ASTM F2280, and/or ASTM A490 bolts, the preventive actions for storage, lubrication, and stress corrosion cracking potential discussed in Section 2.0 of RCSC (Research Council for Structural Connections) publication “*Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts*,” will be used. Procedures will be revised to specify that whenever replacement of bolting is required, bolting material, installation torque or tension, and use of lubricants and sealants are in accordance with the guidelines of EPRI NP-5769, “Degradation and Failure of Bolting in Nuclear Power Plants,” EPRI TR-104213, “Bolted Joint Maintenance & Application Guide,” and the additional recommendations of NUREG-1339, “Resolution of Generic Safety Issue 29: Bolting Degradation of Failure in Nuclear Power Plants”.

SLRA Appendix A2.28 (page A-31) is further revised as follows:

2. The program will be enhanced to include inspection attributes for the aging mechanisms listed in NUREG-2191. For non-coated surfaces this includes evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities including discernible liner plate bulges. For painted or coated surfaces this includes evidence of flaking, blistering, peeling, discoloration, and other signs of potential distress of the underlying metal shell or liner system, including discernible liner plate bulges.
3. The program will be enhanced to specify a one-time volumetric examination of metal liner surfaces that are inaccessible from one side if triggered by plant-specific OE. The trigger for this supplemental examination is plant-specific occurrence or recurrence of measurable metal liner corrosion (base metal material loss exceeding 10% of nominal plate thickness) initiated on the inaccessible side or areas, identified since the date of issuance of the first renewed license. This supplemental volumetric examination consists of a sample of one-foot square locations that include both randomly-selected and focused areas most likely to experience degradation based on operating experience and/or other relevant considerations such as environment. The supplemental volumetric examinations for each unit will occur within two refueling outages after identifying the trigger for the examination in any unit. Any identified degradation is addressed in accordance with the applicable provisions of the ASME Section XI, Subsection IWE program. The sample size, locations, and any needed scope expansion (based on findings) for this one-time set of volumetric examinations should be determined on a plant-specific basis to demonstrate statistically with 95 percent confidence that 95 percent of the accessible portion of the containment liner is not experiencing corrosion degradation with greater than 10 percent loss of nominal thickness.

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
28	ASME Section XI, Subsection IWE program	<p>The ASME Section XI, Subsection IWE AMP is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. The program will be enhanced to specify that for “high strength” structural bolting consisting of ASTM A325, ASTM F1852, <u>ASTM F2280</u>, and/or ASTM A490 bolts, the preventative actions for storage, lubrication, and stress corrosion cracking potential discussed in Section 2.0 of Research Council for Structural Connections publication “<i>Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts</i>,” will be used. <u>Procedures will be revised to specify that whenever replacement of bolting is required, bolting material, installation torque or tension, and use of lubricants and sealants are in accordance with the guidelines of EPRI NP-5769, “Degradation and Failure of Bolting in Nuclear Power Plants,” EPRI TR-104213, “Bolted Joint Maintenance & Application Guide,” and the additional recommendations of NUREG-1339, “Resolution of Generic Safety Issue 29: Bolting Degradation of Failure in Nuclear Power Plants”.</u> 2. Include inspection attributes for the aging mechanisms listed in NUREG-2191. For non-coated surfaces this includes evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities including discernible liner plate bulges. For painted or coated surfaces this includes evidence of flaking, blistering, peeling, discoloration, and other signs of potential distress of the underlying metal shell or liner system, including discernible liner plate bulges. 3. Specify a one-time volumetric examination of metal liner surfaces that are inaccessible from one side if triggered by plant-specific OE. The trigger for this supplemental examination is a plant-specific occurrence or recurrence of measurable metal liner corrosion (base metal material loss exceeding 10% of nominal plate thickness) initiated on the inaccessible side or areas, identified since the date of issuance of the first renewed license. This supplemental volumetric examination consists of a sample of one-foot square locations that include both randomly-selected and focused areas most likely to experience degradation based on OE and/or other relevant considerations such as environment. The supplemental volumetric examinations for each unit will occur within two refueling outages after identifying the trigger for the examination <u>in any unit</u>. Any identified degradation is addressed in accordance with the 	B2.1.28	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

SLRA Section B2.1.28, (pages B-199 and B-200) is revised as follows:

Enhancements

The following enhancements will be implemented in the following program elements: Preventive Actions (Element 2), Parameters Monitored or Inspected (Element 3), and Detection of Aging Effects (Element 4).

1. The program will be enhanced to specify that for “high strength” structural bolting consisting of ASTM A325, ASTM F1852, [ASTM F2280](#), and/or ASTM A490 bolts, the preventative actions for storage, lubrication, and stress corrosion cracking potential discussed in Section 2.0 of Research Council for Structural Connections publication “*Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts*,” will be used. [Procedures will be revised to specify that whenever replacement of bolting is required, bolting material, installation torque or tension, and use of lubricants and sealants are in accordance with the guidelines of EPRI NP-5769, “Degradation and Failure of Bolting in Nuclear Power Plants,” EPRI TR-104213, “Bolted Joint Maintenance & Application Guide,” and the additional recommendations of NUREG-1339, “Resolution of Generic Safety Issue 29: Bolting Degradation of Failure in Nuclear Power Plants.”](#) (Element 2)
2. The program will be enhanced to include inspection attributes for the aging mechanisms listed in NUREG-2191. For non-coated surfaces this includes evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities including discernible liner plate bulges. For painted or coated surfaces this includes evidence of flaking, blistering, peeling, discoloration, and other signs of potential distress of the underlying metal shell or liner system, including discernible liner plate bulges. (Element 3)
3. The program will be enhanced to specify a one-time volumetric examination of metal liner surfaces that are inaccessible from one side if triggered by plant- specific OE. The trigger for this supplemental examination is plant-specific occurrence or recurrence of measurable metal liner corrosion (base metal material loss exceeding 10% of nominal plate thickness) initiated on the inaccessible side or areas, identified since the date of issuance of the first renewed license. This supplemental volumetric examination consists of a sample of one-foot square locations that include both randomly-selected and focused areas most likely to experience degradation based on operating experience and/or other relevant considerations such as environment. The supplemental volumetric examinations for each unit will occur within two refueling outages after identifying the trigger for the examination [in any unit](#). Any identified degradation is addressed in accordance with the applicable provisions of the ASME Section XI, Subsection IWE program. The sample size, locations, and any needed scope expansion (based on findings) for this one-time set of volumetric examinations should be determined on a plant-specific basis to demonstrate statistically with 95 percent confidence that 95 percent of the accessible portion of the containment liner is not experiencing corrosion degradation with greater than 10 percent loss of nominal thickness. (Element 4)

ATTACHMENT 15

OCONEE NUCLEAR STATION
SUBSEQUENT LICENSE RENEWAL APPLICATION
SLRA UPDATES

REVISED MASONRY WALLS AND STRUCTURES
MONITORING AGING MANAGEMENT PROGRAMS

Revised Masonry Walls and Structures Monitoring Aging Management Programs

(TRP-45, TRP-46 and On-Site Audit)

Affected SLRA Sections:

SLRA Appendix A2.32
SLRA Appendix B2.1.32
SLRA Appendix B2.1.33
SLRA Table A6.0-1

Affected SLRA Page Numbers:

A-34
A-97
B-218
B-222

Description of Change:

Revised Masonry Walls AMP to add commitment associated with performing visual inspection of a representative population of masonry wall that is under metal siding. Revised Structures Monitoring AMP Appendix B description to discuss inspection of accessible exterior concrete walls being a leading indicator for the concrete walls located under metal siding.

SLRA Section A2.32 (page A-34) is revised as follows:

A2.32 Masonry Walls

Program Description

The *Masonry Walls AMP* is an existing condition monitoring program that is implemented as part of the *Structures Monitoring (A2.33)* AMP and manages cracking, loss of material, and loss of material (spalling and scaling) that could impact the intended function of the masonry walls. The *Masonry Walls AMP* consists of inspections, consistent with Inspection and Enforcement Bulletin 80-11, and plant-specific monitoring, proposed by Information Notice 87-67, for managing shrinkage, separation, gaps, loss of material and cracking of masonry walls such that the evaluation basis is not invalidated and intended functions are maintained.

Enhancements

The *Masonry Walls AMP* will be enhanced to:

1. Update the parameters monitored to identify potential shrinkage and/or separation of masonry walls and include loss of material in addition to the currently managed cracking at joints.
2. Perform periodic visual inspections of a representative sample of approximately four percent, or 225 square feet, whichever is less, of exterior masonry walls that are covered by metal siding, on a five year frequency, to look for loss of material, cracking, or other signs of degradation. While siding panels are infrequently removed for maintenance activities, opportunistic visual inspections can be counted in this sample.

SLRA Table A6.0-1 (page A-97) is revised as follows:

Table A6.0-1: Subsequent License Renewal Commitments

#	Program	Commitment	AMP	Implementation
31	<i>10 CFR Part 50, Appendix J</i> program	The existing <i>10 CFR Part 50, Appendix J</i> program is credited.	B2.1.31	Ongoing
32	<i>Masonry Walls</i> program	<p>The <i>Masonry Walls</i> AMP is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Update the parameters monitored to identify potential shrinkage and/or separation of masonry walls and include loss of material in addition to the currently managed cracking at joints. 2. Perform periodic visual inspections of a representative sample of approximately four percent, or 225 square feet, whichever is less, of exterior masonry walls that are covered by metal siding, on a five year frequency, to look for loss of material, cracking, or other signs of degradation. While siding panels are infrequently removed for maintenance activities, opportunistic visual inspections can be counted in this sample. 	B2.1.32	Program enhancements for SLR will be implemented no later than 6 months prior to the SPEO.

SLRA Section B2.1.32 (page B-218) is revised as follows:

B2.1.32 MASONRY WALLS

Program Description

The *Masonry Walls* AMP is an existing program implemented as part of the current *Structures Monitoring* (B2.1.33) AMP. It is based on the guidance provided in IE Bulletin 80-11, “*Masonry Wall Design*”, and NRC Information Notice 87-67, “*Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11*”, and is implemented through station procedures.

The *Masonry Walls* AMP manages inspections of masonry walls for cracks in joints, unsealed penetrations, missing or broken blocks, or separation from supports that could impact the intended function or potentially invalidate its evaluation basis. The program relies on periodic visual inspections, conducted at a nominal five year frequency to monitor and maintain the condition of masonry walls within the scope of SLR so that the established evaluation basis for each masonry wall remains valid during the SPEO. Observed aging effects that could impact masonry wall intended function or potentially invalidate its evaluation basis are entered into the corrective action process for further analysis, repair, or replacement. Masonry walls that are considered fire barriers are also managed by the *Fire Protection* (B2.1.15) program.

Aging effects of masonry wall structural steel support elements that provide technical basis for boundary conditions used in seismic analysis are managed by the *Structures Monitoring* (B2.1.33) AMP.

NUREG-2191 Consistency

The Oconee *Masonry Walls* AMP is an existing program that will be consistent with the ten elements of AMP Section XI.S5, *Masonry Walls* specified in NUREG-2191 (GALL-SLR) with enhancements described below.

Exception to NUREG-2191

None

Enhancements

The following enhancement will be implemented in the following program elements: Parameters Monitored or Inspected (Element 3) and Detection of Aging Effects (Element 4)

1. The masonry wall portion of the Structures Monitoring (B2.1.33) AMP will be updated to modify the parameters monitored to identify potential shrinkage and/or separation of masonry walls and include loss of material in addition to the currently managed cracking at joints (Element 3).
2. Perform periodic visual inspections of a representative sample of approximately four percent, or 225 square feet, whichever is less, of exterior masonry walls that are covered by metal siding, on a five year frequency, to look for loss of material, cracking, or other signs of degradation. While siding panels are infrequently removed for maintenance activities, opportunistic visual inspections can be counted in this sample (Element 4).

SLRA Section B2.1.33 (page B-222) is revised as follows:

B2.1.33 STRUCTURES MONITORING

Program Description

The *Structures Monitoring* AMP is an existing condition monitoring program that consists of periodic visual inspection and monitoring the condition of concrete and steel structures, structural components, component supports, and structural commodities to ensure that aging degradation (such as those described in ACI 349.3R, ACI 201.1R, SEI/ASCE 11, and other documents) will be detected, the extent of degradation determined and evaluated, and corrective actions taken prior to loss of intended functions. Quantitative results (measurements) and qualitative information from periodic inspections are trended with sufficient detail, such as photographs and surveys for the type, severity, extent, and progression of degradation, to ensure that corrective actions can be taken prior to a loss of intended function. The acceptance criteria are derived from applicable consensus codes and standards. For concrete structures, the program includes personnel qualifications and quantitative evaluation criteria of ACI 349.3R. Structures are monitored on an interval of a nominal five years. The interval may be increased to a nominal 10- year frequency with appropriate justification based on the structure, environment and related inspections. There are provisions for more frequent inspections when conditions are observed that have a potential for

impacting an intended function. Unacceptable conditions, when found, are evaluated or corrected in accordance with the corrective action program. The monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent significant age related degradation to ensure there is no loss of intended function.

The *Structures Monitoring* AMP was developed to implement the requirements of 10 CFR 50.65 and is based on NUMARC 93-01, "*Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*," and Regulatory Guide 1.160, "*Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*." The program includes elements of the *Masonry Walls* (B2.1.32) program and *Inspection of Water-Control Structures Associated with Nuclear Power Plants* (B2.1.34) program.

Concrete structures are inspected for indications of deterioration and distress including evidence of leaching, loss of material, cracking, and a loss of bond, as defined in ACI 201.1R. **Inspections of the accessible concrete structures are used as leading indicators for the condition of the concrete under the metal siding.** Steel components are inspected for loss of material due to corrosion. Inspections also include seismic joint fillers, elastomeric materials; and fiber reinforced polymers and steel bracings associated with masonry walls. The program also includes provisions for periodic testing and assessment of groundwater chemistry and opportunistic inspections of accessible below grade concrete structures.

Protective coatings are not relied upon to manage the effects of aging for structures included in the scope of this program. A dewatering system is not relied upon to control settlement and porous concrete was not used in the design of foundations.

Applicable components within the scope of this program include, but are not limited to: bolting, concrete anchors and embedments, concrete components, decking and siding, doors and door seals, ductbanks, external surfaces of bus enclosures (metallic ducting) and bus enclosure structural supports, expansion and seismic joints, foundations, hatches, hazard barriers, metal components such as louvers, miscellaneous steel, penetrations seals and sleeves, piles, pipe