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3.0 AGING MANAGEMENT REVIEW RESULTS

Introduction

10 CFR 54.21 (a)(3) requires a demonstration that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the current licensing basis throughout the period of extended operation. This section satisfies the requirement of 10 CFR 54.21 (a)(3).

This section discusses the layout of this application relative to aging management review results. Specifically, this section:

- identifies the component groups subject to aging management review and their component intended functions,
- identifies the environments and materials which result in aging effects,
- identifies the aging effects requiring management, and
- lists the activities that manage the identified aging effects.

Sections 3.1 through 3.6 present, in a six-column tabular format, the components and component groups subject to aging management review, the aging effects requiring management, and the activities credited to manage the aging effects. The tables are arranged to be consistent with the presentation suggested in the Draft Regulatory Guide DG 1104, "Standard Format and Content to Renew Nuclear Power Plant Operating Licenses" and NEI 95-10.

The tables in Sections 3.1 through 3.4 present a system-based overview of the aging management review results for each of the component groups requiring aging management review. Each row indicates the aging management activities that are credited to maintain the intended function of a component group operating in the defined environment for each aging effect acting on a specific material.

The tables in Section 3.5 present a structure-based overview of the aging management review results for each of the component groups requiring aging management review.

Selected components and component groups, common to several systems or structures, were evaluated as commodity groups. Commodity groups are,

- Component Supports
- Hazard Barriers and Elastomers (Doors, Penetration Seals, Fire Wrap, etc.)
- Miscellaneous Steel
- Electrical and Instrumentation Enclosures & Raceways

- Insulation
- Cables
- Connectors, Splices, and Terminal Blocks

The results of the aging management reviews for the commodity groups are presented in Sections 3.5 and 3.6 in the six-column table format.

Appendix B provides a discussion of the program elements of each aging management activity credited for aging management during the period of extended operation.

Aging Management Reviews

The results of the aging management reviews are presented in Sections 3.1 through 3.6 in tabular form. These tables provide the following items for each system or structure within the scope of license renewal:

- A component group derived from the scoping and screening process described in Sections 2.3 through 2.5.
- The component intended function(s).
- The environment being addressed in the evaluation.
- The materials of construction for the component group.
- The aging effects requiring management for the component group.
- The activities credited for managing the aging effects, with hypertext to the applicable activity in Appendix B where the elements of the aging management activity are described.

For each system or structure, the tables are sorted by component group, then by environment, and then by materials of construction. The aging management reviews considered all applicable intended functions, environments, materials of construction and aging effects for each component group. In general, results for each combination of intended function, environment, material and aging effect for a given component group are represented by an individual line item (row) in the table. Multiple intended functions, environments, materials or aging effects for a given component group may be addressed by a single line item (row) when the identified aging management activities apply to the combination.

Credited aging management activities are identified for each combination of intended function, environment, material and aging effect for a given component group. In some cases, a specific combination of component group, intended function, environment, material and aging effect may be listed in more than one row, with different aging management activities credited. The individual rows indicate that different components within the component group (i.e., different portions of the system) are addressed by different aging management activities.

Numbered footnotes are provided in the tables when appropriate for clarification. Footnotes are located at the end of each table.

Component Group

Component groups, including commodities, and associated components are listed in Column 1. In addition, some individual components are listed in Column 1. Examples of component groups, commodities, and associated components include:

Mechanical Systems:

- Casting and forging group (valve bodies, pump casings, strainer bodies, sprinkler heads, and hydrants)
- Heat exchanger group (heat exchangers, heaters, and coolers)
- Elastomer group (flex hoses)
- Piping group (piping, tubing, and fittings)
 Note: Fittings are considered with piping or tubing when made of the same material
- Piping specialties group (restricting orifices, flow elements and condensing chambers)
- Sheet metal group (louvers, plenums, ducts)
- Vessel group (tanks)
- Cranes and Hoists

Structures:

- Reinforced concrete (walls, slabs, beams, columns, foundations, pedestals, curbs, dikes)
- Unreinforced concrete
- Prestressed concrete
- Reinforced concrete block walls
- Reinforced concrete embedments
- Structural steel
- Component supports (bolts, anchors, lubrite plates, grout)
- Insulation
- Electrical and instrumentation enclosures and raceways
- Expansion bellows
- Metal siding and roof deck
- Blowout panels
- Hazards barriers (penetration seals, doors, fire wrap, elastomers)

Electrical:

- Cables
- Connectors, splices, and terminal blocks

Component Intended Function

Component intended functions for the mechanical, structural, and electrical components are included in Column 2 and listed in Table 2.1-1, "Component Intended Functions."

Environment

The aging management reviews for components and structures were evaluated based upon component groupings in common environments. Common environments are listed in Column 3.

The evaluations for mechanical, structural and electrical discipline components and commodities are performed based on their operating environment(s). Since aging degradation may result from contact with the internal process fluid (for mechanical system components) or the external environment, all environments that come in contact with a given component require review.

The aging management reviews were performed using the following environments:

Reactor Grade Water

Reactor grade water is water that has been demineralized, contains no added corrosion inhibitors, and has low conductivity and impurities.

This includes water from three sources. Due to the variations in chemistry activities, reactor grade water has been addressed in Column 3 as:

- **Reactor coolant**

Reactor coolant system water is demineralized and maintained in accordance with stringent chemistry parameters to mitigate corrosion.

- **Condensate storage water**

Condensate storage water is condensed nuclear boiler steam that has been filtered and demineralized but not deaerated.

- **Fuel pool water**

Fuel pool water is demineralized and maintained in accordance with stringent chemistry parameters to mitigate corrosion. Fuel pool water is normally maintained at temperatures less than 150°F.

Fuel Oil

The fuel oil is used to fuel an internal combustion engine. The fuel oil for the emergency diesel generators and the diesel driven fire pump is #2 fuel oil.

Lubricating Oil

Lubricating oil is an organic fluid used to reduce friction between moving parts.

Steam

Steam is produced in the reactor vessel from reactor grade water and has extremely low levels of impurities. The systems that are pertinent to this evaluation are the reactor pressure vessel and internals, main steam, HPCI, and RCIC systems. The steam exists as a two phase vapor, ranging from high quality steam in the main steam system to a low quality steam in the HPCI and RCIC systems. The HPCI and RCIC steam lines normally see little to no steam flow because these systems operate infrequently.

Torus Grade Water

The torus grade water quality is monitored periodically and maintained in accordance with station procedures that include recommendations from EPRI TR-103515, "BWR Water Chemistry Guidelines." Purity of the torus water is maintained by pumping the torus water through filters and demineralizers and through bleed and feed operations with the hotwell.

Some carbon steel pipes, located in the torus, pass through the surface of the torus water and are exposed to a water-gas interface. For lines equipped with vacuum breaker valves, the water-gas interface occurs at both the inside and outside diameter of the pipe. For other lines, a water-gas interface occurs only at the outside diameter because the inside of the pipe remains full of water.

Closed Cooling Water

The chemical makeup of the closed cooling water is maintained in accordance with EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines". Purity and chemical content is maintained by periodic sampling and batch chemical addition of corrosion inhibitors in accordance with plant procedures.

Borated Water

The sodium pentaborate solution of the Standby Liquid Control (SBLC) system can potentially induce corrosion due to solution chemistry (conductivity and pH). The normal makeup water used for mixing the SBLC borated water solution is demineralized water that is maintained within chemistry guidelines, but industry experience has shown that there is a potential for chlorides and sulfates in the boron material. Boron concentration and temperature of the SBLC water are maintained in accordance with PBAPS Technical Specifications.

Raw Water

Raw water is untreated fresh water taken from the Conowingo Pond, which is formed by the Susquehanna River. Raw water typically contains a dilute solution of mineral salt impurities, dissolved gases and biological organisms. These dissolved gases (oxygen and carbon dioxide) are the prime corrosion-initiating agents. Water samples show pH variation from 7.00 to 7.55, chloride content of 9 to 18 ppm and sulfate content from 1 to 46 ppm.

Sheltered

The sheltered environment consists of indoor ambient conditions where components are protected from outdoor moisture. Conditions outside the drywell consist of normal room air temperatures ranging from 65°F - 150°F and a relative humidity ranging from 10% - 90%. The warmest room outside the drywell is the steam tunnel, with an average temperature of 150°F (based on measured temperatures), and maximum normal fluctuation to 165°F.

The drywell is inerted with nitrogen to render the containment atmosphere non-flammable by maintaining the oxygen content to less than 4% oxygen. The drywell normal operating temperature ranges from 65°F - 150°F with a relative humidity from 10% - 90%.

The sheltered environment atmosphere is an air or nitrogen environment with humidity. Components in systems with external surface temperatures the same or higher than ambient conditions are expected to be dry. Lack of a liquid moisture source in direct contact with a given component precludes the concern of external surface corrosion degradation of metallic components as an effect requiring aging management. Note however that the sheltered environment is considered a corrosive environment for some non-metallic elastomer components.

Ventilation Atmosphere

The ventilation systems take their suction from either the building rooms or the outdoor environment. The resulting ventilation system internal temperature and humidity conditions are controlled and are similar to the sheltered environment conditions.

Outdoor

Outdoor environmental conditions consist of air temperatures typically ranging from 0°F - 100°F and an average annual precipitation of approximately 30 inches. Corrosion occurs in the presence of moisture and oxygen but is accelerated by contaminants such as sulfur compounds and salts.

Buried

The buried environment consists of granular bedding material of sand or rock fines, backfill of dirt and rock, and filler material of gravel or crushed stone. Chemical testing of the groundwater has shown a pH between 7.2 and 7.6, a chloride concentration ranging between 13.7 - 21.5 ppm, and sulfates ranging between 10.3 - 41 ppm. Soil is assumed to contain levels of oxygen, moisture including ground water, biological organisms, and contaminants. A buried environment may include such items as pipe, ductbanks and conduits.

Wetted Gas

Wetted gas environments include air, containment atmosphere, and diesel exhaust gas. Air is either ambient or compressed air without air dryers in the system. Containment atmosphere in the drywell and torus is inerted with nitrogen with only 4% oxygen but is assumed to have the same corrosive effects as ambient air. Diesel exhaust can contain sulfur residues and has the potential for moisture and sulfuric acid in exhaust system components.

Dry Gas

The dry gas environments include dried air, nitrogen, carbon dioxide, hydrogen, oxygen, and freon. These gases are considered inert with

respect to corrosion potential because they have no significant moisture content.

Materials of Construction

Each of the component materials for the component groupings was identified during the aging management review process and is identified in Column 4.

Aging Effects

Applicable aging effects are listed in Column 5. The aging effects that require management during the period of extended operation were determined by reviewing the plant-specific materials of construction and applicable operating environments for each component and structure subject to aging management review.

The systematic assessment of aging effects was based on the collective experience of the nuclear power industry available in pertinent industry literature and specific PBAPS operating experience. Identification of those aging effects that require management incorporated information developed from available industry experience and PBAPS experience. The evaluation process included a review of pertinent industry operating experience as contained in NRC generic communications such as Information Notices, Generic Letters and Bulletins. In addition, PBAPS specific experience was reviewed including plant maintenance history, modifications, nonconformance reports, and Licensee Event Reports.

Each combination of environment, component groups and material was assessed to determine the aging effects that require aging management. If during the review of aging effects requiring management during the period of extended operation, it was determined that there were no applicable aging effects requiring aging management, the results are presented in the table by noting "None" in Column 5 and "Not Applicable" in Column 6. For example, there are no aging effects for the dry gas environment or for metallic components in the ventilation environment because the low moisture content would not initiate corrosion degradation. In addition, there are no aging effects for stainless steel in a wetted gas environment because of its resistance to general corrosion and the absence of pooling of moisture where contaminants could concentrate. Similarly, the aging effects of concrete in all environments were determined non-significant and require no aging management; except for change in material properties due to leaching of calcium hydroxide. The concrete mix design meets air content and water-to-cement ratio specified in ACI 318 and is constructed with the guidance of ACI 201.2R. Also the concrete is not exposed to aggressive environment (pH<5.5), or to chloride or sulfate solutions, which exceed allowable limits (chlorides > 500 ppm, or sulfates > 1500 ppm) (Ref. NUREG-1557).

Aging Management Activities

Column 6 lists the aging management activities that are credited to manage the identified aging effects for the given material. These aging management activities have been evaluated to assure that the aging effects identified will be adequately managed such that the intended functions of the components and structures will be maintained consistent with the current licensing basis through the period of extended operation. Descriptions of each of these credited activities are provided in Appendix B. References and hypertext are provided to appropriate Appendix B sections.

There are a few activities listed in Column 6 where the aging management activity title has been shortened for presentation purposes in the table. Full titles of activities are described in Appendix B. An example of this is Column 6 identifies Oil Quality Testing as an aging management activity where the full title of Lubricating and Fuel Oil Quality Testing activities is described in Appendix B.

The relationship between the summary information presented in the six-column tables in Sections 3.1 through 3.6 and the detailed information in the various sections of the application is depicted in Figure 3.0-1 "Correlation of Six Column Tables to Sections in the Application."

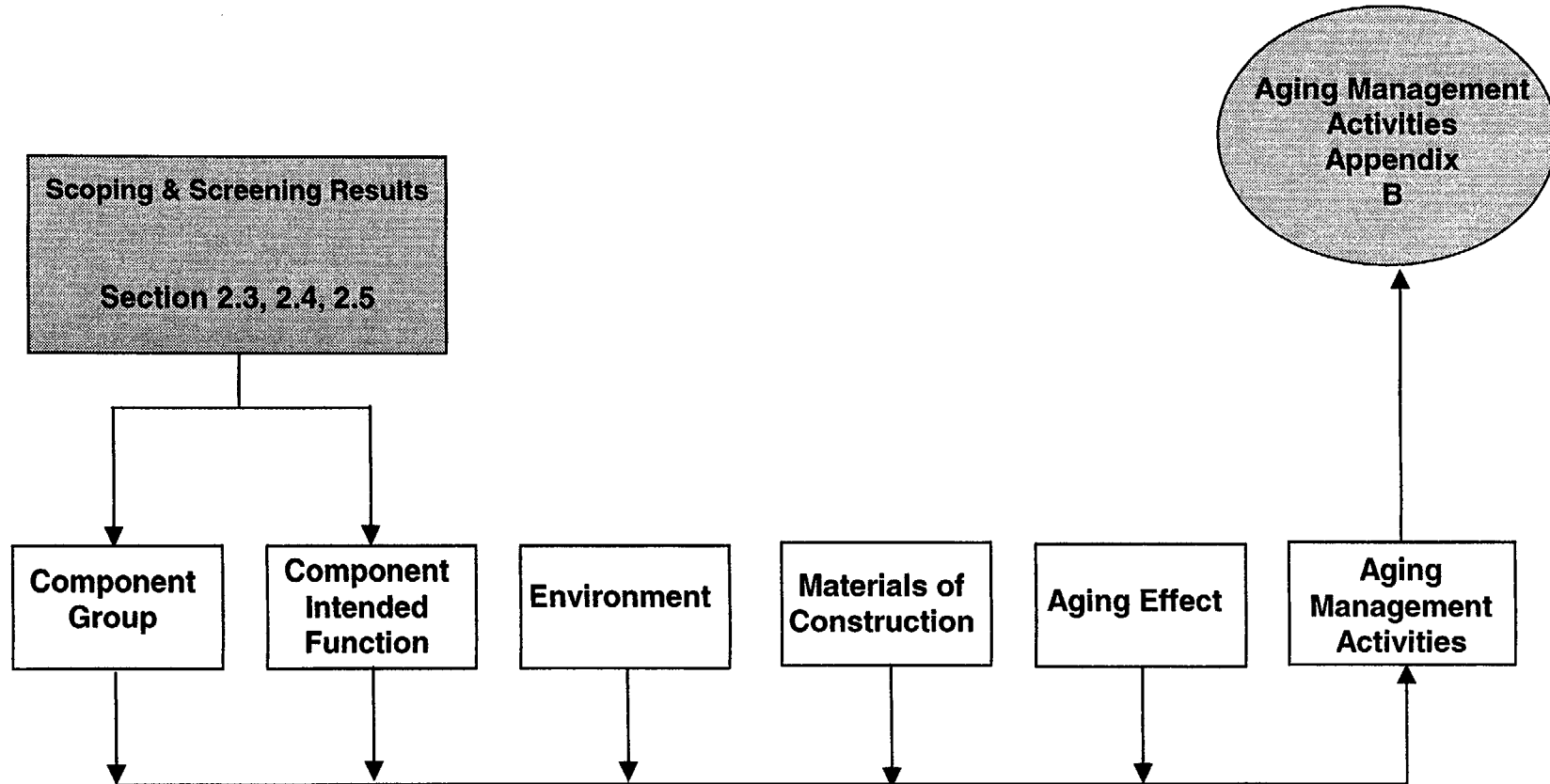


Figure 3.0-1 Correlation of Six Column Tables to Sections in the Application

3.1 AGING MANAGEMENT OF REACTOR COOLANT SYSTEM

The following Tables provide the results of the aging management reviews for each of the reactor coolant systems within the scope of license renewal. Aging management activities that are credited to manage the identified aging effects for the given material are discussed in Appendix B.

3.1.1 Reactor Pressure Vessel and Internals

Table 3.1-1 Aging Management Review Results for Component Groups for the Reactor Pressure Vessel and Internals

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Top Head	<ul style="list-style-type: none"> Pressure Boundary 	Steam	Low Alloy Steel	Loss of Material	<ul style="list-style-type: none"> RCS Chemistry (B.1.2) RPV and Internals ISI Program (B.2.7)
Bottom Head	<ul style="list-style-type: none"> Structural Support Pressure Boundary 	Reactor Coolant	Low Alloy Steel	None (1)	<ul style="list-style-type: none"> Not Applicable
Shell Courses	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Low Alloy Steel	Loss of Fracture Toughness	<ul style="list-style-type: none"> Reactor Materials Surveillance Program (B.1.12)
Flanges	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Low Alloy Steel	None (1)	<ul style="list-style-type: none"> Not Applicable
Closure Studs	<ul style="list-style-type: none"> Pressure Boundary 	Sheltered, Reactor Coolant	Low Alloy Steel	Cracking	<ul style="list-style-type: none"> ISI Program (B.1.8)
Closure Studs	<ul style="list-style-type: none"> Pressure Boundary 	Sheltered	Low Alloy Steel	Cumulative Fatigue Damage - Evaluated as a TLAA - See Section 4.3	<ul style="list-style-type: none"> Fatigue Management Activities (B.4.2)
Closure Nuts	<ul style="list-style-type: none"> Pressure Boundary 	Sheltered,	Low Alloy Steel	None	<ul style="list-style-type: none"> Not Applicable
Stabilizer Bracket	<ul style="list-style-type: none"> Structural Support 	Sheltered	Low Alloy Steel	None	<ul style="list-style-type: none"> Not Applicable

Table 3.1-1 Aging Management Review Results for Component Groups for the Reactor Pressure Vessel and Internals
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Support Skirt	<ul style="list-style-type: none"> Structural Support 	Sheltered	Low Alloy Steel	Cumulative Fatigue Damage - Evaluated as a TLAA - See Section 4.3	<ul style="list-style-type: none"> <u>Fatigue Management Activities</u> (B.4.2)
Feedwater Nozzle, other Nozzles	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Low Alloy Steel	Cumulative Fatigue Damage - Evaluated as a TLAA - See Section 4.3	<ul style="list-style-type: none"> <u>Fatigue Management Activities</u> (B.4.2)
Feedwater Nozzles	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Low Alloy Steel	Cracking	<ul style="list-style-type: none"> <u>RPV and Internals ISI Program</u> (B.2.7)
Nozzle Safe Ends (including Core ΔP/SLC Nozzle Safe End)	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Stainless Steel and Nickel Base Alloys	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry</u> (B.1.2) <u>RPV and Internals ISI Program</u> (B.2.7)
Core Spray Attachments, Jet Pump Riser Brace Attachments, Shroud Support Attachment	<ul style="list-style-type: none"> Structural Support 	Reactor Coolant	Stainless Steel and Nickel Base Alloys	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry</u> (B.1.2) <u>RPV and Internals ISI Program</u> (B.2.7)
Other Attachments	<ul style="list-style-type: none"> Structural Support 	Steam, Reactor Coolant	Stainless Steel and Nickel Base Alloys	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry</u> (B.1.2) <u>RPV and Internals ISI Program</u> (B.2.7)
CRD Stub Tube Penetrations, ICM Housing Penetrations, and Instrument Penetrations	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Stainless Steel and Nickel Base Alloys	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry</u> (B.1.2) <u>RPV and Internals ISI Program</u> (B.2.7)

Table 3.1-1 Aging Management Review Results for Component Groups for the Reactor Pressure Vessel and Internals
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Shroud	<ul style="list-style-type: none"> Structural Support Pressure Boundary 	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
Shroud Support	<ul style="list-style-type: none"> Structural Support Pressure Boundary 	Reactor Coolant	Alloy 600 and Alloy 182 Weldments	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
Access Hole Cover	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Alloy 600 and Alloy 182 Weldments	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
Core Support Plate, Top Guide	<ul style="list-style-type: none"> Structural Support 	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
Core ΔP/SLC Line, Core Spray Line and Core Spray Spargers	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
Jet Pump Assemblies	<ul style="list-style-type: none"> Structural Support Pressure Boundary 	Reactor Coolant	Cast Austenitic Stainless Steel	None (2)	<ul style="list-style-type: none"> Not Applicable
Jet Pump Assemblies	<ul style="list-style-type: none"> Structural Support Pressure Boundary 	Reactor Coolant	Alloy X-750	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
Jet Pump Assemblies	<ul style="list-style-type: none"> Structural Support Pressure Boundary 	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>

Table 3.1-1 Aging Management Review Results for Component Groups for the Reactor Pressure Vessel and Internals
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Orificed Fuel Support, CRD Guide Tube Base	<ul style="list-style-type: none"> Structural Support 	Reactor Coolant	Cast Austenitic Stainless Steel	None (2)	<ul style="list-style-type: none"> Not Applicable
CRDH Stub Tubes	<ul style="list-style-type: none"> Structural Support 	Reactor Coolant	Alloy 600	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
CRDH Guide Tubes	<ul style="list-style-type: none"> Structural Support 	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>
In-Core Housing Guide Tubes, LPRM and WRNMS Dry Tubes	<ul style="list-style-type: none"> Pressure Boundary 	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> <u>RCS Chemistry (B.1.2)</u> <u>RPV and Internals ISI Program (B.2.7)</u>

(1). Per BWRVIP-74, Table 3-1, no age related degradation mechanism are identified.
(2). Delta ferrite < 20%.

3.1.2 Fuel Assemblies

Table 3.1-2 Aging Management Review Results for Component Groups for Fuel Assemblies

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
• None (1)	• Not Applicable	Not Applicable	Not Applicable	Not Applicable	• Not Applicable

(1) Fuel assemblies do not require aging management review because they are short-lived.

3.1.3 Reactor Pressure Vessel Instrumentation System

Table 3.1-3 Aging Management Review Results for Component Groups for the Reactor Pressure Vessel Instrumentation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)

Table 3.1-3 Aging Management Review Results for Component Groups for the Reactor Pressure Vessel Instrumentation System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Condensing Chamber	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Condensing Chamber	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Condensing Chamber • Restricting Orifice	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Piping Specialties • Condensing Chamber	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Condensing Chamber	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)

(1) The ISI Program is credited for only the Class 1 piping or components in the component group.

3.1.4 Reactor Recirculation System

Table 3.1-4 Aging Management Review Results for Component Groups in the Reactor Recirculation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Casting and Forging • Pump Casings	• Pressure Boundary	Reactor Coolant	Cast Austenitic Stainless Steel	Loss of Fracture Toughness	<ul style="list-style-type: none"> • <u>ISI Program</u> (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Sheltered	Stainless Steel, Carbon Steel, Cast Austenitic Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Stainless Steel, Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

Table 3.1-4 Aging Management Review Results for Component Groups in the Reactor Recirculation System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Flow Elements • Thermowells	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Flow Elements • Thermowells	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Flow Elements • Thermowells • Restricting Orifice	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable

3.2 AGING MANAGEMENT OF ENGINEERED SAFETY FEATURES SYSTEMS

The following Tables provide the results of the aging management reviews for each of the Engineered Safety Features Systems within the scope of license renewal. Aging management activities that are credited to manage the identified aging effects for the given material are discussed in Appendix B.

3.2.1 High Pressure Coolant Injection System

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies • Filter Bodies	• Pressure Boundary	Lubricating Oil	Brass and Bronze	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Casting and Forging • Valve Bodies • Filter Bodies	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Lubricating Oil	Cast Iron	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program (1)</u> (B.1.8)

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AGING MANAGEMENT OF ENGINEERED
SAFETY FEATURES SYSTEMS

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies • Pump Casings • Filter Bodies • Turbine Casing	• Pressure Boundary	Sheltered	Cast Iron, Carbon Steel, Stainless Steel, Brass and Bronze	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry</u> (B.1.5)
Casting and Forging • Pump Casings	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Torus Piping Inspection</u> (B.3.1)
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8)

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Turbine Casing	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>HPCI and RCIC Turbine Inspection (B.2.10)</u>
Elastomer • Flex Hoses	• Pressure Boundary	Lubricating Oil	Neoprene and Rubber	Loss of Properties	• <u>HPCI and RCIC Turbine Inspection (B.2.10)</u>
Elastomer • Flex Hoses	• Pressure Boundary	Sheltered	Neoprene and Rubber	None	• Not Applicable
Heat Exchanger • HPCI Gland Seal Condenser (Tubes)	• Pressure Boundary	Condensate Storage Water	Admiralty	Loss of Material	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Gland Seal Condenser (Tubes)	• Pressure Boundary	Condensate Storage Water	Admiralty	Cracking	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Gland Seal Condenser (Tubes)	• Heat Transfer	Condensate Storage Water	Admiralty	Reduction of Heat Transfer	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Tubes)	• Pressure Boundary	Condensate Storage Water	Admiralty	Loss of Material	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Tubes)	• Pressure Boundary	Condensate Storage Water	Admiralty	Cracking	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Tubes)	• Heat Transfer	Condensate Storage Water	Admiralty	Reduction of Heat Transfer	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Gland Seal Condenser (Channel, Tube Sheet)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Gland Seal Condenser (Channel, Tube Sheet)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Cracking	• <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Gland Seal Condenser (Channel, Tube Sheet)	• Heat Transfer	Condensate Storage Water	Carbon Steel	Reduction of Heat Transfer	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Channel, Tube Sheet)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Channel, Tube Sheet)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Cracking	• <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Channel, Tube Sheet)	• Heat Transfer	Condensate Storage Water	Carbon Steel	Reduction of Heat Transfer	• <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Tube)	• Pressure Boundary	Lubricating Oil	Admiralty	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Tube)	• Pressure Boundary	Lubricating Oil	Admiralty	Cracking	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Tube)	• Heat Transfer	Lubricating Oil	Admiralty	Reduction of Heat Transfer	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Shell, Tubesheet)	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Shell, Tubesheet)	• Pressure Boundary	Lubricating Oil	Carbon Steel	Cracking	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • HPCI Turbine Lube Oil Cooler (Shell, Tubesheet)	• Heat Transfer	Lubricating Oil	Carbon Steel	Reduction of Heat Transfer	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • HPCI Pump Rooms Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Loss of Material	• <u>ISI Program (B.1.8)</u>

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • HPCI Pump Rooms Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>ISI Program</u> (B.1.8) •
Heat Exchanger HPCI Pump Rooms Cooling Coils (2) (Tubes)	• Pressure Boundary	Raw Water	Copper	Flow Blockage (N/A for abandoned coils)	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • HPCI Pump Room Cooling Coils (Fins)	• Pressure Boundary	Sheltered	Aluminum	None	• Not Applicable
Heat Exchanger • HPCI Gland Seal Condenser • HPCI Turbine Lube Oil Cooler	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable
Heat Exchanger • HPCI Pump Room Cooling Coils (Tubes)	• Pressure Boundary	Sheltered	Copper	None	• Not Applicable
Heat Exchanger • HPCI Pump Room Cooling Coils (no flow) (Tube Sheet and Frames)	• Pressure Boundary	Sheltered	Galvanized Carbon Steel	None	• Not Applicable

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • HPCI Gland Seal Condenser (Impingement plates at shell inlets)	• Pressure Boundary	Steam	304 Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2)
Heat Exchanger • HPCI Gland Seal Condenser (Tube)	• Pressure Boundary	Steam	Admiralty	Cracking	• <u>RCS Chemistry</u> (B.1.2)
Heat Exchanger • HPCI Gland Seal Condenser (Tube Sheet, Shell, Baffles, Tube Supports)	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping • Pipe	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping • Fittings	• Pressure Boundary	Lubricating Oil	Brass, Brass Alloys	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Piping • Pipe	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)

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Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Tubing	• Pressure Boundary	Lubricating Oil	Stainless Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>FAC Program</u> (B.1.1) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered	Stainless Steel, Carbon Steel, Brass Alloys	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5) • <u>Torus Piping Inspection</u> (B.3.1)
Piping • Pipe • Tubing	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe. • Tubing	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Piping • Pipe	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Torus Piping Inspection (B.3.1)</u>
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Piping Specialties • Thermowell • Flow Elements	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Piping Specialties • Restricting Orifice	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry (B.1.4)</u>
Piping Specialties • Restricting Orifice	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry (B.1.4)</u>
Piping Specialties • Steam Trap	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u>

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Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Thermowell • Flow Elements • Restricting Orifice • Steam Trap • Rupture Disc	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping Specialties • Sparger	• Spray	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry</u> (B.1.5)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Piping Specialties • Steam Trap	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Torus Piping Inspection</u> (B.3.1)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Wetted Gas	Stainless Steel	None	• Not Applicable

Table 3.2-1 Aging Management Review Results for Component Groups in the High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Rupture Disc	<ul style="list-style-type: none"> • Pressure Boundary • Throttle 	Wetted Gas	Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable
Vessel • Lubricating Oil Tanks	<ul style="list-style-type: none"> • Pressure Boundary 	Lubricating Oil	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing (B.2.1)</u> • <u>HPCI and RCIC Turbine Inspection (B.2.10)</u>
Vessel • Lubricating Oil Tanks	<ul style="list-style-type: none"> • Pressure Boundary 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

- (1) The ISI Program is credited only for the Class 1 piping or components in the component group.
(2) One of two trains is abandoned in-place and the inlet to the cooler is isolated.

3.2.2 Core Spray System

Table 3.2-2 Aging Management Review Results for Component Groups in the Core Spray System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry (B.1.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Carbon Steel, Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Sheltered	Stainless Steel, Carbon Steel	None	• Not Applicable
Casting and Forging • Pump Casings	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>

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Table 3.2-2 Aging Management Review Results for Component Groups in the Core Spray System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Casing)	• Pressure Boundary	Lubricating Oil	Cast iron	Cracking	• <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Casing)	• Heat Transfer	Lubricating Oil	Cast Iron	Reduction of Heat Transfer	• <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Lubricating Oil	Stainless Steel	Cracking	• <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Coil)	• Heat Transfer	Lubricating Oil	Stainless Steel	Reduction of Heat Transfer	• <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Loss of Material	• <u>ISI Program</u> (B.1.8)
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>ISI Program</u> (B.1.8)
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (1) (Tubes)	• Pressure Boundary	Raw Water	Copper	Flow Blockage (N/A for abandoned coils)	• <u>GL 89-13 Activities</u> (B.2.8)

Table 3.2-2 Aging Management Review Results for Component Groups in the Core Spray System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (Tubes)	• Heat Transfer (N/A for abandoned coils)	Raw Water	Copper	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	• <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • Core Spray Pump Motor Oil Cooler (Coil)	• Heat Transfer	Raw Water	Stainless Steel	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (Fins)	• Heat Transfer (N/A for abandoned coils)	Sheltered	Aluminum	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)

Table 3.2-2 Aging Management Review Results for Component Groups in the Core Spray System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • Core Spray Pump Motor Oil Cooler	• Pressure Boundary	Sheltered	Cast Iron	None	• Not Applicable
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (Tubes)	• Heat Transfer (N/A for abandoned coils)	Sheltered	Copper	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • Core Spray Pump Rooms Cooling Coils (Tube Sheet and Frames)	• Heat Transfer (N/A for abandoned coils)	Sheltered	Galvanized Carbon Steel	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe	• Pressure Boundary	Dry Gas	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Stainless Steel, Carbon Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)

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Table 3.2-2 Aging Management Review Results for Component Groups in the Core Spray System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u> • <u>Torus Piping Inspection (B.3.1)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Restricting Orifices	• Pressure Boundary • Throttle	Dry Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Flow Elements • Thermowells • Restricting Orifice • Cyclone Separators	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Flow Elements • Thermowells	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>

Table 3.2-2 Aging Management Review Results for Component Groups in the Core Spray System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Cyclone Separators • Restricting Orifices	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Cyclone Separators • Restricting Orifices	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>

(1) One of two trains is abandoned in-place and the inlet to the cooler is isolated.

3.2.3 Primary Containment Isolation System

Table 3.2-3 Aging Management Review Results for Component Groups in the Primary Containment Isolation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	• <u>CCW Chemistry</u> (B.1.3)
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Carbon Steel Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Cast Austenitic Stainless Steel	Loss of Fracture Toughness	• <u>ISI Program</u> (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program (1)</u> (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program (1)</u> (B.1.8)
Casting and Forgings • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Primary Containment Leakage Rate Testing Program</u> (B.1.10)
Castings and Forgings • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Cast Austenitic Stainless Steel	None	• Not Applicable
Castings and Forgings • Valve Bodies	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	• <u>CCW Chemistry</u> (B.1.3)
Piping • Pipe	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable

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Table 3.2-3 Aging Management Review Results for Component Groups in the Primary Containment Isolation System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Primary Containment Leakage Rate Testing Program</u> (B.1.10)
Piping • Pipe	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Flow Elements	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2)

Table 3.2-3 Aging Management Review Results for Component Groups in the Primary Containment Isolation System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Flow Elements	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u>
Piping Specialties • Restricting Orifice • Flow Elements	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable

(1) The ISI Program is credited only for the Class 1 piping or components in the component group.

3.2.4 Reactor Core Isolation Cooling System

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry (B.1.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating Oil	Brass and Bronze	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (1) (B.1.8)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Turbine Casing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Brass and Bronze, Alloy Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (1) (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (1) (B.1.8)</u>

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (1) (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Turbine Casing	• Pressure Boundary	Wetted Gas	Alloy Steel	Loss of Material	<ul style="list-style-type: none"> • <u>HPCI and RCIC Turbine Inspection (B.2.10)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Bronze	None	<ul style="list-style-type: none"> • Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Torus Piping Inspection (B.3.1)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>ISI Program (B.1.8)</u>
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Tube)	• Pressure Boundary	Condensate Storage Water	Admiralty	Loss of Material	<ul style="list-style-type: none"> • <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Tube)	• Pressure Boundary	Condensate Storage Water	Admiralty	Cracking	<ul style="list-style-type: none"> • <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Tube)	• Heat Transfer	Condensate Storage Water	Admiralty	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>CST Chemistry (B.1.4)</u> • <u>Heat Exchanger Inspection (B.2.12)</u>

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Channel, Tubesheet)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4) • <u>Heat Exchanger Inspection</u> (B.2.12)
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Channel, Tubesheet)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Cracking	<ul style="list-style-type: none"> • <u>Heat Exchanger Inspection</u> (B.2.12)
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Channel, Tubesheet)	• Heat Transfer	Condensate Storage Water	Carbon Steel	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4) • <u>Heat Exchanger Inspection</u> (B.2.12)
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Tube)	• Pressure Boundary	Lubricating Oil	Admiralty	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Tube)	• Pressure Boundary	Lubricating Oil	Admiralty	Cracking	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Tube)	• Heat Transfer	Lubricating Oil	Admiralty	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Shell, Tube Sheet)	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Shell, Tube Sheet)	• Pressure Boundary	Lubricating Oil	Carbon Steel	Cracking	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • RCIC Turbine Lube Oil Cooler (Shell, Tube Sheet)	• Heat Transfer	Lubricating Oil	Carbon Steel	Reduction of Heat Transfer	• <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • RCIC Pump Rooms Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Loss of Material	• <u>ISI Program (B.1.8)</u>
Heat Exchanger • RCIC Pump Rooms Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>ISI Program (B.1.8)</u>
Heat Exchanger RCIC Pump Rooms Cooling Coils (2) (Tubes)	• Pressure Boundary	Raw Water	Copper	Flow Blockage (N/A for abandoned coolers)	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RCIC Pump Room Cooling Coils (Fins)	• Pressure Boundary	Sheltered	Aluminum	None	• Not Applicable
Heat Exchanger • RCIC Turbine Lube Oil Cooler	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable
Heat Exchanger • RCIC Pump Room Cooling Coils (Tubes)	• Pressure Boundary	Sheltered	Copper	None	• Not Applicable

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RCIC Pump Room Cooling Coils (Tube Sheet and Frame)	• Pressure Boundary	Sheltered	Galvanized Carbon Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping • Fittings	• Pressure Boundary	Lubricating Oil	Brass, Brass Alloys	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Piping • Pipe	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Piping • Tubing	• Pressure Boundary	Lubricating Oil	Stainless Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>FAC Program</u> (B.1.1) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered	Carbon Steel, Brass Alloys, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)

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Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe • Tubing	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Steam	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping • Pipe	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Torus Water Chemistry</u> (B.1.5)
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Torus Water Chemistry</u> (B.1.5) • <u>Torus Piping Inspection</u> (B.3.1)
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Torus Piping Inspection</u> (B.3.1)
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>ISI Program</u> (B.1.8)
Piping Specialties • Thermowell • Flow Element	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Y-Strainer Body	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Y-Strainer Screens	• Filter	Condensate Storage Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Y-Strainer Screens	• Filter	Condensate Storage Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Restricting Orifice	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>CST Chemistry</u> (B.1.4)

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Restricting Orifice	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Steam Trap	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Restricting Orifice • Thermowells • Y Strainer Bodies • Steam Trap • Rupture Disc	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry</u> (B.1.5)
Piping Specialties • Steam Trap	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Torus Piping Inspection</u> (B.3.1)

Table 3.2-4 Aging Management Review Results for Component Groups in the Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Steam Traps	• Pressure Boundary • Throttle	Wetted Gas	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8)
Piping Specialties • Rupture Disc	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Restricting Orifices	• Pressure Boundary • Throttle	Wetted Gas	Stainless Steel	None	• Not Applicable
Vessel • Tank (Barometric Condenser)	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Vessel • Tank (Barometric Condenser)	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable

- (1) The ISI Program is credited only for the Class 1 piping or components in the component group.
(2) One of two trains is abandoned in-place and the inlet to the cooler is isolated.

3.2.5 Residual Heat Removal System

Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Primary Containment Leakage Rate Testing Program (B.1.10)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable

Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RHR Heat Exchangers (Tube, Tube Sheet)	• Pressure Boundary	Raw Water	304 Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>HPSW Radioactive Monitoring Activities</u> (B.1.7) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Tube, Tube Sheet)	• Pressure Boundary	Raw Water	304 Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>HPSW Radioactive Monitoring Activities</u> (B.1.7) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Tube, Tube Sheet)	• Pressure Boundary	Raw Water	304 Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Tube, Tube Sheet)	• Heat Transfer	Raw Water	304 Stainless Steel	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Channel)	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Channel)	• Pressure Boundary	Raw Water	Carbon Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Channel)	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Channel)	• Heat Transfer	Raw Water	Carbon Steel	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)

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Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RHR Pump Room Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Loss of Material	• <u>ISI Program (B.1.8)</u>
Heat Exchanger • RHR Pump Room Cooling Coils (Tubes)	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>ISI Program (B.1.8)</u>
Heat Exchanger • RHR Pump Room Cooling Coils (1) (Tubes)	• Pressure Boundary	Raw Water	Copper	Flow Blockage (N/A for abandoned coils)	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Pump Room Cooling Coils (Tubes)	• Heat Transfer (N/A for abandoned coils)	Raw Water	Copper	Reduction of Heat Transfer	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Pump Room Cooling Coils (Fins)	• Heat Transfer (N/A for abandoned coils)	Sheltered	Aluminum	Reduction of Heat Transfer	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Heat Exchangers	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable

Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RHR Pump Room Cooling Coils (Tubes)	• Heat Transfer (N/A for abandoned coils)	Sheltered	Copper	Reduction of Heat Transfer	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Pump Room Cooling Coils (Tube Sheet and Frames)	• Heat Transfer (N/A for abandoned coils)	Sheltered	Galvanized Carbon Steel	Reduction of Heat Transfer	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Heat Exchangers (Tube Sheets, Shell, Baffles, Nozzles, Internals)	• Pressure Boundary	Torus Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Heat Exchangers (Tube Sheets, Shell, Baffles, Nozzles, Internals)	• Pressure Boundary	Torus Water	Carbon Steel	Cracking	• <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Heat Exchangers (Tube Sheets, Shell, Baffles, Nozzles, Internals)	• Heat Transfer	Torus Water	Carbon Steel	Reduction of Heat Transfer	• <u>IST Program (B.1.11)</u> • <u>Torus Water Chemistry (B.1.5)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • RHR Heat Exchangers (Tube)	• Pressure Boundary	Torus Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u> • <u>GL 89-13 Activities (B.2.8)</u>

Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • RHR Heat Exchangers (Tube)	• Pressure Boundary	Torus Water	Stainless Steel	Cracking	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • RHR Heat Exchangers (Tube)	• Heat Transfer	Torus Water	Stainless Steel	Reduction of Heat Transfer	• <u>IST Program</u> (B.1.11) • <u>Torus Water Chemistry</u> (B.1.5) • <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping • Pipe	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping • Pipe	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry</u> (B.1.5)

Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Tubing	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping • Tubing	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u> • <u>Torus Piping Inspection (B.3.1)</u>
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Primary Containment Leakage Rate Testing Program (B.1.10)</u>
Piping • Pipe	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Thermowells • Flow Elements • Cyclone Separators • Restricting Orifices	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Flow Elements	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Thermowells	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Cyclone Separators	• Pressure Boundary	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Cyclone Separators	• Pressure Boundary	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>

Table 3.2-5 Aging Management Review Results for Component Groups in the Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Restricting Orifices	• Pressure Boundary • Throttle	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Restricting Orifices	• Pressure Boundary • Throttle	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Loss of Material	• <u>Torus Water Chemistry (B.1.5)</u>
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>

(1) One of two trains is abandoned in-place and the inlet to the cooler is isolated.

3.2.6 Containment Atmosphere Control and Dilution System

Table 3.2-6 Aging Management Review Results for Component Groups in the Containment Atmosphere Control and Dilution System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Pump Casings	• Pressure Boundary	Dry Gas	Aluminum	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Brass	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Carbon Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Aluminum, Brass	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Primary Containment Leakage Rate Testing Program (B.1.10)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Dry Gas	Carbon Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable

Table 3.2-6 Aging Management Review Results for Component Groups in the Containment Atmosphere Control and Dilution System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Primary Containment Leakage Rate Testing Program (B.1.10)</u>
Piping • Pipe	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Piping Specialty • Nitrogen Electric Vaporizers	• Pressure Boundary	Dry Gas, Sheltered	Carbon Steel	None	• Not Applicable
Vessel • Nitrogen Storage Tanks	• Pressure Boundary	Dry Gas, Sheltered	Carbon Steel	None	• Not Applicable
Vessel • H ₂ and O ₂ Detection Chambers	• Pressure Boundary	Dry Gas, Sheltered	Stainless Steel	None	• Not Applicable

3.2.7 Standby Gas Treatment System

Table 3.2-7 Aging Management Review Results for Component Groups in the Standby Gas Treatment System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Carbon Steel, Stainless Steel, Bronze, Brass	None	• Not Applicable
Elastomer • Fan Flex Connections	• Pressure Boundary	Ventilation Atmosphere, Sheltered	Fiberglass Impregnated Neoprene	Change in Material Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Elastomer • Filter Plenum Access Door Seals	• Pressure Boundary	Ventilation Atmosphere, Sheltered	Sponge Neoprene Rubber	Change in Material Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Piping • Pipe	• Pressure Boundary	Buried	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Copper, Dielectric Unions	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Piping • Fittings	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel, Dielectric Unions	None	• Not Applicable
Piping • Tubing	• Pressure Boundary	Ventilation Atmosphere	Copper, Stainless Steel	None	• Not Applicable

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Table 3.2-7 Aging Management Review Results for Component Groups in the Standby Gas Treatment System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Flow Elements • Pressure Elements • Temperature Element Couplings	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Carbon Steel, Stainless Steel, Anodized Aluminum	None	• Not Applicable
Sheet Metal • Ducting • Plenums • Fan Enclosures • Damper Enclosures	• Pressure Boundary	Sheltered	Carbon Steel, Galvanized Steel	None	• Not Applicable
Sheet Metal • Plenums	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Sheet Metal • Fan Enclosures	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable
Sheet Metal • Ducting • Damper Enclosures	• Pressure Boundary	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable

3.2.8 Secondary Containment System

Table 3.2-8 Aging Management Review Results for Component Groups in the Secondary Containment System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Piping • Tubing	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Stainless Steel	None	• Not Applicable
Sheet Metal • Ducting	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable

3.3 AGING MANAGEMENT OF AUXILIARY SYSTEMS

The following Tables provide the results of the aging management reviews for each of the Auxiliary Systems within the scope of license renewal. Aging management activities that are credited to manage the identified aging effects for the given material are discussed in Appendix B.

3.3.1 Fuel Handling System

Table 3.3-1 Aging Management Review Results for Component Groups in the Fuel Handling System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Fuel Preparation Machines	• Structural Support	Fuel Pool Water	Stainless Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Fuel Preparation Machines	• Structural Support	Fuel Pool Water	Aluminum	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Refueling Platform (assembly)	• Structural Support	Sheltered	Stainless Steel	None	• Not Applicable
Refueling Platform (assembly)	• Structural Support	Sheltered	Carbon Steel	None	• Not Applicable
Refueling Platform (rails)	• Structural Support	Sheltered	Carbon Steel	None	• Not Applicable
Refueling Platform (mast)	• Structural Support	Fuel Pool Water	Stainless Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Refueling Platform (mast)	• Structural Support	Fuel Pool Water	Chrome Plated Stainless Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)

3.3.2 Fuel Pool Cooling and Cleanup System

Table 3.3-2 Aging Management Review Results for Component Groups in the Fuel Pool Cooling and Cleanup System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Fuel Pool Water	Carbon Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Casting and Forging • Valve Bodies	• Pressure Boundary	Fuel Pool Water	Stainless Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Casting and Forging • Valve Bodies	• Pressure Boundary	Fuel Pool Water	Stainless Steel	Cracking	• <u>Fuel Pool Chemistry</u> (B.1.6)
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Fuel Pool Water	Carbon Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Piping • Pipe	• Pressure Boundary	Fuel Pool Water	Stainless Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Piping • Pipe	• Pressure Boundary	Fuel Pool Water	Stainless Steel	Cracking	• <u>Fuel Pool Chemistry</u> (B.1.6)
Piping • Pipe	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Vacuum Breakers • Restricting Orifice	• Pressure Boundary	Fuel Pool Water	Stainless Steel	Loss of Material	• <u>Fuel Pool Chemistry</u> (B.1.6)
Piping Specialties • Vacuum Breakers • Restricting Orifice	• Pressure Boundary	Fuel Pool Water	Stainless Steel	Cracking	• <u>Fuel Pool Chemistry</u> (B.1.6)
Piping Specialties • Vacuum Breakers • Restricting Orifice	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable

3.3.3 Control Rod Drive System

Table 3.3-3 Aging Management Review Results for Component Groups in the Control Rod Drive System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Carbon Steel, Stainless Steel	None	• Not Applicable
Castings and Forgings • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Castings and Forgings • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe	• Pressure Boundary	Dry Gas	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8)

Table 3.3-3 Aging Management Review Results for Component Groups in the Control Rod Drive System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Filter Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Filter Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping Specialties • Rupture Disc	• Pressure boundary	Dry Gas	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Filter Bodies • Rupture Disc	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Vessel • Accumulators	• Pressure Boundary	Condensate Storage Water	Carbon Steel, Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Vessel • Accumulators	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Vessel • Accumulators	• Pressure boundary	Dry Gas	Carbon Steel, Stainless Steel	None	• Not Applicable
Vessel • Accumulators	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable

3.3.4 Standby Liquid Control System

Table 3.3-4 Aging Management Review Results for Component Groups in the Standby Liquid Control System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Borated Water	Stainless Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Borated Water	Stainless Steel	Cracking	• <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Borated Water	Stainless Steel	Loss of Material	• <u>SBLC System Surveillance (B.1.13)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Borated Water	Stainless Steel	Cracking	• <u>SBLC System Surveillance (B.1.13)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Piping • Pipe • Tubing	• Pressure Boundary	Borated Water	Stainless Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Borated Water	Stainless Steel	Cracking	• <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Borated Water	Stainless Steel	Loss of Material	• <u>SBLC System Surveillance (B.1.13)</u>

Table 3.3-4 Aging Management Review Results for Component Groups in the Standby Liquid Control System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Borated Water	Stainless Steel	Cracking	• <u>SBLC System Surveillance (B.1.13)</u>
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry (B.1.2)</u> • <u>ISI Program (B.1.8)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Piping Specialties • Thermowells	• Pressure Boundary	Borated Water	Stainless Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Piping Specialties • Thermowells	• Pressure Boundary	Borated Water	Stainless Steel	Cracking	• <u>ISI Program (B.1.8)</u>
Piping Specialties • Thermowells	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Vessel • Accumulators	• Pressure Boundary	Borated Water	Carbon Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Vessel • Solution Tank	• Pressure Boundary	Borated Water	Stainless Steel	Loss of Material	• <u>SBLC System Surveillance (B.1.13)</u>
Vessel • Solution Tank	• Pressure Boundary	Borated Water	Stainless Steel	Cracking	• <u>SBLC System Surveillance (B.1.13)</u>
Vessel • Accumulators	• Pressure Boundary	Dry Gas	Carbon Steel	None	• Not Applicable
Vessel • Accumulators • Solution Tank	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable

3.3.5 High Pressure Service Water System

Table 3.3-5 Aging Management Review Results for Component Groups in the High Pressure Service Water System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Pump Casings • Strainer Bodies • Valve Bodies	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>GL 89-13 Activities (B.2.8)</u>
Casting and Forging • Pump Casings • Strainer Bodies • Valve Bodies	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• <u>GL 89-13 Activities (B.2.8)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casings (External) (Bowls and Suction Bell)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	• <u>GL 89-13 Activities (B.2.8)</u>

Table 3.3-5 Aging Management Review Results for Component Groups in the High Pressure Service Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Casting and Forging • Strainer Screens	• Filter	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Casting and Forging • Strainer Screens	• Filter	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Casting and Forging • Strainer Screens	• Filter	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Casting and Forging • Strainer Bodies • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable
Heat Exchanger • HPSW Pump Motor Oil Cooler (Casing)	• Pressure Boundary	Lubricating Oil	Cast Iron	Cracking	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • HPSW Pump Motor Oil Cooler (Casing)	• Heat Transfer	Lubricating Oil	Cast Iron	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • HPSW Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Lubricating Oil	Copper	Cracking	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • HPSW Pump Motor Oil Cooler (Coil)	• Heat Transfer	Lubricating Oil	Copper	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • HPSW Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Raw Water	Copper	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1)

Table 3.3-5 Aging Management Review Results for Component Groups in the High Pressure Service Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • HPSW Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • HPSW Pump Motor Oil Cooler (Coil)	• Pressure Boundary	Raw Water	Copper	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • HPSW Pump Motor Oil Cooler (Coil)	• Heat Transfer	Raw Water	Copper	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • HPSW Pump Motor Oil Cooler	• Pressure Boundary	Sheltered	Cast Iron	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Buried	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8) • <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)
Piping • Pipe	• Pressure Boundary	Raw Water	Alloy Steel	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Alloy Steel	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Tubing	• Pressure Boundary	Raw Water	Stainless Steel	None	• Not Applicable

Table 3.3-5 Aging Management Review Results for Component Groups in the High Pressure Service Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Alloy Steel	None	<ul style="list-style-type: none"> • Not Applicable
Piping Specialties • Restricting Orifice	<ul style="list-style-type: none"> • Pressure Boundary • Throttle 	Raw Water	Carbon Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Piping Specialties • Restricting Orifice	<ul style="list-style-type: none"> • Pressure Boundary • Throttle 	Raw Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	<ul style="list-style-type: none"> • Pressure Boundary • Throttle 	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8)
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	<ul style="list-style-type: none"> • Pressure Boundary • Throttle 	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)

Table 3.3-5 Aging Management Review Results for Component Groups in the High Pressure Service Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Flow Elements • Restricting Orifice	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable

3.3.6 Emergency Service Water System

Table 3.3-6 Aging Management Review Results for Component Groups in the Emergency Service Water System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>IST Program (B.1.11)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• <u>IST Program (B.1.11)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Casings (External) (Bowls and Suction Bell)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>

Table 3.3-6 Aging Management Review Results for Component Groups in the Emergency Service Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Buried	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8) • <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)
Piping • Pipe	• Pressure Boundary	Raw Water	Alloy Steel	Flow Blockage	• <u>IST Program</u> (B.1.11) • <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Alloy Steel	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>IST Program</u> (B.1.11) • <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Copper	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Copper	Flow Blockage	• <u>IST Program</u> (B.1.11) • <u>GL 89-13 Activities</u> (B.2.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	• <u>GL 89-13 Activities</u> (B.2.8) • <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	• <u>IST Program</u> (B.1.11) • <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-6 Aging Management Review Results for Component Groups in the Emergency Service Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping • Tubing	• Pressure Boundary	Raw Water	Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Copper, Alloy Steel, Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable
Piping Specialties • Thermowells	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u>
Piping Specialties • Thermowells	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Flow Element • Expansion Joints	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Flow Element • Expansion Joints	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>IST Program (B.1.11)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Piping Specialties • Flow Element • Expansion Joints	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Thermowells • Flow Element • Expansion Joints	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable

3.3.7 Fire Protection System

Table 3.3-7 Aging Management Review Results for Component Groups in the Fire Protection System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Buried	Cast Iron	Loss of Material	<ul style="list-style-type: none"> • <u>Fire Protection Activities (B.2.9)</u> • <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Sprinkler Heads	<ul style="list-style-type: none"> • Pressure Boundary • Spray 	Dry Gas	Bronze	None	<ul style="list-style-type: none"> • Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Bronze, Brass, Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Fuel Oil	Brass and Bronze	Cracking	<ul style="list-style-type: none"> • <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Fuel Oil	Brass, Bronze, Cast Iron	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing (B.2.1)</u> • <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Strainer Screens	<ul style="list-style-type: none"> • Pressure Boundary • Filter (Strainer Screens Only) 	Fuel Oil	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing (B.2.1)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Bronze	None	<ul style="list-style-type: none"> • Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Cast Iron	Loss of Material	<ul style="list-style-type: none"> • <u>Fire Protection Activities (B.2.9)</u>

Table 3.3-7 Aging Management Review Results for Component Groups for the Fire Protection System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Hydrants	• Pressure Boundary	Outdoor	Cast Iron	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Pump Casings (External) (Bowls and Suction Bell)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Brass	Cracking	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Brass	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Brass	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Sprinkler Heads	• Pressure Boundary • Spray	Raw Water	Brass and Chrome Plated Brass	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Sprinkler Heads	• Pressure Boundary • Spray	Raw Water	Brass and Chrome Plated Brass	Cracking	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Sprinkler Heads	• Pressure Boundary • Spray	Raw Water	Brass and Chrome Plated Brass	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Valve Bodies • Strainer Bodies	• Pressure Boundary	Raw Water	Bronze	Cracking	• <u>Fire Protection Activities</u> (B.2.9)
Casting and Forging • Valve Bodies • Strainer Bodies	• Pressure Boundary	Raw Water	Bronze	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)

Table 3.3-7 Aging Management Review Results for Component Groups for the Fire Protection System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies • Strainer Bodies	• Pressure Boundary	Raw Water	Bronze	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Valve Bodies • Strainer Bodies	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Valve Bodies • Strainer Bodies	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Hydrants	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Hydrants	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Strainer Screens	• Filter	Raw Water	Stainless Steel	Cracking	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Strainer Screens	• Filter	Raw Water	Stainless Steel	Flow Blockage	• <u>Fire Protection Activities (B.2.9)</u>
Casting and Forging • Strainer Screens	• Filter	Raw Water	Stainless Steel	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>

Table 3.3-7 Aging Management Review Results for Component Groups for the Fire Protection System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Sprinkler Heads	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Cast Iron, Chrome-plated Brass, Brass and Bronze	None	• Not Applicable
Elastomer • Flexible Hoses	• Pressure Boundary	Fuel Oil	Neoprene and Rubber	Change in Material Properties	• <u>Fire Protection Activities (B.2.9)</u>
Piping • Pipe	• Pressure Boundary	Buried	Lined Cast Iron	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u> • <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Piping • Pipe	• Pressure Boundary	Dry Gas	Carbon Steel	None	• Not Applicable
Piping • Fittings	• Pressure Boundary	Fuel Oil	Brass, Brass Alloys	Cracking	• <u>Fire Protection Activities (B.2.9)</u>
Piping • Fittings	• Pressure Boundary	Fuel Oil	Brass, Brass Alloys	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Fire Protection Activities (B.2.9)</u>
Piping • Pipe	• Pressure Boundary	Fuel Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Piping • Tubing	• Pressure Boundary	Fuel Oil	Stainless Steel	Cracking	• <u>Fire Protection Activities (B.2.9)</u>
Piping • Tubing	• Pressure Boundary	Fuel Oil	Stainless Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Fire Protection Activities (B.2.9)</u>
Piping • Pipe	• Pressure Boundary	Outdoor	Carbon Steel	None	• Not Applicable

Table 3.3-7 Aging Management Review Results for Component Groups for the Fire Protection System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Outdoor	Malleable Iron	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Raw Water	Black Steel	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Pipe	• Pressure Boundary	Raw Water	Black Steel	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Tubing	• Pressure Boundary	Raw Water	Copper	Cracking	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Tubing	• Pressure Boundary	Raw Water	Copper	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Tubing	• Pressure Boundary	Raw Water	Copper	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Pipe	• Pressure Boundary	Raw Water	Lined Cast Iron	Flow Blockage	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Pipe	• Pressure Boundary	Raw Water	Lined Cast Iron	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Copper, Brass Alloys, Malleable Iron	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)

Table 3.3-7 Aging Management Review Results for Component Groups for the Fire Protection System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Discharge Nozzles	• Pressure Boundary • Spray	Dry Gas	Bronze	None	• Not Applicable
Piping Specialties • Strainer Bodies • Y Strainer Body	• Pressure Boundary	Dry Gas	Bronze, Carbon Steel, Cast Iron, Aluminum	None	• Not Applicable
Piping Specialties • Strainer Screens	• Filter	Dry Gas	Carbon Steel	None	• Not Applicable
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Raw Water	Carbon Steel	Flow Blockage	• <u>Fire Protection Activities (B.2.9)</u>
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Raw Water	Carbon Steel	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	• <u>Fire Protection Activities (B.2.9)</u>
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	• <u>Fire Protection Activities (B.2.9)</u>
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>
Piping Specialties • Strainer Bodies • Y Strainer Body • Discharge Nozzles • Restricting Orifice • Flow Elements • Metal Flex Connection	• Pressure Boundary	Sheltered	Bronze, Carbon Steel, Cast Iron, Aluminum, Stainless Steel	None	• Not Applicable

Table 3.3-7 Aging Management Review Results for Component Groups for the Fire Protection System
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Metal Flex Connection	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)
Vessel • Cardox Tank	• Pressure Boundary	Dry Gas	Carbon Steel	None	• Not Applicable
Vessel • Fuel Tank	• Pressure Boundary	Fuel Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1)
Vessel • Cardox Tank • Fuel Tank • Muffler	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable
Vessels • Muffler	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Fire Protection Activities</u> (B.2.9)

3.3.8 Control Room Ventilation System

Table 3.3-8 Aging Management Review Results for Component Groups in the Control Room Ventilation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Stainless Steel, Brass	None	• Not Applicable
Elastomer • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Fiberglass Impregnated Neoprene	Change in Material Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Elastomer • Filter Plenum Access Door Seals	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Sponge Neoprene Rubber	Change in Material Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Copper, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Piping • Tubing	• Pressure Boundary	Ventilation Atmosphere	Copper, Stainless Steel	None	• Not Applicable
Piping Specialties • Flow Elements	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Stainless Steel	None	• Not Applicable
Sheet Metal • Ducting • Damper Enclosures • Plenums • Fan Enclosures	• Pressure Boundary	Sheltered	Carbon Steel, Galvanized Steel	None	• Not Applicable
Sheet Metal • Plenums • Fan Enclosures	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable

Table 3.3-8 Aging Management Review Results for Component Groups in the Control Room Ventilation System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable
Sheet Metal • Ducting • Damper Enclosures	• Pressure Boundary	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable

3.3.9 Battery and Emergency Switchgear Ventilation System

Table 3.3-9 Aging Management Review Results for Component Groups in the Battery and Emergency Switchgear Ventilation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Stainless Steel	None	• Not Applicable
Elastomer • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Fiberglass Impregnated Neoprene	Change in Material Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Piping • Tubing	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Stainless Steel	None	• Not Applicable
Sheet Metal • Bird Screens	• Filter	Outdoor, Ventilation Atmosphere	Galvanized Steel Mesh	None	• Not Applicable
Sheet Metal • Exhaust Hoods	• Pressure Boundary	Outdoor, Ventilation Atmosphere	Galvanized Steel with Galvanized Casing	None	• Not Applicable
Sheet Metal • Ducting • Plenums • Damper Enclosures • Fan Enclosures	• Pressure Boundary	Sheltered	Carbon Steel, Galvanized Steel	None	• Not Applicable
Sheet Metal • Fan Enclosures	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable

Table 3.3-9 Aging Management Review Results for Component Groups in the Battery and Emergency Switchgear Ventilation System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Sheet Metal • Ducting • Plenums • Damper Enclosures	• Pressure Boundary	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable

3.3.10 Diesel Generator Building Ventilation System

Table 3.3-10 Aging Management Review Results for Component Groups in the Diesel Generator Building Ventilation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Elastomer • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Fiberglass Impregnated Neoprene	Change in Mechanical Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Sheet Metal • Ducting • Damper Enclosures • Fan Enclosures	• Pressure Boundary	Sheltered	Carbon Steel, Galvanized Steel	None	• Not Applicable
Sheet Metal • Fan Enclosures	• Pressure Boundary	Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Sheet Metal • Ducting • Damper Enclosures	• Pressure Boundary	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable

3.3.11 Pump Structure Ventilation System

Table 3.3-11 Aging Management Review Results for Component Groups in the Pump Structure Ventilation System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Brass	None	• Not Applicable
Elastomer • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Fiberglass Impregnated Neoprene	Change in Material Properties	• <u>Ventilation System Inspection and Testing (B.2.3)</u>
Piping • Tubing	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Copper	None	• Not Applicable
Sheet Metal • Fan Enclosures	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Carbon Steel	None	• Not Applicable
Sheet Metal • Ducting • Damper Enclosures	• Pressure Boundary	Sheltered, Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere	Galvanized Steel	None	• Not Applicable
Sheet Metal • Bird Screens	• Filter	Ventilation Atmosphere, Outdoor	Galvanized Steel Mesh	None	• Not Applicable

3.3.12 Safety Grade Instrument Gas System

Table 3.3-12 Aging Effects and Aging Management Activities for component groups in the Safety Grade Instrument Gas System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel, Brass	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Flexible Hoses	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel	None	• Not Applicable

3.3.13 Backup Instrument Nitrogen to ADS System

Table 3.3-13 Aging Effects and Aging Management Activities for component groups in the Backup Instrument Nitrogen to ADS System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Flexible Hoses • Flow Element	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel	None	• Not Applicable
Vessel • Accumulators	• Pressure Boundary	Sheltered, Dry Gas	Stainless Steel	None	• Not Applicable

3.3.14 Emergency Cooling Water System

Table 3.3-14 Aging Management Review Results for Component Groups in the Emergency Cooling Water System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Stainless Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Stainless Steel	Cracking	• <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	• <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Bodies (External)	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Pump Bodies (External) (Bowls and Suction Bell)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Lined Carbon Steel	Flow Blockage	• <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Lined Carbon Steel	Loss of Material	• <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>

Table 3.3-14 Aging Management Review Results for Component Groups in the Emergency Cooling Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>ISI Program (B.1.8)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Sheltered	Carbon Steel, Cast Iron, Lined Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Piping • Pipe	• Pressure Boundary	Buried	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>ISI Program (B.1.8)</u> • <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Piping • Pipe	• Pressure Boundary	Outdoor	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Outdoor	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Outdoor	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Raw Water	Alloy Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Piping • Pipe	• Pressure Boundary	Raw Water	Alloy Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Piping • Pipe	• Pressure Boundary	Raw Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping • Tubing	• Pressure Boundary	Raw Water	Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable

Table 3.3-14 Aging Management Review Results for Component Groups in the Emergency Cooling Water System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Piping • Pipe	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Alloy Steel	None	<ul style="list-style-type: none"> • Not Applicable
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Flow Blockage	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>IST Program (B.1.11)</u>
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water	Stainless Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities (B.2.8)</u> • <u>ISI Program (B.1.8)</u>
Piping Specialties • Flow Elements	• Pressure Boundary	Sheltered	Stainless Steel	None	<ul style="list-style-type: none"> • Not Applicable

3.3.15 Condensate Storage System

Table 3.3-15 Aging Management Review Results for Component Groups in the Condensate Storage System

Component Groupings	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Stainless Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Stainless Steel	Cracking	• <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Loss of Material	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water	Stainless Steel	Cracking	• <u>CST Chemistry</u> (B.1.4)
Piping • Pipe	• Pressure Boundary	Outdoor	Stainless Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)
Piping • Pipe	• Pressure Boundary	Outdoor	Stainless Steel	Cracking	• <u>Outdoor, Buried and Submerged Component Inspection</u> (B.2.5)

Table 3.3-15 Aging Management Review Results for Component Groups in the Condensate Storage System (Continued)

Component Groupings	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Stainless Steel	None	• Not Applicable
Vessel • Condensate Storage Tanks	• Pressure Boundary	Condensate Storage Water	Carbon Steel	Loss of Material	• <u>CST Chemistry (B.1.4)</u>
Vessel • Condensate Storage Tanks	• Pressure Boundary	Outdoor	Carbon Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Vessel • Condensate Storage Tanks (Tank Nozzles)	• Pressure Boundary	Outdoor	Stainless Steel	Loss of Material	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Vessel • Condensate Storage Tanks (Tank Nozzles)	• Pressure Boundary	Outdoor	Stainless Steel	Cracking	• <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>

3.3.16 Emergency Diesel Generator

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Aluminum	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Brass	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Pump Casings • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Bronze	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Pump Casings	• Pressure Boundary	Closed Cooling Water	Cast Iron	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Cracking	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Aluminum	Cracking	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Aluminum	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Aluminum Alloys	Cracking	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Aluminum Alloys	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Brass	Cracking	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Brass and Bronze	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Strainer Screens	• Pressure Boundary • Filter (Strainer Screens Only)	Lubricating and Fuel Oil	Carbon Steel	Cracking	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Strainer Screens	• Pressure Boundary • Filter (Strainer Screens Only)	Lubricating and Fuel Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Cast Iron	Cracking	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies	• Pressure Boundary	Lubricating and Fuel Oil	Cast Iron	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor	Stainless Steel	None	• Not Applicable

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Pump Casings • Valve Bodies • Strainer Bodies	• Pressure Boundary	Sheltered	Brass and Bronze, Aluminum, Aluminum Alloys, Stainless Steel Carbon Steel, Cast Iron	None	• Not Applicable
Casting and Forging • Strainer Screens	• Filter	Wetted Gas	Carbon Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Casting and Forging • Strainer Bodies	• Pressure Boundary	Wetted Gas	Cast Iron	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Elastomer • Flexible Hoses	• Pressure Boundary	Closed Cooling Water	Neoprene and Rubber	Change in Material Properties	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Elastomer • Flexible Hoses	• Pressure Boundary	Lubricating and Fuel Oil	Neoprene and Rubber	Change in Material Properties	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Elastomer • Flexible Hoses	• Pressure Boundary	Sheltered	Neoprene and Rubber	None	• Not Applicable
Elastomer • Flexible Hoses	• Pressure Boundary	Wetted Gas	Neoprene	Change in Material Properties	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Jacket Coolant Cooler (Tube)	• Pressure Boundary	Closed Cooling Water	Admiralty	Loss of Material	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube)	• Pressure Boundary	Closed Cooling Water	Admiralty	Cracking	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube)	• Heat Transfer	Closed Cooling Water	Admiralty	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>CCW Chemistry</u> (B.1.3)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Pressure Boundary	Closed Cooling Water	Admiralty	Loss of Material	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Pressure Boundary	Closed Cooling Water	Admiralty	Cracking	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Heat Transfer	Closed Cooling Water	Admiralty	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>CCW Chemistry</u> (B.1.3)
Heat Exchanger • EDG Jacket Coolant Cooler (Shell and internals)	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Jacket Coolant Cooler (Shell and internals)	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Cracking	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Shell and internals)	• Heat Transfer	Closed Cooling Water	Carbon Steel	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8) • <u>CCW Chemistry</u> (B.1.3)
Heat Exchanger • EDG Air Coolant Cooler (Shell and internals)	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Shell and internals)	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Cracking	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Shell and internals)	• Heat Transfer	Closed Cooling Water	Carbon Steel	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8) • <u>CCW Chemistry</u> (B.1.3)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube Sheet)	• Pressure Boundary	Closed Cooling Water	Muntz Metal	Loss of Material	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube Sheet)	• Pressure Boundary	Closed Cooling Water	Muntz Metal	Cracking	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket	• Heat Transfer	Closed Cooling Water	Muntz Metal	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8) • <u>CCW Chemistry</u> (B.1.3)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Coolant Cooler (Tube Sheet)					
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Pressure Boundary	Closed Cooling Water	Muntz Metal	Loss of Material	• <u>CCW Chemistry (B.1.3)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Pressure Boundary	Closed Cooling Water	Muntz Metal	Cracking	• <u>CCW Chemistry (B.1.3)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Heat Transfer	Closed Cooling Water	Muntz Metal	Reduction of Heat Transfer	• <u>GL 89-13 Activities (B.2.8)</u> • <u>CCW Chemistry (B.1.3)</u>
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Pressure Boundary	Lubricating Oil	Admiralty	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Pressure Boundary	Lubricating Oil	Admiralty	Cracking	• <u>GL 89-13 Activities (B.2.8)</u> • <u>Oil Quality Testing (B.2.1)</u>
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Heat Transfer	Lubricating Oil	Admiralty	Reduction of Heat Transfer	• <u>Oil Quality Testing (B.2.1)</u> • <u>GL 89-13 Activities (B.2.8)</u>
Heat Exchanger • EDG Lube Oil Cooler (Shell, Baffles, and	• Pressure Boundary	Lubricating Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>GL 89-13 Activities (B.2.8)</u>

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Tube Supports)					
Heat Exchanger • EDG Lube Oil Coolers (Shell, Baffles, and Tube Supports)	• Pressure Boundary	Lubricating Oil	Carbon Steel	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • EDG Lube Oil Coolers (Shell, Baffles, and Tube Supports)	• Heat Transfer	Lubricating Oil	Carbon Steel	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Pressure Boundary	Lubricating Oil	Muntz Metal	Loss of Material	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Pressure Boundary	Lubricating Oil	Muntz Metal	Cracking	<ul style="list-style-type: none"> • <u>GL 89-13 Activities</u> (B.2.8) • <u>Oil Quality Testing</u> (B.2.1)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Heat Transfer	Lubricating Oil	Muntz Metal	Reduction of Heat Transfer	<ul style="list-style-type: none"> • <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube)	• Pressure Boundary	Raw Water	Admiralty	Loss of Material	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket	• Pressure Boundary	Raw Water	Admiralty	Cracking	<ul style="list-style-type: none"> • <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Coolant Cooler (Tube)					
Heat Exchanger • EDG Jacket Coolant Cooler (Tube)	• Pressure Boundary	Raw Water	Admiralty	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube)	• Heat Transfer	Raw Water	Admiralty	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Pressure Boundary	Raw Water	Admiralty	Loss of Material	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Pressure Boundary	Raw Water	Admiralty	Cracking	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Pressure Boundary	Raw Water	Admiralty	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube)	• Heat Transfer	Raw Water	Admiralty	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Pressure Boundary	Raw Water	Admiralty	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Pressure Boundary	Raw Water	Admiralty	Cracking	• Oil Quality Testing (B.2.1) • GL 89-13 Activities (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Pressure Boundary	Raw Water	Admiralty	Flow Blockage	• GL 89-13 Activities (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube)	• Heat Transfer	Raw Water	Admiralty	Reduction of Heat Transfer	• GL 89-13 Activities (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• GL 89-13 Activities (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Cracking	• GL 89-13 Activities (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• GL 89-13 Activities (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Channel)	• Heat Transfer	Raw Water	Cast Iron	Reduction of Heat Transfer	• GL 89-13 Activities (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Air Coolant Cooler (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Cracking	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Channel)	• Heat Transfer	Raw Water	Cast Iron	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Loss of Material	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Cracking	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Channel)	• Pressure Boundary	Raw Water	Cast Iron	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Lube Oil Coolers (Channel)	• Heat Transfer	Raw Water	Cast Iron	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Loss of Material	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Cracking	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Jacket Coolant Cooler (Tube Sheet)	• Heat Transfer	Raw Water	Muntz Metal	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Loss of Material	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Cracking	• <u>CCW Chemistry</u> (B.1.3) • <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Air Coolant Cooler (Tube Sheet)	• Heat Transfer	Raw Water	Muntz Metal	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Loss of Material	• <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Cracking	• <u>Oil Quality Testing</u> (B.2.1) • <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Pressure Boundary	Raw Water	Muntz Metal	Flow Blockage	• <u>GL 89-13 Activities</u> (B.2.8)
Heat Exchanger • EDG Lube Oil Coolers (Tube Sheet)	• Heat Transfer	Raw Water	Muntz Metal	Reduction of Heat Transfer	• <u>GL 89-13 Activities</u> (B.2.8)

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Heat Exchanger • EDG Jacket Coolant Cooler • EDG Air Coolant Cooler • Lube Oil Cooler	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Buried	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Outdoor, Buried and Submerged Component Inspection (B.2.5)</u>
Piping • Pipe	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping • Pipe • Tubing	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Cracking	• <u>CCW Chemistry (B.1.3)</u>
Piping • Fittings	• Pressure Boundary	Lubricating and Fuel Oil	Brass, Brass Alloys	Cracking	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping • Fittings	• Pressure Boundary	Lubricating and Fuel Oil	Brass, Brass Alloys	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping • Pipe	• Pressure Boundary	Lubricating and Fuel Oil	Carbon Steel	Cracking	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping • Pipe	• Pressure Boundary	Lubricating and Fuel Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u>
Piping • Tubing	• Pressure Boundary	Lubricating and Fuel Oil	Copper, Copper Alloys	Cracking	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Tubing	• Pressure Boundary	Lubricating and Fuel Oil	Copper, Copper Alloys	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping • Tubing	• Pressure Boundary	Lubricating and Fuel Oil	Stainless Steel	Cracking	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping • Tubing	• Pressure Boundary	Lubricating and Fuel Oil	Stainless Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping • Pipe	• Pressure Boundary	Outdoor	Carbon Steel	None	• Not Applicable
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel, Brass Alloys, Copper Alloys	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Wetted Gas	Stainless Steel	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping Specialties • Thermowells	• Pressure Boundary	Closed Cooling Water	Brass	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping Specialties • Thermocouple Cap	• Pressure Boundary	Closed Cooling Water	Brass	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping Specialties • Thermocouple Cap	• Pressure Boundary	Closed Cooling Water	Cast Iron	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping Specialties • Restricting Orifices	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping Specialties • Restricting Orifices	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Cracking	• <u>CCW Chemistry (B.1.3)</u>
Piping Specialties • Expansion Joints	• Pressure Boundary	Closed Cooling Water	Stainless Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Piping Specialties	• Pressure	Closed Cooling Water	Stainless Steel	Cracking	• <u>CCW Chemistry (B.1.3)</u>

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
• Expansion Joints	Boundary				
Piping Specialties • Expansion Joints • Thermowells • Thermowell Caps • Restricting Orifice • Drain Traps	• Pressure Boundary	Sheltered	Carbon Steel, Cast Iron, Brass, Stainless Steel	None	• Not Applicable
Piping Specialties • Drain Traps	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Piping Specialties • Expansion Joints	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Vessel • Expansion Tank	• Pressure Boundary	Closed Cooling Water	Carbon Steel	Loss of Material	• <u>CCW Chemistry (B.1.3)</u>
Vessel • Fuel Oil Day Tank	• Pressure Boundary	Fuel Oil	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Vessel • Fuel Oil Storage Tank	• Pressure Boundary	Fuel Oil, Buried	Carbon Steel	Loss of Material	• <u>Oil Quality Testing (B.2.1)</u> • <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Vessel • Lubricating Oil Tank	• Pressure Boundary	Lubricating Oil	Carbon Steel	None	• Not Applicable
Vessel • Lubricating Oil Tank • Expansion Tank • Fuel Oil Day Tank • Air Receivers • Silencers	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable

Table 3.3-16 Aging Management Review Results for Component Groups for the Emergency Diesel Generator
(Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Vessel • Air Receivers	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>
Vessel • Silencers	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Emergency Diesel Generator Inspection (B.2.4)</u>

3.3.17 Suppression Pool Temperature Monitoring System

Table 3.3-17 Aging Management Review Results for Component Groups in the Suppression Pool Temperature Monitoring System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
<ul style="list-style-type: none"> Penetration Sleeves (Thermowells) 	<ul style="list-style-type: none"> Pressure Boundary Fission Product Barrier 	Torus Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
<ul style="list-style-type: none"> Penetration Sleeves (Thermowells) 	<ul style="list-style-type: none"> Pressure Boundary Fission Product Barrier 	Sheltered	Stainless Steel	None	<ul style="list-style-type: none"> Not Applicable

3.3.18 Cranes and Hoists

Table 3.3-18 Aging Management Review Results for Component Groups for Cranes and Hoists

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Cranes and Hoists • Circulating Water Pump Structure Crane 35 Ton Gantry (Structural Members, Rails, Rail Clips, and Rail Bolts)	• Structural Support to Non-S/R Components	Outdoor	Carbon Steel, Low-Alloy Steel	Loss of Material	• <u>Crane Inspection Activities (B.1.14)</u>
Cranes and Hoists • Reactor Building Overhead Bridge Cranes (Rails, Rail Clips and Rail Bolts)	• Structural Support • Structural Support to Non-S/R Components	Sheltered	Carbon Steel, Low-Alloy Steel	Loss of Material (1)	• <u>Crane Inspection Activities (B.1.14)</u>
Cranes and Hoists • Other Cranes and Hoists (Rails, Monorail Flanges, Rail Clips, and Rail Bolts)	• Structural Support to Non-S/R Components	Sheltered	Carbon Steel, Low-Allow Steel	Loss of Material (1)	• <u>Crane Inspection Activities (B.1.14)</u>

(1) Loss of material due to mechanical wear.

3.4 AGING MANAGEMENT OF STEAM AND POWER CONVERSION SYSTEMS

The following Tables provide the results of the aging management reviews for each of the Steam and Power Conversion Systems within the scope of license renewal. Aging management activities that are credited to manage the identified aging effects for the given material are discussed in Appendix B.

3.4.1 Main Steam System

Table 3.4-1 Aging Management Review Results for component groups in the Main Steam System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas	Brass Carbon Steel Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Brass, Carbon Steel, Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Torus Piping Inspection</u> (B.3.1)
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>ISI Program</u> (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Stainless Steel	None	• Not Applicable
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas	Stainless Steel	Cracking	• <u>ISI Program</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Dry Gas	Copper	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable

Table 3.4-1 Aging Management Review Results for Component Groups in the Main Steam System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Copper, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>FAC Program</u> (B.1.1) • <u>ISI Program (1)</u> (B.1.8)
Piping • Pipe • Tubing	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program (1)</u> (B.1.8)
Piping • Pipe	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program (1)</u> (B.1.8)
Piping • SRV Tailpipe	• Pressure Boundary	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)
Piping • SRV Tailpipe	• Pressure Boundary	Torus Grade Water (Gas Interface)	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5) • <u>Torus Piping Inspection</u> (B.3.1)
Piping • Pipe	• Pressure Boundary	Wetted Gas	Carbon Steel	Loss of Material	• <u>Torus Piping Inspection</u> (B.3.1)
Piping • Pipe (RPV Head Flange Leakoff)	• Pressure Boundary	Wetted Gas	Stainless Steel	Cracking	• <u>ISI Program</u> (B.1.8)
Piping Specialties • Dashpot	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable
Piping Specialties • Flexible Hoses	• Pressure Boundary	Dry Gas	Stainless Steel	None	• Not Applicable

Section 3.4
AGING MANAGEMENT OF STEAM AND POWER
CONVERSION SYSTEMS

Table 3.4-1 Aging Management Review Results for Component Groups in the Main Steam System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Flow Elements • Dashpot • Y Strainer • Condensing Chamber • Restricting Orifice • Flexible Hoses	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Flow Elements (body)	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Y Strainer	• Pressure Boundary	Steam	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Flow Elements (throat)	• Throttle	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Flow Elements (throat)	• Throttle	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Condensing Chambers	• Pressure Boundary	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Condensing Chambers	• Pressure Boundary	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program</u> (1) (B.1.8)
Piping Specialties • Spargers	• Spray	Torus Grade Water	Carbon Steel	Loss of Material	• <u>Torus Water Chemistry</u> (B.1.5)

Table 3.4-1 Aging Management Review Results for Component Groups in the Main Steam System (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Piping Specialties • Restricting Orifice (RPV Head Flange Leakoff)	• Pressure Boundary • Throttle	Wetted Gas	Stainless Steel	Cracking	• <u>ISI Program (B.1.8)</u>
Vessel • Accumulators	• Pressure Boundary	Dry Gas, Sheltered	Stainless Steel	None	• Not Applicable

(1) The ISI Program is credited only for the Class 1 piping or components in the component group.

3.4.2 Main Condenser

Table 3.4-2 Aging Management Review Results for Component Groups in the Main Condenser

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect (1)	Aging Management Activities (1)
Main Condenser (Waterbox)	<ul style="list-style-type: none"> Containment, Holdup and Plateout 	Raw Water	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Main Condenser (Feedwater Heater Shell) (Drain Cooler Shell)	<ul style="list-style-type: none"> Containment, Holdup and Plateout 	Steam	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Main Condenser (Nozzles)	<ul style="list-style-type: none"> Containment, Holdup and Plateout 	Steam	Carbon Steel, Stainless Steel	None	<ul style="list-style-type: none"> Not Applicable
Main Condenser (Expansion Joint)	<ul style="list-style-type: none"> Containment, Holdup and Plateout 	Steam	Stainless Steel	None	<ul style="list-style-type: none"> Not Applicable
Main Condenser (Shell)	<ul style="list-style-type: none"> Containment, Holdup and Plateout 	Steam, Reactor Coolant	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Main Condenser (Tubes) (Tubesheet)	<ul style="list-style-type: none"> Containment, Holdup and Plateout 	Steam, Raw Water	Titanium	None	<ul style="list-style-type: none"> Not Applicable

(1) Aging management of the main condenser is not based on analysis of materials, environments and aging effects. Condenser integrity required to perform post accident intended function (holdup and plateout of MSIV leakage) is continuously confirmed by normal plant operation. No traditional aging management review or aging management program is required. The main condenser must perform a significant pressure boundary function (maintain vacuum) to allow continued plant operation. The post-accident intended function of the main condenser is to provide a holdup volume and plateout surface for MSIV leakage. This intended function does not require the condenser to be leak-tight, and the post-accident conditions in the condenser will be essentially atmospheric. Under post-accident conditions, there will be no challenge to the pressure boundary integrity of the condenser. Since normal plant operation assures adequate condenser pressure boundary integrity, the post-accident intended function to provide holdup volume and plateout surface is assured.

3.4.3 Feedwater System

Table 3.4-3 Aging Management Review Results for Component Groups in the Feedwater System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>ISI Program (1)</u> (B.1.8)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2)
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping • Pipe	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>FAC Program</u> (B.1.1) • <u>ISI Program (1)</u> (B.1.8)
Piping • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Cracking	• <u>RCS Chemistry</u> (B.1.2)
Piping • Tubing	• Pressure Boundary	Reactor Coolant	Stainless Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered	Carbon Steel, Stainless Steel	None	• Not Applicable
Piping Specialties • Flow Elements	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2) • <u>FAC Program</u> (B.1.1)
Piping Specialties • Thermowell	• Pressure Boundary	Reactor Coolant	Carbon Steel	Loss of Material	• <u>RCS Chemistry</u> (B.1.2)
Piping Specialties • Flow Elements • Thermowells	• Pressure Boundary	Sheltered	Carbon Steel	None	• Not Applicable

(1) The ISI Program is credited only for the Class 1 piping or components in the component group.

3.5 AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

The following tables provide the results of aging management reviews for structural component groups in each of the structures within the scope of license renewal. This section also provides the results of the aging management reviews for the structural commodities. Aging management activities that are credited to manage the identified aging effects for the given material are discussed in Appendix B.

3.5.1 Containment Structure

Table 3.5-1 Aging Management Review Results for component groups in the Containment Structure

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> Reactor Pedestal Foundation Floor Slab 	<ul style="list-style-type: none"> Structural Support Shelter, Protection and/or Radiation Shielding 	Sheltered	Concrete	None	<ul style="list-style-type: none"> Not Applicable
Unreinforced Concrete <ul style="list-style-type: none"> Sacrificial Shield Wall (1) 	<ul style="list-style-type: none"> Shelter, Protection and/or Radiation Shielding 	Sheltered	Concrete	None	<ul style="list-style-type: none"> Not Applicable
Drywell <ul style="list-style-type: none"> Shell Head 	<ul style="list-style-type: none"> Pressure Boundary Structural Support Shelter, Protection and/or Radiation Shielding Fission Product Barrier 	Sheltered	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Drywell <ul style="list-style-type: none"> CRD Removal Hatch Equipment Hatch Personnel Airlock Access Manhole and Inspection Ports Penetrations 	<ul style="list-style-type: none"> Pressure Boundary Fission Product Barrier 	Sheltered	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Drywell <ul style="list-style-type: none"> Penetration Bellows 	<ul style="list-style-type: none"> Pressure Boundary Fission Product Barrier 	Sheltered	Stainless Steel	Cumulative Fatigue Damage	<ul style="list-style-type: none"> <u>TLAA (4.6.4)</u>

Section 3.5
AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

Table 3.5-1 Aging Management Review Results for component groups in the Containment Structure (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Drywell • Gaskets and O-Rings	• Pressure Boundary	Sheltered	Silicone Rubber, and EPDM	Change In Material Properties Cracking	• <u>Primary Containment Leakage Rate Testing Program (B.1.10)</u>
Pressure Suppression Chamber • Shell	• Pressure Boundary • Structural Support • Fission Product Barrier	Sheltered, Torus Water	Carbon Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Pressure Suppression Chamber • Shell	• Pressure Boundary • Structural Support • Fission Product Barrier	Sheltered, Torus Water	Carbon Steel	Cumulative Fatigue Damage	• <u>TLAA (4.6.1)</u>
Pressure Suppression Chamber • Ring Girders	• Structural Support	Sheltered, Torus Water	Carbon Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Pressure Suppression Chamber • Column and Saddle Supports • Seismic Restraints	• Structural Support	Sheltered	Carbon Steel	None	• Not Applicable
Pressure Suppression Chamber • Lubrite Plates	• Structural Support	Sheltered	Bronze / Graphite	None (2)	• Not Applicable
Pressure Suppression Chamber • Access Hatches	• Pressure Boundary • Fission Product Barrier	Sheltered	Carbon Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Pressure Suppression Chamber • Penetrations	• Pressure Boundary • Fission Product Barrier	Sheltered, Torus Water	Carbon Steel, Stainless Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Pressure Suppression Chamber • Penetrations	• Pressure Boundary • Fission Product Barrier	Sheltered, Torus Water	Carbon Steel, Stainless Steel	Cumulative Fatigue Damage	• <u>TLAA (4.6.1)</u>

Table 3.5-1 Aging Management Review Results for component groups in the Containment Structure (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Pressure Suppression Chamber • Elastomers (Gaskets)	• Pressure Boundary	Sheltered	EPDM	Change In Material Properties and Cracking	• <u>Primary Containment Leakage Rate Testing Program (B.1.10)</u>
Vent System • Vent Lines	• Pressure Boundary • Fission Product Barrier	Sheltered	Carbon Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Vent System • Vent Lines	• Pressure Boundary • Fission Product Barrier	Sheltered	Carbon Steel	Cumulative Fatigue Damage	• <u>TLAA (4.6.1)</u>
Vent System • Vent Line Bellows	• Pressure Boundary • Fission Product Barrier	Sheltered	Stainless Steel	Cumulative Fatigue Damage	• <u>TLAA (4.6.3)</u>
Vent System • Header and Downcomers	• Pressure Boundary	Sheltered, Torus Water	Carbon Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Vent System • Downcomer Bracing • Vent System Supports	• Structural Support	Sheltered, Torus Water	Carbon Steel	Loss of Material	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>
Structural Steel • Reactor Vessel Pedestal Steel • Sacrificial Shield Wall Steel • Sacrificial Shield Wall Stabilizer • Radial Beam Seats • Lubrite Plates	• Structural Support	Sheltered	Carbon Steel, Bronze / Graphite (Lubrite Plates) (2)	None	• Not Applicable
Structural Steel • Jet Impingement Shields	• HELB Shielding	Sheltered	Carbon Steel	None	• Not Applicable

Section 3.5
AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

Table 3.5-1 Aging Management Review Results for component groups in the Containment Structure (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Structural Steel • Pipe Whip Restraints	• Pipe Whip Restraint	Sheltered	Carbon Steel	None	• Not Applicable
Structural Steel • Missile Barriers	• Missile Barrier	Sheltered	Carbon Steel	None	• Not Applicable
Structural Steel • Radiation Shields	• Shelter, Protection and/or Radiation Shielding	Sheltered	Carbon Steel	None	• Not Applicable

- (1) Concrete is encased in carbon steel plate and is designed to provide radiation shielding only.
 (2) Loss of material due to mechanical wear is non-significant because of infrequent cyclic loading.

3.5.2 Reactor Building Structure

Table 3.5-2 Aging Management Review Results for component groups in the Reactor Building Structure

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> Walls Slabs Columns Beams Foundation 	<ul style="list-style-type: none"> Structural Support Fire Barrier Shelter, Protection and/or Radiation Shielding Flood Barrier Fission product barrier Missile Barrier HELB Shielding Structural Support to Non-S/R Components Contain Fluids 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> Not Applicable
Reinforced Concrete Block Walls	<ul style="list-style-type: none"> Structural Support Fire Barrier Shelter, Protection and/or Radiation Shielding Flood Barrier HELB Shielding Structural Support to Non-S/R Components 	Sheltered	Masonry Block	None	<ul style="list-style-type: none"> Not Applicable
Fuel Pool Liner	<ul style="list-style-type: none"> Pressure Boundary 	Fuel Pool Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> <u>Fuel Pool Chemistry (B.1.6)</u>
Fuel Pool Liner	<ul style="list-style-type: none"> Pressure Boundary 	Sheltered	Stainless Steel	None	<ul style="list-style-type: none"> Not Applicable

Section 3.5
AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

Table 3.5-2 Aging Management Review Results for component groups in the Reactor Building Structure (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Fuel Pool Gates	<ul style="list-style-type: none"> Pressure Boundary 	Fuel Pool Water	Aluminum	Loss of Material	<ul style="list-style-type: none"> <u>Fuel Pool Chemistry (B.1.6)</u>
Fuel Pool Gates	<ul style="list-style-type: none"> Pressure Boundary 	Sheltered	Aluminum	None	<ul style="list-style-type: none"> Not Applicable
Fuel Storage Racks	<ul style="list-style-type: none"> Structural Support 	Fuel Pool Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> <u>Fuel Pool Chemistry (B.1.6)</u>
Boraflex Absorbers	<ul style="list-style-type: none"> Absorb Neutrons 	Fuel Pool Water	Boraflex	Change in Material Properties	<ul style="list-style-type: none"> <u>Boraflex Management Activities (B.2.2)</u>
Component Supports	<ul style="list-style-type: none"> Structural Support 	Fuel Pool Water	Stainless Steel	Loss of Material	<ul style="list-style-type: none"> <u>Fuel Pool Chemistry (B.1.6)</u>
Component Supports	<ul style="list-style-type: none"> Structural Support 	Fuel Pool Water	Aluminum	Loss of Material	<ul style="list-style-type: none"> <u>Fuel Pool Chemistry (B.1.6)</u>
Structural Steel <ul style="list-style-type: none"> Structural Steel Reinforced Concrete Embedments 	<ul style="list-style-type: none"> Structural Support Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Structural Steel <ul style="list-style-type: none"> Pipe Whip Restraints 	<ul style="list-style-type: none"> Pipe Whip Restraint 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Structural Steel <ul style="list-style-type: none"> Missile Barrier 	<ul style="list-style-type: none"> Missile Barrier 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Structural Steel <ul style="list-style-type: none"> Metal Siding (1) 	<ul style="list-style-type: none"> Fission Product Barrier 	Outdoor	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> <u>Maintenance Rule Structural Monitoring Program (B.1.16)</u>
Structural Steel <ul style="list-style-type: none"> Blowout Panels 	<ul style="list-style-type: none"> Fission Product Barrier Over-Pressure Protection 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> Not Applicable
Structural Steel <ul style="list-style-type: none"> Blowout Panels 	<ul style="list-style-type: none"> Fission Product Barrier Over-Pressure Protection 	Outdoor	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> <u>Maintenance Rule Structural Monitoring Program (B.1.16)</u>

Table 3.5-2 Aging Management Review Results for component groups in the Reactor Building Structure (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Structural Steel • Roof Deck (1)	• Fission Product Barrier	Sheltered	Carbon Steel	None	• Not Applicable

(1) Reactor building metal siding and roof deck are a part of the secondary containment pressure boundary..

3.5.3 Radwaste Building and Reactor Auxiliary Bay

Table 3.5-3 Aging Management Review Results for component groups in the Radwaste Building and Reactor Auxiliary Bay

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> • Walls • Slabs • Columns • Beams • Foundation 	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • HELB Shielding • Missile Barrier • Structural Support to Non-S/R Components 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Reinforced Concrete Block Walls	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components 	Sheltered	Masonry Block	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Structural Steel • Reinforced Concrete Embedments 	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

Section 3.5
AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

Table 3.5-3 Aging Management Review Results for component groups in the Radwaste Building and Reactor Auxiliary Bay (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Structural Steel • Jet Impingement Shields	• HELB Shielding	Sheltered	Carbon Steel	None	• Not Applicable
Structural Steel • Missile Barrier	• Missile Barrier	Sheltered	Carbon Steel	None	• Not Applicable

3.5.4 Turbine Building and Main Control Room Complex

Table 3.5-4 Aging Management Review Results for component groups in the Turbine Building and Main Control Room Complex

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> • Walls • Slabs • Columns • Beams • Foundation 	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • HELB Shielding • Structural Support to Non-S/R Components 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Reinforced Concrete Block Walls	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components 	Sheltered	Masonry Block	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Structural Steel • Reinforced Concrete Embedments 	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Missile Barrier 	<ul style="list-style-type: none"> • Missile Barrier 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

3.5.5 Emergency Cooling Tower and Reservoir

Table 3.5-5 Aging Management Review Results for component groups in the Emergency Cooling Tower and Reservoir

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete • Walls	• Structural Support	Raw Water, Outdoor	Concrete	Change in Material Properties	• Maintenance Rule Structural Monitoring Program (B.1.16)
Reinforced Concrete • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered	Concrete	None	• Not Applicable
Prestressed Concrete • Roof Slab	• Structural Support • Shelter, Protection and/or Radiation Shielding	Outdoor	Concrete	None	• Not Applicable
Reinforced Concrete Block Walls	• Structural Support • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components	Sheltered	Masonry Block	None	• Not Applicable
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered	Carbon Steel	None	• Not Applicable

3.5.6 Station Blackout Structure and Foundation

Table 3.5-6 Aging Management Review Results for component groups in the Station Blackout Structure and Foundation

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete • Foundation	• Structural Support to Non-S/R Components	Buried, Outdoor	Concrete	None	• Not Applicable
Structural Steel • Metal Siding	• Shelter, Protection and/or Radiation Shielding	Outdoor	Carbon Steel	Loss of Material	• <u>Maintenance Rule Structural Monitoring Program (B.1.16)</u>
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support to Non-S/R Components	Sheltered	Carbon Steel	None	• Not Applicable

3.5.7 Yard Structures

Table 3.5-7 Aging Management Review Results for component groups in the Yard Structures

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete • Walls • Slabs • Foundation	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Missile Barrier • Structural Support to Non-S/R Components 	Buried, Outdoor	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Condensate Storage Tanks Foundation	<ul style="list-style-type: none"> • Structural Support 	Buried	Gravel, Sand	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel • Reinforced Concrete Embedments	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

3.5.8 Stack

Table 3.5-8 Aging Management Review Results for component groups in the Stack

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete	<ul style="list-style-type: none"> • Structural Support 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable

3.5.9 Nitrogen Storage Building

Table 3.5-9 Aging Management Review Results for component groups in the Nitrogen Storage Building

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> • Walls • Slab • Foundation 	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Missile Barrier • Structural Support to Non-S/R Components 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Reinforced Concrete Embedments 	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

3.5.10 Diesel Generator Building

Table 3.5-10 Aging Management Review Results for component groups in the Diesel Generator Building

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> • Walls • Slabs • Columns • Beams • Foundation 	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • Structural Support to Non-S/R Components 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Structural Steel • Reinforced Concrete Embedments 	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Steel Foundation Piles	<ul style="list-style-type: none"> • Structural Support 	Buried	Carbon Steel	None (1)	<ul style="list-style-type: none"> • Not Applicable

(1) Steel piles driven in undisturbed soils have been unaffected by corrosion (Ref. NUREG-1557)

3.5.11 Circulating Water Pump Structure

Table 3.5-11 Aging Management Review Results for component groups in the Circulating Water Pump Structure

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> • Walls • Slabs • Columns • Beams • Foundation 	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • Structural Support to Non-S/R Components 	Raw Water, Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Reinforced Concrete Block Walls	<ul style="list-style-type: none"> • Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components 	Sheltered	Masonry Block	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Structural Steel • Reinforced Concrete Embedments 	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components • Flood Barrier 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Sluice Gates 	<ul style="list-style-type: none"> • Pressure Boundary 	Raw Water, Sheltered	Carbon Steel, Cast Iron	None (1)	<ul style="list-style-type: none"> • Not Applicable

(1) Sluice gates are designed to operate in raw water environment for extended period of time without loss function. Industry and PBAPS experience substantiate their operating performance.

3.5.12 Recombiner Building

Table 3.5-12 Aging Management Review Results for component groups in the Recombiner Building

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Reinforced Concrete <ul style="list-style-type: none"> • Walls • Slabs • Columns • Beams • Foundation 	<ul style="list-style-type: none"> • Structural Support to Non-S/R Components 	Buried, Outdoor, Sheltered	Concrete	None	<ul style="list-style-type: none"> • Not Applicable
Structural Steel <ul style="list-style-type: none"> • Structural Steel 	<ul style="list-style-type: none"> • Structural Support to Non-S/R Components 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

3.5.13 Component Supports

Table 3.5-13 Aging Management Review Results for Component Supports

Component Group	Component Intended Function	Environment	Materials Of Construction	Aging Effect	Aging Management Activity
Anchors (Emergency Cooling Water)	• Structural Support	Outdoor	Carbon Steel	Loss of Material	• <u>Maintenance Rule Structural Monitoring Program (B.1.16)</u>
Anchors	• Structural Support	Sheltered	Stainless Steel, Carbon Steel, Alloy Steel	None	• Not Applicable
Grout	• Structural Support	Sheltered	Grout	None	• Not Applicable
Lubrite Plates	• Structural Support	Sheltered	Bronze, Graphite	None	• Not Applicable
Support Members	• Structural Support	Raw Water, Torus Water	Carbon Steel, Alloy Steel, Stainless Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>
Support Members	• Structural Support	Torus Water	Stainless Steel	Cracking	• <u>Torus Water Chemistry (B.1.5)</u>
Support Members	• Structural Support	Sheltered	Aluminum, Galvanized Steel, Stainless Steel, Carbon Steel, Alloy Steel	None	• Not Applicable
Support Members (Emergency Cooling Water)	• Structural Support	Outdoor	Carbon Steel	Loss of Material	• <u>ISI Program (B.1.8)</u>

3.5.14 Hazard Barriers and Elastomers

Table 3.5-14 Aging Management Review Results for Hazard Barriers and Elastomers

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Hazard Barrier: • Fire Barrier Penetration Seals	• Fire Barrier	Sheltered, Outdoor	Silicone, Boot Fabric (BISCO), Fire Stop Putty, Grout/Cement, Alumina Silica, Resin, Adhesive	Cracking, Delamination and Separation, Change in Material Properties	• <u>Fire Protection Activities (B.2.9)</u>
Hazard Barrier: • Other Penetration Seals	• Flood Barrier • Fission Product Barrier • HELB Shielding	Sheltered, Outdoor	Silicone, Boot Fabric (BISCO), Fire Stop Putty, Grout/Cement, Alumina Silica, Resin, Adhesive	Cracking, Delamination and Separation, Change in Material Properties	• <u>Maintenance Rule Structural Monitoring Program (B.1.16)</u>
Hazard Barrier: • Fire Barrier Doors	• Fire Barrier	Sheltered, Outdoor	Carbon Steel (1)	Loss of Material	• <u>Fire Protection Activities (B.2.9)</u>

Section 3.5
AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

Table 3.5-14 Aging Management Review Results for Hazard Barriers and Elastomers (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Hazard Barrier: • Other Hazard Barrier Doors	<ul style="list-style-type: none"> • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier • Missile Barrier • HELB Shielding • Over-pressure Protection 	Outdoor	Carbon Steel	Loss of Material	<ul style="list-style-type: none"> • <u>Door Inspection Activities</u> (B.2.6)
Hazard Barrier: • Other Hazard Barrier Doors	<ul style="list-style-type: none"> • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier • Missile Barrier • HELB Shielding • Over-pressure Protection 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Hazard Barrier: • Gaskets for Watertight Doors	<ul style="list-style-type: none"> • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier 	Sheltered	Neoprene	Cracking, Change in Material Properties	<ul style="list-style-type: none"> • <u>Door Inspection Activities</u> (B.2.6)

Section 3.5
AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

Table 3.5-14 Aging Management Review Results for Hazard Barriers and Elastomers (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Hazard Barrier: • Gaskets for Watertight Doors	<ul style="list-style-type: none"> • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier 	Outdoor	Neoprene	Change in Material Properties	<ul style="list-style-type: none"> • <u>Door Inspection Activities</u> (B.2.6)
Hazard Barrier: • Fire Wraps	<ul style="list-style-type: none"> • Fire Barrier 	Sheltered	Subliming compound with and without steel mesh or fiberglass cloth (rigid fiber board, trowelable or sprayed on fire proofing) Cementitious fireproofing (sprayed on fire proofing)	Change in Material Properties, Loss of Material	<ul style="list-style-type: none"> • <u>Fire Protection Activities</u> (B.2.9)
Elastomer: • Expansion Joint Seals	<ul style="list-style-type: none"> • Flood Barrier 	Sheltered, Outdoor	Rubber, Neoprene, Silicone	Cracking, Change in Material Properties	<ul style="list-style-type: none"> • <u>Maintenance Rule Structural Monitoring Program</u> (B.1.16)
Elastomer: • Reactor Building Blowout Panel Seals	<ul style="list-style-type: none"> • Fission Product Barrier 	Sheltered	Neoprene	None	<ul style="list-style-type: none"> • Not Applicable

Table 3.5-14 Aging Management Review Results for Hazard Barriers and Elastomers (Continued)

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Elastomer: • Reactor Building Metal Siding Gap Seals	• Fission Product Barrier	Sheltered	Silicone	None	• Not Applicable
Elastomer: • Moisture Barrier Inside Drywell	• Flood Barrier	Sheltered	Polysulfide Sealant	Loss of Sealing	• <u>Primary Containment Inservice Inspection Program (B.1.9)</u>

(1) Fire barrier doors in sheltered environment are subject to non-significant loss of material. Aging management activity is conservatively specified for them to maintain UL fire test qualification.

3.5.15 Miscellaneous Steel

Table 3.5-15 Aging Management Review Results for Miscellaneous Steel

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Miscellaneous Steel <ul style="list-style-type: none"> • Platforms • Grating • Stairs • Ladders • Curbs (Steel) • Handrails • Kick Plates • Instrument Tubing Trays 	<ul style="list-style-type: none"> • Structural Support • Structural Support to Non-S/R Components • Contain Fluid 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Miscellaneous Steel <ul style="list-style-type: none"> • Manhole Covers 	<ul style="list-style-type: none"> • Shelter, Protection and/or Radiation Shielding • Contain Fluid 	Outdoor	Carbon Steel	None (1)	<ul style="list-style-type: none"> • Not Applicable

(1) Manhole covers are designed for outdoor environment.

3.5.16 Electrical and Instrumentation Enclosures and Raceways

Table 3.5-16 Aging Management Review Results for Electrical and Instrumentation Enclosures and Raceways

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Electrical and Instrumentation Enclosures and Raceways <ul style="list-style-type: none"> • Cable Tray and Covers • Electrical Conduits and Fittings • Wireway Gutters • Panels • Cabinets • Boxes 	<ul style="list-style-type: none"> • Structural Support • Shelter, Protection and/or Radiation Shielding 	Sheltered	Carbon Steel, Aluminum, Galvanized Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable
Raceways <ul style="list-style-type: none"> • Electrical Conduits and Fittings • Boxes 	<ul style="list-style-type: none"> • Structural Support • Shelter, Protection and/or Radiation Shielding 	Outdoor	Aluminum, Galvanized Carbon Steel	None (1)	<ul style="list-style-type: none"> • Not Applicable
<ul style="list-style-type: none"> • Drip Shields 	<ul style="list-style-type: none"> • Shelter, Protection and/or Radiation Shielding 	Sheltered	Carbon Steel	None	<ul style="list-style-type: none"> • Not Applicable

(1) Engineering evaluation concluded loss of material due to corrosion of the conduits and boxes is non-significant and will not impact the intended function.

3.5.17 Insulation

Table 3.5-17 Aging Management Review Results for Insulation

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activities
Insulation	<ul style="list-style-type: none"> Insulating Characteristics 	Sheltered	Aluminum & Stainless Steel (Mirror), Calcium Silicate, Ceramic Fiber, Fiberglass	None	<ul style="list-style-type: none"> Not Applicable
Insulation (Jacketing)	<ul style="list-style-type: none"> Insulation Jacket Integrity 	Sheltered	Aluminum and Stainless Steel Jacketing	None	<ul style="list-style-type: none"> Not Applicable
Insulation	<ul style="list-style-type: none"> Insulating Characteristics 	Outdoor	Calcium Silicate	None	<ul style="list-style-type: none"> Not Applicable
Insulation (Jacketing)	<ul style="list-style-type: none"> Insulation Jacket Integrity 	Outdoor	Aluminum Jacketing with Stainless Steel Straps	Insulation Degradation	<ul style="list-style-type: none"> <u>Outdoor, Buried and Submerged Component Inspection Activities (B.2.5)</u>

3.6 AGING MANAGEMENT OF ELECTRICAL AND INSTRUMENTATION AND CONTROLS

The following tables provide the results of the aging management reviews for the Station Blackout System and electrical commodities within the scope of license renewal that are subject to an aging management review. Because commodities are not associated with one particular system, but could be in any in-scope system, they were evaluated using a “spaces” approach.

In the spaces approach, the evaluation was based on areas where bounding service environmental parameters were identified. An example of a bounding service environmental parameter, such as temperature, is the highest average service temperature present in the defined space taking into account the ambient temperature, and ohmic heating, where applicable. This bounding value is then compared to the 60-year limiting service temperature. The 60-year limiting service temperature is that value where the insulation material experiences no aging effect which would cause the insulation material to lose its intended function for the period of extended operation.

The process used to perform an aging management review of a commodity or component group for a specific environmental stressor is:

- Identification of component group materials of construction
- Identification of aging effects for the component group when exposed to the environmental stressor
- Determination of the value of the bounding service environmental parameter to which the component groups in the area to be reviewed are exposed
- Comparison of the aging characteristics of the identified materials in the bounding service environmental parameter against the 60-year limiting service environmental parameter, and determination if the component groups are able to maintain their intended function during the period of extended operation

Aging management activities that are credited to manage the identified aging effects for the given material are discussed in Appendix B.

3.6.1 Cables

Table 3.6-1 Aging Management Review Results for Cable

Component Group	• Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with cross-linked polyethylene(XLPO) and polyolefin (XLPE) insulation	None (1)	• Not Applicable
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with ethylene propylene (rubber) (EPR) and silicon rubber (SR) insulation	None (1)	• Not Applicable
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with polyethylene (PE) and polyolefin (PO) insulation	None (1)	• Not Applicable
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with chlorosulfinated polyethylene (Hypalon) (CSPE) insulation	None (1)	• Not Applicable
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with teflon-based insulation materials (ETFE, ETTC, FEP, TFE) insulation	None (1)	• Not Applicable
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with nylon insulation	None (1)	• Not Applicable
Electrical Cables (fiber optic only)	• Electrical Continuity	Sheltered	Fiberglass	None (2)	• Not Applicable
Electrical Cables	• Electrical Continuity	Sheltered	Metallic conductor with polyvinyl chloride (PVC) insulation	Loss of Material Properties	• <u>FSSD Cable Inspection</u> (B.3.2)

(1) 60-year limiting service temperature greater than the bounding service temperature (design ambient temperature plus ohmic heating, as applicable.)

(2) No aging effects for fiberglass cables.

3.6.2 Connectors, Splices, and Terminal Blocks

Table 3.6-2 Aging Management Review Results for Connectors, Splices, and Terminal Blocks

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Electrical Connectors - Insulation	<ul style="list-style-type: none"> Electrical Continuity 	Sheltered	Connector insulations bounded by Cables AMR discussed in <u>Section 2.5.1</u>	None (1)	<ul style="list-style-type: none"> Not Applicable
Electrical Connectors - Metallic Connector	<ul style="list-style-type: none"> Electrical Continuity 	Sheltered	Copper, tinned copper, and aluminum.	None (2)	<ul style="list-style-type: none"> Not Applicable.
Electrical Splices - Insulation	<ul style="list-style-type: none"> Electrical Continuity 	Sheltered	Modified Polyolefin (XLPO, XLPE)	None (1)	<ul style="list-style-type: none"> Not Applicable
Electrical Terminal Blocks - Insulation	<ul style="list-style-type: none"> Electrical Continuity 	Sheltered	Phenolic and nylon insulation	None (1)	<ul style="list-style-type: none"> Not Applicable
Electrical Terminal Blocks- Metallic	<ul style="list-style-type: none"> Electrical Continuity 	Sheltered	Copper, tinned copper, brass, bronze & aluminum	None (2)	<ul style="list-style-type: none"> Not Applicable

(1) 60-year limiting service temperature greater than the bounding service temperature (design ambient temperature plus ohmic heating, as applicable.)

(2) No aging effects identified for PBAPS.

3.6.3 Station Blackout System

Table 3.6-3 Aging Management Review Results for the Station Blackout System

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Wooden Pole	<ul style="list-style-type: none"> Structural Support to Non-S/R Components 	Outdoor	Wood	Loss of Material	<ul style="list-style-type: none"> <u>Wooden Pole Inspection (B.2.11)</u>
Wooden Pole	<ul style="list-style-type: none"> Structural Support to Non-S/R Components 	Outdoor, Buried	Wood	Change in Material Properties	<ul style="list-style-type: none"> <u>Wooden Pole Inspection (B.2.11)</u>
Conowingo Hydroelectric Plant	<ul style="list-style-type: none"> Shelter, Protection and/or Radiation Shielding Structural Support to Non-S/R Components 	Raw Water, Outdoor	Reinforced Concrete, Steel	Loss of Material	<ul style="list-style-type: none"> <u>Conowingo Hydroelectric Plant (Dam) Aging Management Program (B.1.15)</u>
Conowingo Hydroelectric Plant	<ul style="list-style-type: none"> Shelter, Protection and/or Radiation Shielding Structural Support to Non-S/R Components 	Raw Water, Outdoor	Reinforced Concrete, Steel	Change in Material Properties	<ul style="list-style-type: none"> <u>Conowingo Hydroelectric Plant (Dam) Aging Management Program (B.1.15)</u>
Substation Foundations	<ul style="list-style-type: none"> Structural Support to Non-S/R Components 	Outdoor	Concrete	None (See Section 3.5.6)	<ul style="list-style-type: none"> Not Applicable
Substation Busbar	<ul style="list-style-type: none"> Structural Support to Non-S/R Components Electrical Continuity 	Outdoor	Aluminum	None (1)	<ul style="list-style-type: none"> Not Applicable
Substation Insulators	<ul style="list-style-type: none"> Insulate 	Outdoor	Porcelain	None (1)	<ul style="list-style-type: none"> Not Applicable
Submarine Cable	<ul style="list-style-type: none"> Electrical Continuity 	Raw Water	EPR Insulation	None (2)	<ul style="list-style-type: none"> Not Applicable

(1) No aging effects identified for PBAPS
 (2) Designed to operate in its environment