3.2 ENGINEERED SAFETY FEATURES SYSTEMS

The following systems are included in this section:

- Containment Cooling
- Containment Spray
- Containment Isolation
- Safety Injection (includes Shutdown Cooling)
- Containment Post Accident Monitoring

Subsection 2.3.2 provides a description of these systems and identifies the components requiring an aging management review for license renewal. For the Engineered Safety Features Systems, the specific materials and environments, the resulting aging effects, and the specific programs to manage these aging effects are listed in Tables 3.2-1 through 3.2-5. Appendix C contains the process that identified the aging effects requiring management for non-Class 1 components.

The aging management review results included under Containment Isolation are for those process systems whose only license renewal system intended function is containment isolation. Process systems that have license renewal system intended functions in addition to the containment isolation function are included in the system aging management review results described elsewhere in Sections 3.1, 3.2, 3.3, and 3.4. The pressure boundary (metallic) portions of electrical penetrations and miscellaneous/spare mechanical penetrations that are not associated with a process system are included in the civil/structural aging management review results described in Section 3.5. The non-metallic and conductor portions of containment electrical penetrations are included in the electrical system aging management review results described in Section 3.6. Note, an aging management review was performed for all containment penetrations and associated containment isolation valves and components that ensure containment integrity, regardless of where they are described.

The Engineered Safety Features Systems scoping, screening, and aging management review results were compared to the GALL Report [Reference 3.2-1]. The following component/commodity groups identified in the GALL Report do not require an aging management review for St. Lucie Units 1 and 2 for the reasons noted.

- Containment Spray Heat Exchangers (V A.6) - The St. Lucie Units 1 and 2 design do not contain these components. The St. Lucie designs utilize the shutdown cooling heat exchangers to perform this function.
- Refueling Water Tank Circulation Pumps (V D1.3) - The St. Lucie Units 1 and 2 designs do not contain these components.
- Refueling Water Tank Heating Heat Exchangers (V D1.6) - The St. Lucie Units 1 and 2 designs do not contain these components.
- Primary Containment Heating and Ventilation System Filters (VII F3.4) - The St. Lucie Units 1 and 2 designs do not contain these components.

Additionally, the GALL Report does not address systems/subsystems included in Containment Post Accident Monitoring.

For component/commodity groups that require an aging management review that are also included in the GALL Report, differences in materials and environments are described in Subsection 3.2.1. Aging management programs that are consistent with the GALL Report and those that are plant specific are identified in Subsection 3.2.4 and detailed in the appropriate subsections of Appendix B. Component/commodity groups identified in Tables 3.2-1 through 3.2-5 provide a GALL Report reference in brackets, where applicable, indicating that the St. Lucie Units 1 and 2 component/commodity group, material, and environment are the same. If no GALL Report reference is included, the component/commodity group is plant specific.

3.2.1 MATERIALS AND ENVIRONMENTS

The Engineered Safety Features Systems are exposed to internal environments of treated water - borated, treated water - other, raw water - drains, and air/gas; and external environments of outdoor, indoor - not air conditioned, containment air, and potential borated water leaks (see Tables 3.0-1 and 3.0-2). For corresponding component/commodity groups included in the GALL Report, FPL identified the following additional environments at St. Lucie Units 1 and 2:

- Internal environment of treated water - other for Containment Spray valves, thermowells, orifices, and piping and fittings
- Internal environment of raw water - valves, piping, and fittings associated with the reactor cavity sumps (included as part of Containment Spray)
- Internal environment of air/gas for Containment Isolation valves, piping, and fittings
- Internal environment of air/gas for refueling water tanks and safety injection tanks

The tanks, pumps, heat exchangers, piping, tubing, and associated components and commodity groups for these systems are constructed of stainless steel, nickel alloy, carbon steel, galvanized carbon steel, cast iron, aluminum, copper, brass, copper-nickel, glass, fiberglass reinforced vinyl ester, and rubber coated cloth. For corresponding component/commodity groups included in the GALL Report, FPL identified the following additional material applications at St. Lucie Units 1 and 2:

- Nickel alloy utilized for piping
- Aluminum and fiberglass reinforced vinyl ester utilized for the Unit 1 refueling water tank
- Brass utilized for valves
- Stainless steel utilized for spray nozzles, bolting, and safety injection tanks

The components and commodity groups, their intended functions, the materials, and environments for the Engineered Safety Features Systems are summarized in Tables 3.2-1 through 3.2-5.

For the Engineered Safety Features Systems, there are no systems or components considered inaccessible for inspection.

3.2.2 AGING EFFECTS REQUIRING MANAGEMENT

The aging effects requiring management and the programs and activities that manage the aging effects for each applicable environment and material combination are provided in Tables 3.2-1 through 3.2-5. The aging effects requiring management for each system are summarized in the following paragraphs.

Containment Cooling - The aging effects requiring management are loss of material for carbon steel, stainless steel, copper, copper-nickel, and galvanized carbon steel components; cracking for rubber coated cloth; and fouling for copper heat exchanger tubing and fins. The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity.

Containment Spray - The aging effects requiring management are loss of material for carbon steel, stainless steel, brass, aluminum, and cast iron components; cracking for the fiberglass reinforced vinyl ester tank liner and certain stainless steel valves, thermowells, piping, tubing, and fittings; delamination of the fiberglass reinforced vinyl ester tank liner; and fouling for stainless steel heat exchanger tubing. The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity.

Containment Isolation - The aging effect requiring management is loss of material for carbon steel. The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity.

Safety Injection - The aging effects requiring management are loss of material for carbon steel, stainless steel, brass, and cast iron components; cracking for certain stainless steel components; and fouling for stainless steel heat exchanger tubing. The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity. Note that fatigue of safety injection valves, piping, and fittings is identified in the GALL Report as an aging effect. At St. Lucie Units 1 and 2, fatigue is a TLAA and is addressed in Subsection 4.3.2.

Containment Post Accident Monitoring - The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity.

3.2.3 OPERATING EXPERIENCE

3.2.3.1 INDUSTRY EXPERIENCE

A review of industry operating history and a review of NRC generic communications were performed to validate the set of aging effects that require management. The industry correspondence that was reviewed for operating experience related to Engineered Safety Features Systems includes the following:

- NRC Bulletin 79-17, "Pipe Cracks in Stagnant Borated Water Systems at PWR Plants"
- NRC Bulletin 82-02, "Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of PWR Plants"
- NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems"
- NRC Bulletin 89-02, "Stress Corrosion Cracking of High-Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350W Swing Check Valves or Valves of Similar Design"
- NRC IE Circular 76-06, "Stress Corrosion Cracks in Stagnant, Low Pressure Stainless Piping Containing Boric Acid Solution at PWRs"
- NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants"
- NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"
- NRC Generic Letter 91-17, "Generic Issue 29, Bolting Degradation or Failure in Nuclear Power Plants"
- NRC Information Notice 79-19, "Pipe Cracks in Stagnant Borated Water Systems at PWR Plants"
- NRC Information Notice 80-05, "Chloride Contamination of Safety Related Piping and Components"
- NRC Information Notice 81-38, "Potentially Significant Equipment Failures Resulting from Contamination of Air-Operated Systems"
- NRC Information Notice 82-09, "Cracking in Piping of Makeup Coolant Lines at B&W Plants"
- NRC Information Notice 84-18, "Stress Corrosion Cracking in Pressurized Water Reactor Systems"
- NRC Information Notice 85-34, "Heat Tracing Contributes to Corrosion Failure of Stainless Steel Piping"
- NRC Information Notice 89-01, "Valve Body Erosion"
- NRC Information Notice 89-07, "Potentially Significant Equipment Failures Resulting from Contamination of Air-Operated Systems"

- NRC Information Notice 89-30, "High Temperature Environments at Nuclear Power Plants"
- NRC Information Notice 90-26, "Inadequate Flow of Essential Service Water to Room Coolers and Heat Exchangers for Engineered Safety-Feature Systems"
- NRC Information Notice 90-39, "Recent Problems with Service Water Systems"
- NRC Information Notice 90-65, "Recent Orifice Plate Problems"
- NRC Information Notice 91-05, "Intergranular Stress Corrosion Cracking in Pressurized Water Reactor Safety Injection Accumulator Nozzles"
- NRC Information Notice 97-13, "Deficient Conditions Associated with Protective Coatings at Nuclear Power Plants"
- NRC Information Notice 99-01, "Deterioration of High-Efficiency Particulate Air Filters in a PWR Containment Fan Cooler Unit"

No aging effects requiring management were identified from the above documents beyond those already identified in Subsection 3.2.2.

3.2.3.2 PLANT-SPECIFIC EXPERIENCE

St. Lucie Units 1 and 2 operating experience was also reviewed to validate the identified aging effects requiring management. This review included a survey of St. Lucie non-conformance reports, licensee event reports, and condition reports for any documented instances of Engineered Safety Features Systems component aging, in addition to interviews with responsible engineering personnel. No aging effects requiring management were identified from this review beyond those identified in Subsection 3.2.2.

3.2.4 CONCLUSION

The review of industry information, NRC generic communications, and St. Lucie Units 1 and 2 operating experience identified no additional aging effects beyond those discussed in Subsection 3.2.2. Tables 3.2-1 through 3.2-5 contain the results of the aging management review for the Engineered Safety Features Systems and summarize the aging effects requiring management.

The aging effects requiring management are adequately managed by the following programs:

St. Lucie programs consistent with the corresponding programs in the GALL Report:

- ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program
- Boric Acid Wastage Surveillance Program
- Chemistry Control Program

St. Lucie plant-specific programs:

- Galvanic Corrosion Susceptibility Inspection Program
- Periodic Surveillance and Preventive Maintenance Program
- Systems and Structures Monitoring Program

Based on the evaluations provided in Appendix B for the programs listed above, aging effects are adequately managed so that the intended functions of the Engineered Safety Features Systems components listed in Tables 3.2-1 through 3.2-5 are maintained consistent with the St. Lucie Units 1 and 2 CLBs for the period of extended operation.

3.2.5 REFERENCES

3.2-1 NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," U. S. Nuclear Regulatory Commission, April 2001.

TABLE 3.2-1
CONTAINMENT COOLING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment					
Containment fan cooler (HVS-1A, B, C, and D) housings [VII F3.1.2]	Pressure boundary	Carbon steel	Air/gas	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Containment fan cooler heat exchanger tubes	Pressure boundary Heat transfer	Copper	Treated water - other	Loss of material Fouling	Chemistry Control Program
Containment fan cooler heat exchanger headers and end caps	Pressure boundary	Copper	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Containment fan cooler heat exchanger vent plugs	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Unit 1 containment fan cooler heat exchanger stubs/flanges	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 2 containment fan cooler heat exchanger stubs/flanges	Pressure boundary	Copper nickel	Treated water - other	Loss of material	Chemistry Control Program
Unit 2 containment fan cooler closed cooling water flanges	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Containment fan cooler motor heat exchanger tubes (Unit 1 only)	Pressure boundary Heat transfer	Copper	Treated water - other	Loss of material Fouling	Chemistry Control Program

TABLE 3.2-1 (continued)
CONTAINMENT COOLING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Containment fan cooler motor heat exchanger headers (Unit 1 only)	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Valves (Unit 1 only)	Pressure boundary	Carbon steel	Air/gas	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings [VII F3.3.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Drip pans	Pressure boundary	Stainless steel	Raw water - drains	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Flexible connections [VII F3.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program
Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Thermowells	Pressure boundary	Stainless steel	Air/gas	None	None required

TABLE 3.2-1 (continued)
CONTAINMENT COOLING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment					
Containment fan cooler (HVS-1A, B, C, and D) housings [VII I.1.1]	Pressure boundary	Carbon steel	Containment air	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Containment fan cooler heat exchanger tubes	Pressure boundary Heat transfer	Copper	Containment air (wetted)	Loss of material Fouling	Periodic Surveillance and Preventive Maintenance Program
Containment fan cooler heat exchanger fins	Heat transfer	Copper	Containment air (wetted)	Loss of material Fouling	Periodic Surveillance and Preventive Maintenance Program
Containment fan cooler heat exchanger headers and end caps	Pressure boundary	Copper	Containment air (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Containment fan cooler heat exchanger vent plugs and frame side plates	Pressure boundary	Stainless steel	Containment air (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Unit 1 containment fan cooler heat exchanger stubs/flanges [VII I.1.1]	Pressure boundary	Carbon steel	Containment air (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 2 containment fan cooler heat exchanger stubs/flanges	Pressure boundary	Copper nickel	Containment air (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

TABLE 3.2-1 (continued)
CONTAINMENT COOLING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment (continued)					
Containment fan cooler motor heat exchanger tubes (Unit 1 only)	Pressure boundary Heat transfer	Copper	Containment air (wetted)	Loss of material Fouling	Periodic Surveillance and Preventive Maintenance Program
Containment fan cooler motor heat exchanger fins (Unit 1 only)	Heat transfer	Copper	Containment air (wetted)	Loss of material Fouling	Periodic Surveillance and Preventive Maintenance Program
Containment fan cooler motor heat exchanger headers (Unit 1 only) [VII I.1.1]	Pressure boundary	Carbon steel	Containment air (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves (Unit 1 only) [VII I.1.1]	Pressure boundary	Carbon steel	Containment air	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Containment air (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Drip pans Thermowells	Pressure boundary	Stainless steel	Containment air	None	None required
Flexible connections	Pressure boundary	Rubber coated cloth	Containment air	Cracking	Systems and Structures Monitoring Program

TABLE 3.2-1 (continued)
CONTAINMENT COOLING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment (continued)					
Ducts	Pressure boundary	Galvanized carbon steel	Containment air	None	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-2
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment					
Unit 1 Refueling Water Tank	Pressure boundary	Aluminum	Treated water - borated	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
			Air/gas	None	None required
		Fiberglass reinforced vinyl ester	Treated water - borated	Cracking Delamination (including loss of adhesion)	ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program
Unit 2 Refueling Water Tank [V D1.8.1-D1.8.3]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
			Air/gas	None	None required
NaOH Storage Tank (Unit 1 only)	Pressure boundary	Stainless steel	Treated water - other Air/gas	None[1]	None required
Hydrazine Storage Tank (Unit 2 only)	Pressure boundary	Stainless steel	Treated water - other Air/gas	None[1]	None required
NaOH Tank rupture disc (Unit 1 only)	Pressure boundary	Stainless steel	Air/gas	None	None required
Containment spray pumps [V A.3.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Hydrazine pumps (Unit 2 only)	Pressure boundary	Stainless steel	Treated water - other	None[1]	None required

NOTES: 1. Stainless steel in an environment of hydrazine or sodium hydroxide (NaOH) was determined to have no aging effects requiring management.

TABLE 3.2-2 (continued)
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Eductors (Unit 1 only) [V A.1.5]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Containment spray pump cooler tubes (Unit 1 only)	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Containment spray pump cooler shells (Unit 1 only)	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Containment spray pump cooler flex connectors (Unit 1 only)	Pressure boundary	Brass	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Refueling water tank vortex breaker (Unit 1 only)	Vortex prevention	Aluminum	Treated water - borated	Loss of material	Chemistry Control Program

TABLE 3.2-2 (continued)
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Valves [V A.4.1] Piping/fittings [V A.1.1] Tubing/fittings Thermowells [V A.1.3]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
Valves Piping/fittings Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Treated water - other	None[2]	None required
Valves Piping/fittings (reactor cavity sump drains)	Pressure boundary	Stainless steel	Raw water - drains	None	None required
Piping	Pressure boundary	Nickel alloy	Raw water - drains Air/gas	None	None required

NOTES: 1. Portions of the system >140°F are potentially susceptible to SCC (see Appendix C).
2. Stainless steel in an environment of hydrazine or NaOH was determined to have no aging effects requiring management.

TABLE 3.2-2 (continued)
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Orifices	Pressure boundary Throttling	Stainless steel	Treated water - other	None[1]	None required
Orifices [V A.1.2]	Pressure boundary Throttling	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Sight glass (Unit 1 only)	Pressure boundary	Carbon steel with stainless steel cladding	Treated water - other Air/gas	None[1]	None required
		Glass	Treated water - other Air/gas	None[1]	None required
Refueling water tank strainers	Filtration	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Spray nozzles	Pressure boundary Spray	Stainless steel	Air/gas	None	None required

NOTES: 1. Stainless steel and glass in a NaOH environment were determined to have no aging effects requiring management.

TABLE 3.2-2 (continued)
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment					
Unit 1 Refueling Water Tank	Pressure boundary	Aluminum	Outdoor	Loss of material[1]	Periodic Surveillance and Preventive Maintenance Program
Unit 2 Refueling Water Tank	Pressure boundary	Stainless steel	Outdoor	None	None required
NaOH Storage Tank (Unit 1 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Hydrazine Storage Tank (Unit 2 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Containment spray pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Eductors (Unit 1 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Hydrazine pumps (Unit 2 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Containment spray pump cooler shells (Unit 1 only)	Pressure boundary	Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Containment spray pump cooler flex connectors (Unit 1 only)	Pressure boundary	Brass	Indoor - not air conditioned	None	None required

NOTES: 1. Plant experience has identified the potential for external loss of material due to galvanic corrosion of the tank bottom.

TABLE 3.2-2 (continued)
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment (continued)					
Valves Tubing/fittings Piping/fittings	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned Containment air	None	None required
Piping	Pressure boundary	Nickel alloy	Containment air Indoor - not air conditioned	None	None required
Thermowells	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned	None	None required
Rupture disc	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Piping/fittings	Pressure boundary	Stainless steel	Outdoor (ECCS pipe tunnel)	Loss of material[1] Cracking[1]	Periodic Surveillance and Preventive Maintenance Program
Sight glass (Unit 1 only) [V E1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Sight glass (Unit 1 only)	Pressure boundary	Glass	Indoor - not air conditioned	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned	None	None required

NOTES: 1. Plant experience has identified the potential for SCC and loss of material due to pitting corrosion on stainless steel components located in the Emergency Core Cooling System (ECCS) pipe tunnel.

TABLE 3.2-2 (continued)
CONTAINMENT SPRAY

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment (continued)					
Spray nozzles	Pressure boundary Spray	Stainless steel	Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air Outdoor	None	None required
Bolting (mechanical closures) [V A.1.4, A.3.2, A.4.2, A.5.2, D1.8.4]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air Outdoor	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-3
CONTAINMENT ISOLATION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Containment Purge					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
Debris screens (Unit 1 only)	Filtration	Stainless steel	Air/gas	None	None required
External Environment					
Valves Piping/fittings [V E.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Tubing/fittings	Pressure boundary	Stainless steel	Containment air	None	None required
Valves Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Debris screens (Unit 1 only)	Filtration	Stainless steel	Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-3 (continued)
CONTAINMENT ISOLATION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Unit 1 Hydrogen Purge					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
External Environment					
Valves Piping/fittings [V E.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-3 (continued)
CONTAINMENT ISOLATION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Unit 2 Continuous Containment/Hydrogen Purge					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Debris screen	Filtration	Carbon steel	Air/gas	None	None required
External Environment					
Valves Piping/fittings [V E.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Debris screen [V E.1.1]	Filtration	Carbon steel	Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-3 (continued)
CONTAINMENT ISOLATION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Integrated Leak Rate Test					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Valves Piping/fittings [V E.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-3 (continued)
CONTAINMENT ISOLATION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Service Air					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves	Pressure boundary	Brass	Air/gas	None	None required
External Environment					
Valves Piping/fittings [V E.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves	Pressure boundary	Brass	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-3 (continued)
CONTAINMENT ISOLATION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Containment Vacuum Relief					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Valves Piping/fittings [V E.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-4
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment					
Safety injection tanks [V D1.7.3]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
			Air/gas	None	None required
Low pressure safety injection pumps [V D1.2.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
High pressure safety injection pumps [V D1.2.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material[1]	Chemistry Control Program
Shutdown cooling heat exchanger tubes [V D1.5.2]	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling Cracking	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Shutdown cooling heat exchanger tube sheets	Pressure boundary	Carbon steel clad with stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
			Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program

NOTES: 1. Cracking is not an applicable aging effect because the high pressure safety injection temperature is $\leq 140^{\circ}F$ (see Appendix C).

TABLE 3.2-4 (continued)
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Shutdown cooling heat exchanger channel nozzles, channel facings, channel cover facings [V D1.5.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
Shutdown cooling heat exchanger shells, baffles, tube supports [V D1.5.3]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 1 low pressure safety injection pump cooler tubes [V D1.5.2]	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling Cracking	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Unit 1 low pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
High pressure safety injection pump cooler tubes [V D1.5.2]	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program

TABLE 3.2-4 (continued)
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Unit 1 high pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 2 high pressure safety injection pump cooler shells [V D1.5.3]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 1 high pressure safety injection pump cooler tube shields	Pressure boundary	Brass	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Valves [V D1.4.1] Piping/fittings [V D1.1.1 - D1.1.5] Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
Orifices [V D1.2.3]	Pressure boundary Throttling	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program

NOTES: 1. Portions of the system >140°F are potentially susceptible to SCC (see Appendix C).

TABLE 3.2-4 (continued)
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment					
Safety injection tanks	Pressure boundary	Stainless steel	Containment air	None	None required
High pressure safety injection pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Low pressure safety injection pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Shutdown cooling heat exchanger shells [V D1.5.3]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Shutdown cooling heat exchanger channel heads and channel covers	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 1 low pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 1 high pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 2 high pressure safety injection pump cooler shells [V D1.5.3]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program

TABLE 3.2-4 (continued)
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment (continued)					
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures) [V D1.1.7, D1.2.2, D1.4.2, and D1.5.5]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-5
CONTAINMENT POST ACCIDENT MONITORING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Containment Hydrogen Monitoring					
Internal Environment					
Flex hoses Valves Sample vessel (Unit 1) Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Valves Tubing/fittings	Pressure boundary	Stainless steel	Containment air	None	None required
Flex hoses Valves Sample vessel (Unit 1 only) Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-5 (continued)
CONTAINMENT POST ACCIDENT MONITORING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Unit 2 Post Accident Sampling					
Internal Environment					
Valves	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Valves	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.2-5 (continued)
CONTAINMENT POST ACCIDENT MONITORING

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Containment Atmosphere Radiation Monitoring					
Internal Environment					
Valves Piping/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Valves Piping/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

3.3 AUXILIARY SYSTEMS

The following systems are included in this section:

- Chemical and Volume Control
- Component Cooling Water
- Demineralized Makeup Water (Unit 2 only)
- Diesel Generators and Support Systems
- Emergency Cooling Canal
- Fire Protection
- Fuel Pool Cooling
- Instrument Air
- Intake Cooling Water
- Miscellaneous Bulk Gas Supply
- Primary Makeup Water
- Sampling
- Service Water
- Turbine Cooling Water (Unit 1 only)
- Ventilation
- Waste Management

Subsection 2.3.3 provides a description of these systems and identifies the components requiring an aging management review for license renewal. For Auxiliary Systems, the specific materials and environments, the resulting aging effects, and the specific programs to manage these aging effects are listed in Tables 3.3-1 through 3.3-16. Appendix C contains the process that identified the aging effects requiring management for non-Class 1 components.

The Auxiliary Systems scoping, screening, and aging management review results were compared to the GALL Report [Reference 3.3-1]. The following component/commodity groups identified in the GALL Report do not require an aging management review for St. Lucie Units 1 and 2 for the reasons noted.

- New Fuel Racks (VII A1.1) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.
- Spent Fuel Pool Cooling and Cleanup Filters (VII A3.2) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.

- Spent Fuel Pool Cooling and Cleanup Ion Exchangers (VII A3.5) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.
- Ultimate Heat Sink Pumps (VII C3.3) - The St. Lucie Units 1 and 2 designs do not include these components.
- Chemical and Volume Control Regenerative Heat Exchanger Bolting (VII E1.7.5) - The St. Lucie Units 1 and 2 designs do not include these components.
- Chemical and Volume Control Letdown Heat Exchanger Shells and Access Covers (VII E1.8.4) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.
- Chemical and Volume Control Basket Strainers (VII E1.9) - The St. Lucie Units 1 and 2 designs do not include these components.
- Control Room Area, Auxiliary and Radwaste Area Ventilation seals in access doors, dampers, and filters (VII F1.1.4, VII F1.4.2, VII F2.1.4, and VII F2.4.2) - These components are considered to be consumables and do not require an aging management review consistent with the guidance of NEI 95-10 [Reference 3.3-2].
- Primary Containment Heating and Ventilation System (VII F3) - Containment cooling is included in Section 3.2, Engineered Safety Features.
- Diesel Generator Building Ventilation (VII F4) - This system does not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore is not within the scope of license renewal.
- Diesel-Driven Fire Pumps and Fuel Supply Lines (VII G.8) - The St. Lucie Units 1 and 2 designs do not include these components.
- Diesel Engine Cooling Water Subsystem (VII H2.1.1 and H2.1.2) –Not applicable because the St. Lucie Units 1 and 2 designs utilize a self-contained cooling loop.

Additionally, the following component/commodity groups identified in the Auxiliary Systems section of the GALL Report are included in other sections of the St. Lucie Units 1 and 2 License Renewal Application, as indicated below:

- Spent Fuel Storage Racks (VII A2.1) - Section 3.5, Structures and Structural Components.
- Overhead Heavy Load and Light Load (Related to Refueling) Handling Cranes (VII B.1) - Section 3.5, Structures and Structural Components.
- Overhead Heavy Load and Light Load (Related to Refueling) Handling Rails (VII B.2) - Section 3.5, Structures and Structural Components.
- Primary Containment Heating and Ventilation (VII F3) - Section 3.2, Engineered Safety Features.

- Fire Protection fire barrier penetration seals, walls, ceilings, floors, and fire doors (VII G.1, VII G2, VII G3, VII G4, and VII G5) - Section 3.5, Structures and Structural Components.

For components/commodity groups that require an aging management review that are also included in the GALL Report, differences in materials and environments are described in Subsection 3.3.1. Aging management programs that are consistent with the GALL Report and those that are plant specific are identified in Subsection 3.3.4 and detailed in the appropriate subsections of Appendix B. Component/commodity groups identified in Tables 3.3-1 through 3.3-16 provide a GALL Report reference in brackets, where applicable, indicating that the St. Lucie Units 1 and 2 component/commodity group, material, and environment are the same. If no GALL Report reference is included, the component/commodity group is plant specific.

3.3.1 MATERIALS AND ENVIRONMENT

The Auxiliary Systems are exposed to internal environments of air/gas, raw water - city water, raw water - salt water, raw water - drains, treated water - borated, treated water - other, lubricating oil, and fuel oil; and external environments of outdoor, indoor - not air conditioned, containment air, buried, embedded/encased, raw water - salt water, raw water - drains, and potential borated water leaks (see Tables 3.0-1 and 3.0-2). For corresponding component/commodity groups included in the GALL Report, FPL identified the following additional environments at St. Lucie Units 1 and 2:

- External environment of embedded/encased for Intake Cooling Water underground piping and fittings
- Internal environment of air/gas for Component Cooling Water tanks, valves, piping, and fittings
- Internal environment of treated water - other for Control Room Air Conditioning heat exchanger tubes
- Internal environment of air/gas for reactor coolant pump oil collection tanks, valves, piping, and fittings
- Internal environment of air/gas for diesel generator fuel oil and day tanks

The tanks, pumps, heat exchangers, housings, piping, tubing, valves, and associated components and commodity groups for these systems are constructed of carbon steel, galvanized carbon steel, stainless steel, nickel alloy, cast iron, aluminum, aluminum alloy, aluminum brass, aluminum bronze, brass, bronze, copper, copper alloy, copper nickel, fiberglass, glass, Monel, plastic, Plexiglas, polyester/rubber, rubber, rubber coated cloth, and titanium. For corresponding component/commodity groups included in the GALL Report, FPL identified the following additional material applications at St. Lucie Units 1 and 2:

- Nickel alloy utilized for piping
- Aluminum bronze utilized for pump casings
- Brass, copper alloy, aluminum, and plastic utilized for valves
- Galvanized carbon steel utilized for vessels, piping/fittings, and ducts
- Titanium and Monel utilized for orifices
- Rubber coated cloth utilized for flexible connections
- Stainless steel utilized for bolting
- Aluminum brass and fiberglass utilized for piping/fittings

The only parts of systems or components considered to be inaccessible for inspection are those that are buried or embedded/encased in concrete. These environments are addressed as part of the aging management review process; see Table 3.0-2, "External Service Environments." Potential aging effects associated with these environments are

reviewed and those aging effects requiring management are identified along with the credited aging management program(s). All other parts of systems and components can be accessed, if required. The Auxiliary Systems containing inaccessible parts are:

- Fire Protection that contains buried cast iron valves, hydrants, and piping/fittings, and embedded/encased cast iron piping/fittings
- Emergency Cooling Canal that contains embedded/encased carbon steel piping
- Intake Cooling Water that contains buried and embedded/encased carbon steel piping/fittings, and buried stainless steel piping/fittings and carbon steel bolting
- Primary Water that contains embedded/encased stainless steel piping/fittings
- Waste Management that contains embedded/encased stainless steel strainers and piping/fittings

The components, their intended functions, materials, and environments for the Auxiliary Systems are summarized in Tables 3.3-1 through 3.3-16.

3.3.2 AGING EFFECTS REQUIRING MANAGEMENT

The aging effects requiring management and the programs and activities that manage the aging effects for each applicable environment and material combination are provided in Tables 3.3-1 through 3.3-16. The aging effects requiring management for each system are summarized in the following paragraphs.

Chemical and Volume Control - The aging effects requiring management are loss of material and cracking for stainless steel components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity. Note that fatigue of regenerative heat exchangers, letdown heat exchangers, valves, piping, and fittings is identified in the GALL Report as an aging effect. At St. Lucie Units 1 and 2, fatigue is a TLAA and is addressed in Subsection 4.3.2.

Component Cooling Water - The aging effects requiring management are loss of material for carbon steel, stainless steel, cast iron, and aluminum bronze components; and loss of material and fouling for aluminum brass components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Demineralized Makeup Water (Unit 2 only) - The aging effect requiring management is loss of material for stainless steel components.

Diesel Generators and Support Systems - The aging effects requiring management are loss of material for cast iron, carbon steel, stainless steel, and copper alloy components; cracking for rubber, polyester/rubber, and Plexiglas components; and loss of material and fouling for aluminum, brass, and copper radiator tubes and fins.

Emergency Cooling Canal - The aging effect requiring management is loss of material for carbon steel and aluminum bronze components.

Fire Protection - The aging effect requiring management is loss of material for carbon steel, stainless steel, cast iron, and copper alloy components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Fuel Pool Cooling - The aging effects requiring management are loss of material for carbon steel and stainless steel components; and loss of material and fouling (Unit 2 only) for stainless steel heat exchanger tubes. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Instrument Air - The aging effects requiring management are loss of material for galvanized carbon steel, carbon steel, brass, bronze, stainless steel, and copper alloy components; cracking for rubber and plastic components; and fouling for copper heat exchanger tubes. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Intake Cooling Water - The aging effects requiring management are loss of material for carbon steel, stainless steel, cast iron, aluminum brass, aluminum bronze, bronze, and Monel components and cracking for rubber and fiberglass components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Miscellaneous Bulk Gas Supply - The aging effect requiring management is loss of material for carbon steel components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Primary Makeup Water - The aging effects requiring management are loss of material for carbon steel, nickel alloy, and copper alloy components; loss of material and cracking for stainless steel components; and cracking for rubber components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Sampling - The aging effects requiring management are loss of material and cracking for stainless steel components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Service Water - The aging effects requiring management are loss of material for galvanized carbon steel and copper alloy components; and loss of material and cracking for stainless steel components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Turbine Cooling Water (Unit 1 only) - The aging effects requiring management are loss of material for carbon steel and stainless steel components; and loss of material and fouling for brass fan cooler tubes and fins.

Ventilation - The aging effects requiring management are loss of material for galvanized carbon steel, carbon steel, stainless steel, and copper nickel components; cracking for rubber coated cloth expansion joints; and fouling for copper nickel heat exchanger tubes. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

Waste Management - The aging effect requiring management is loss of material for carbon steel components. The aging effect requiring management for carbon steel mechanical bolting is loss of mechanical closure integrity.

3.3.3 OPERATING EXPERIENCE

3.3.3.1 INDUSTRY EXPERIENCE

A review of industry operating history and a review of NRC generic communications were performed to validate the set of aging effects that require management. The industry correspondence that was reviewed for operating experience related to Auxiliary Systems includes the following:

- NRC Bulletin 79-17, "Pipe Cracks in Stagnant Borated Water Systems at PWR Plants"
- NRC Bulletin 81-03, "Flow Blockage of Cooling Water to Safety System Components by Corbicula sp. (asiatic clam) and Mytilus sp. (mussel)"
- NRC Bulletin 82-02, "Degradation of Threaded Fasteners in Reactor Coolant Pressure Boundary of PWR Plants"
- NRC Bulletin 88-08 and Supplements 1, 2, and 3, "Thermal Stresses in Piping Connected to Reactor Coolant Systems"
- NRC Bulletin 89-02, "Stress Corrosion Cracking of High Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350W Swing Check Valves or Valves of Similar Design"
- NRC Circular 76-06, "Stress Corrosion Cracks in Stagnant, Low Pressure Stainless Piping Containing Boric Acid Solution at PWRs"
- NRC Circular 80-11, "Emergency Diesel Generator Lube Oil Cooler Failures"
- NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants"
- NRC Generic Letter 89-08, "Erosion/Corrosion Induced Pipe Wall Thinning"
- NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"
- NRC Generic Letter 91-17, "Generic Issue 29, Bolting Degradation or Failure in Nuclear Power Plants"
- NRC Information Notice 79-19, "Pipe Cracks in Borated Water Systems at PWR Plants"
- NRC Information Notice 79-23, "Emergency Diesel Generator Lube Oil Coolers"
- NRC Information Notice 80-05, "Chloride Contamination of Safety-Related Piping and Components"
- NRC Information Notice 81-38, "Potentially Significant Equipment Failures Resulting from Contamination of Air-Operated Systems"
- NRC Information Notice 84-18, "Stress Corrosion Cracking in Pressurized Water Reactor Systems"
- NRC Information Notice 84-71, "Graphitic Corrosion of Cast Iron in Salt Water"

- NRC Information Notice 85-24, "Failures of Protective Coatings in Pipes and Heat Exchangers"
- NRC Information Notice 85-30, "Microbiologically Induced Corrosion of Containment Service Water System"
- NRC Information Notice 85-34, "Heat Tracing Contributes to Corrosion Failure of Stainless Steel Piping"
- NRC Information Notice 85-56, "Inadequate Environment Control for Components and Systems in Extended Storage or Lay-up"
- NRC Information Notice 86-96, "Heat Exchanger Fouling Can Cause Inadequate Operability of Service Water System"
- NRC Information Notice 88-17, "Summary of Responses to NRC Bulletin 87-01, Thinning of Pipe Walls in Nuclear Power Plants"
- NRC Information Notice 88-37, "Flow Blockage of Cooling Water to Safety System Components"
- NRC Information Notice 89-01, "Valve Body Erosion"
- NRC Information Notice 89-07, "Failures of Small Diameter Tubing in Control Air, Fuel Oil, and Lube Oil Systems Render Emergency Diesel Generators Inoperable"
- NRC Information Notice 90-26, "Inadequate Flow of Essential Service Water to Room Coolers and Heat Exchangers for Engineered Safety Feature Systems"
- NRC Information Notice 90-39, "Recent Problems with Service Water Systems"
- NRC Information Notice 90-65, "Recent Orifice Plate Problems"
- NRC Information Notice 91-46, "Degradation of Emergency Diesel Generator Fuel Oil Delivery Systems"
- NRC Information Notice 91-85, "Potential Failures of Thermostatic Control Valves for Diesel Generator Jacket Cooling Water System"
- NRC Information Notice 94-03, "Deficiencies Identified During Service Water System Operational Performance Inspections"
- NRC Information Notice 94-58, "Reactor Coolant Pump Lube Oil Fire"
- NRC Information Notice 94-59, "Accelerated Dealloying of Cast Aluminum-Bronze Valves Caused by Microbiologically Induced Corrosion"
- NRC Information Notice 94-79, "Microbiologically Influenced Corrosion of Emergency Diesel Generator Service Water Piping"
- NRC Information Notice 96-67, "Vulnerability of Emergency Diesel Generators to Fuel Oil/Lubricating Oil Incompatibility"
- NRC Information Notice 97-13, "Deficient Conditions Associated with Protective Coatings at Nuclear Power Plants"
- NRC Information Notice 98-43, "Leaks in the Emergency Diesel Generator Lubricating Oil and Jacket Cooling Water Piping"

- NRC Information Notice 99-01, "Deterioration of High-Efficiency Particulate Air Filters in a PWR Containment Fan Cooler Unit"
- NRC Information Notice 99-07, "Failed Fire Protection Deluge Valves and Potential Testing Deficiencies in Preaction Sprinkler Systems"

No aging effects requiring management were identified from the above documents beyond those identified in Subsection 3.3.2.

3.3.3.2 PLANT-SPECIFIC EXPERIENCE

St. Lucie Units 1 and 2 operating experience was also reviewed to validate the identified aging effects requiring management. The review included a survey of St. Lucie non-conformance reports, licensee event reports, and condition reports for any documented instances of Auxiliary Systems component aging, in addition to interviews with responsible engineering personnel. No aging effects requiring management were identified from this review beyond those identified in Subsection 3.3.2.

3.3.4 CONCLUSION

The review of industry information, NRC generic communications, and St. Lucie Units 1 and 2 operating experience identified no additional aging effects beyond those discussed in Subsection 3.3.2. Tables 3.3-1 through 3.3-16 contain the results of the aging management review for the Auxiliary Systems and summarize the aging effects requiring management.

The aging effects requiring management are adequately managed by the following programs:

St. Lucie programs consistent with the corresponding programs in the GALL Report:

- Boric Acid Wastage Surveillance Program
- Chemistry Control Program (Water Chemistry Control and Closed-Cycle Closed Cooling Water Chemistry Subprograms)
- Fire Protection Program

St. Lucie plant-specific programs:

- Chemistry Control Program (Fuel Oil Chemistry Subprogram)
- Galvanic Corrosion Susceptibility Inspection Program
- Intake Cooling Water Inspection Program
- Periodic Surveillance and Preventive Maintenance Program
- Pipe Wall Thinning Inspection Program
- Systems and Structures Monitoring Program

Based on the evaluations provided in Appendix B for the programs listed above, aging effects are adequately managed so that the intended functions of the Auxiliary Systems components listed in Tables 3.3-1 through 3.3-16 are maintained consistent with the St. Lucie Units 1 and 2 CLBs for the period of extended operation.

3.3.5 REFERENCES

3.3-1 NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," U. S. Nuclear Regulatory Commission, April 2001.

3.3-2 NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Revision 3, Nuclear Energy Institute, March 2001.

TABLE 3.3-1
CHEMICAL AND VOLUME CONTROL

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Boric acid makeup tanks	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
			Air/gas	None	None required
Volume control tanks	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
			Air/gas	None	None required
Boric acid makeup pumps	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Charging pumps [VII E1.5.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
				Cracking[1]	Periodic Surveillance and Preventive Maintenance Program
Letdown heat exchanger tubes[2] [VII E1.8.3]	Pressure boundary	Stainless steel	Treated water - borated (inside diameter)	Loss of material Cracking	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material	Chemistry Control Program
Letdown heat exchanger tubesheets [VII E1.8.2]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
			Treated water - other	Loss of material	Chemistry Control Program

NOTES:
1. Plant experience has identified the potential for Unit 2 charging pump cracking due to fatigue.
2. Heat transfer is not a license renewal intended function for the letdown heat exchangers.

TABLE 3.3-1 (continued)
CHEMICAL AND VOLUME CONTROL

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Letdown heat exchanger channel heads and covers [VII E1.8.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
Regenerative heat exchangers (including tubes)[1] [VII E1.7.1 - E1.7.4]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
Valves [VII E1.3.1] Piping/fittings [VII E1.1.1] Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking[2]	Chemistry Control Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
Housings (charging pump strainers, suction stabilizers, pulsation dampers, purification filters, letdown strainers, boric acid suction strainers, and ion exchangers)	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking[2]	Chemistry Control Program

NOTES: 1. Heat transfer is not a license renewal intended function for the regenerative heat exchangers.
2. Portions of the system >140°F are potentially susceptible to SCC (see Appendix C).

TABLE 3.3-1 (continued)
CHEMICAL AND VOLUME CONTROL

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Strainer elements	Filtration	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Orifices	Pressure boundary Throttling	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program

NOTES: 1. Portions of the system >140°F are potentially susceptible to SCC (see Appendix C).

TABLE 3.3-1 (continued)
CHEMICAL AND VOLUME CONTROL

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Boric acid makeup tanks	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Volume control tanks	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Boric acid makeup pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Charging pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Letdown heat exchanger channel heads	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Regenerative heat exchanger	Pressure boundary	Stainless steel	Containment air	None	None required
Valves Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Piping/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Piping/fittings (from boric acid makeup tanks to boric acid makeup pumps and charging pumps)	Pressure boundary	Stainless steel	Indoor - not air conditioned	Cracking[1]	Systems and Structures Monitoring Program

NOTES: 1. Plant experience has identified the potential for cracking of previously heat-traced piping and fittings.

TABLE 3.3-1 (continued)
CHEMICAL AND VOLUME CONTROL

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Piping/fittings (refueling water tanks to charging pump suctions)	Pressure boundary	Stainless steel	Outdoor (ECCS pipe tunnel)	Loss of material[1] Cracking[1]	Periodic Surveillance and Preventive Maintenance Program
			Outdoor Indoor - not air conditioned	None	None required
Housings (purification filters, letdown strainers, boric acid suction strainers, ion exchangers, charging pump strainers, suction stabilizers, and pulsation dampers)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures) [VII E1.1.2, E1.2.1, E1.3.2, E1.4.1, E1.5.2, E1.6.1, E1.8.5, E1.10.1]	Pressure boundary	Carbon steel	Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel Stainless steel	Outdoor Indoor - not air conditioned Containment air	None	None required

NOTES: 1. Plant experience has identified the potential for SCC and loss of material due to pitting corrosion on stainless steel components located in the ECCS pipe tunnel.

TABLE 3.3-2
COMPONENT COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Component cooling water surge tanks [VII C2.4.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas	None	None required
Component cooling water pumps [VII C2.3.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Component cooling water heat exchanger tubes [VII C1.3.5]	Pressure boundary Heat transfer	Aluminum brass	Raw water - salt water (inside diameter)	Loss of material Fouling	Intake Cooling Water Inspection Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Component cooling water heat exchanger tubesheets [VII C1.3.4]	Pressure boundary	Aluminum bronze	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
			Treated water - other	Loss of material	Chemistry Control Program
Component cooling water heat exchanger channels and doors [VII C1.3.2, C1.3.3]	Pressure boundary	Carbon steel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Component cooling water heat exchanger shells and baffles [VII C1.3.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program

TABLE 3.3-2 (continued)
COMPONENT COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Valves [VII C2.2.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Valves [VII C2.2.1] Thermowells Tubing/Fittings Sight glasses (Unit 2 only)	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Valves (Unit 1 only)	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program
Valves Piping/fittings Sight glasses (Unit 1 only)	Pressure boundary	Carbon steel	Air/gas	None	None required
Piping/fittings [VII C2.1.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Pipe Wall Thinning Inspection Program[1] Galvanic Corrosion Susceptibility Inspection Program
Sight glasses (Unit 1 only)	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Sight glasses (Unit 2 only)	Pressure boundary	Stainless steel	Air/gas	None	None required

NOTES: 1. Plant experience has identified the potential for loss of material due to erosion of the carbon steel pipe downstream of throttle valves due to localized cavitation.

TABLE 3.3-2 (continued)
COMPONENT COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Orifices	Pressure boundary Throttling	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Sight glasses	Pressure boundary	Glass	Treated water - other	None	None required

TABLE 3.3-2 (continued)
COMPONENT COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Component cooling water surge tanks [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Component cooling water pumps [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Component cooling water heat exchanger shells, includes channels and doors [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
			Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned Containment air	None	None required
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Outdoor	Loss of material	Systems and Structures Monitoring Program
			Containment air	Loss of material	Systems and Structures Monitoring Program Galvanic Corrosion Susceptibility Inspection Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program

TABLE 3.3-2 (continued)
COMPONENT COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Valves (Unit 1 only)	Pressure boundary	Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Outdoor Indoor - not air conditioned	None	None required
Sight glasses (Unit 1 only) [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Sight glasses (Unit 2 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Sight glasses	Pressure boundary	Glass	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-3
DEMINERALIZED MAKEUP WATER (UNIT 2 ONLY)

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Valves Piping/fittings	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
External Environment					
Valves Piping/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-4
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Cooling Water System					
Internal Environment					
Cooling water expansion tanks	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas	None	None required
Cooling water pumps	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Cooling water radiator headers	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Cooling water radiator tubes	Pressure boundary Heat transfer	Brass	Treated water - other	Loss of material Fouling	Chemistry Control Program
Valves Expansion joints	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Valves	Pressure boundary	Brass	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas	None	None required
Piping/fittings [VII H2.1.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Cooling Water System (continued)					
Internal Environment (continued)					
Tubing/fittings	Pressure boundary	Copper	Treated water - other	Loss of material	Chemistry Control Program
Tubing/fittings Thermowells Flexible hoses	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Flexible hoses	Pressure boundary	Rubber	Treated water - other	Cracking	Periodic Surveillance and Preventive Maintenance Program
Sight glasses	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas	None	None required
		Plexiglas	Treated water - other Air/gas	Cracking	Systems and Structures Monitoring Program

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Cooling Water System (continued)					
External Environment					
Cooling water expansion tanks [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Cooling water pumps [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Cooling water radiator headers [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Cooling water radiator tubes	Pressure boundary Heat transfer	Brass	Indoor - not air conditioned	None	None required
Cooling water radiator fins (Unit 1 only)	Heat transfer	Copper	Indoor - not air conditioned	Loss of material[1] Fouling[1]	Periodic Surveillance and Preventive Maintenance Program
Cooling water radiator fins (Unit 2 only)	Heat transfer	Aluminum	Indoor - not air conditioned	Loss of material[1] Fouling[1]	Periodic Surveillance and Preventive Maintenance Program
Valves Piping/fittings Expansion joints [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves	Pressure boundary	Brass	Indoor - not air conditioned	None	None required
Tubing/fittings	Pressure boundary	Copper Stainless steel	Indoor - not air conditioned	None	None required

NOTES: 1. Plant experience shows a history of loss of material and fouling due to corrosion on fins.

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Cooling Water System (continued)					
External Environment (continued)					
Flexible hoses	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
		Rubber	Indoor - not air conditioned	Cracking	Periodic Surveillance and Preventive Maintenance Program
Sight glasses [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Sight glasses	Pressure boundary	Plexiglas	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Air Start and Intake System					
Internal Environment					
Start-up air tanks (Unit 1 only)	Pressure boundary	Carbon steel	Air/gas	None	None required
Start-up air tanks (Unit 2 only)	Pressure boundary	Stainless steel	Air/gas	None	None required
Air start motors	Pressure boundary	Aluminum alloy	Air/gas	None	None required
Air start motor lubricators	Pressure boundary	Aluminum alloy	Air/gas	None	None required
Valves Piping/fittings Tubing/fittings Flexible hoses	Pressure boundary	Stainless steel	Air/gas	None	None required
Valves Piping/fittings Tubing/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Tubing/fittings	Pressure boundary	Copper alloy	Air/gas	None	None required
Start-up air strainer housings (Unit 1 only)	Pressure boundary	Carbon steel	Air/gas	None	None required
Start-up air strainer housings (Unit 2 only)	Pressure boundary	Stainless steel	Air/gas	None	None required
Strainer elements	Filtration	Stainless steel	Air/gas	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Air Start and Intake System (continued)					
Internal Environment (continued)					
Intake air filter housings [VII H2.3.1 - H2.3.2]	Pressure boundary	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Flexible hoses	Pressure boundary	Polyester/rubber Rubber	Air/gas	Cracking	Periodic Surveillance and Preventive Maintenance Program

Notes: 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Air Start and Intake System (continued)					
External Environment					
Start-up air tanks (Unit 1 only) [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Start-up air tanks (Unit 2 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Air start motors	Pressure boundary	Aluminum alloy	Indoor - not air conditioned	None	None required
Air start motor lubricators	Pressure boundary	Aluminum alloy	Indoor - not air conditioned	None	None required
Valves Piping/fittings Tubing/fittings Flexible hoses	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Valves Piping/fittings Tubing/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Tubing/fittings	Pressure boundary	Copper alloy	Indoor - not air conditioned	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Air Start and Intake System (continued)					
External Environment (continued)					
Start-up air strainer housings (Unit 1 only) [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Start-up air strainer housings (Unit 2 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Intake air filter housings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Flexible hoses	Pressure boundary	Polyester/rubber Rubber	Indoor - not air conditioned	Cracking	Periodic Surveillance and Preventive Maintenance Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel Stainless steel	Indoor - not air conditioned	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Exhaust System					
Internal Environment					
Exhaust silencer [VII H2.4.2]	Pressure boundary	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings [VII H2.4.1]	Pressure boundary	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Expansion joints	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Exhaust silencer [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Expansion joints	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

Notes: 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Fuel Oil System					
Internal Environment					
Diesel fuel oil storage tanks [VII H1.4.1]	Pressure boundary	Carbon steel	Fuel oil	Loss of material	Chemistry Control Program Periodic Surveillance and Preventive Maintenance Program
Diesel fuel oil storage tanks	Pressure boundary	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Diesel fuel oil day tanks [VII H2.5.1]	Pressure boundary	Carbon steel	Fuel oil	Loss of material	Chemistry Control Program Periodic Surveillance and Preventive Maintenance Program
Diesel fuel oil day tanks	Pressure boundary	Carbon steel	Air/gas	None	None required
Diesel fuel oil transfer pumps	Pressure boundary	Stainless steel	Fuel oil	Loss of material	Chemistry Control Program
Diesel fuel oil pumps (Priming, engine-driven, etc.)	Pressure boundary	Carbon steel	Fuel oil	Loss of material	Chemistry Control Program
Valves Piping/fittings	Pressure boundary	Carbon steel	Fuel oil	Loss of material	Chemistry Control Program
			Air/gas	None	None required

NOTES: 1. Loss of material was identified as a potential aging mechanism due to the potential for moisture contamination.

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Fuel Oil System (continued)					
Internal Environment (continued)					
Valves	Pressure boundary	Bronze	Fuel oil	Loss of material	Chemistry Control Program
Tubing/fittings	Pressure boundary	Copper	Fuel oil	Loss of material	Chemistry Control Program
Valves Piping/fittings Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Fuel oil	Loss of material	Chemistry Control Program
Tubing/fittings Filter housings	Pressure boundary	Carbon steel	Fuel oil	Loss of material	Chemistry Control Program
Orifices	Pressure boundary Throttling	Stainless steel	Fuel oil	Loss of material	Chemistry Control Program
Flexible hoses	Pressure boundary	Stainless steel	Fuel oil	Loss of material	Chemistry Control Program
Flame arrestors	Prevent spread of fire	Aluminum	Air/gas	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Fuel Oil System (continued)					
External Environment					
Diesel fuel oil storage tanks (Unit 1 only) [VII H1.4.2]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Diesel fuel oil storage tanks (Unit 2 only) [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Diesel fuel oil day tanks [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Diesel fuel oil transfer pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Diesel fuel oil pumps (Priming, engine-driven, etc.) [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings Tubing/fittings Filter housings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Tubing/fittings	Pressure boundary	Bronze Copper	Indoor - not air conditioned	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Fuel Oil System (continued)					
External Environment (continued)					
Valves [VII H1.2.1] Piping/fittings [VII H1.1.1] Tubing/fittings [VII I.1.1] Filter housings [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings Tubing/fittings Thermowells Flexible hoses	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned	None	None required
Flame arrestors	Prevent spread of fire	Aluminum	Outdoor	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures) [VII H1.2.2]	Pressure boundary	Carbon steel	Outdoor	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Lube Oil System					
Internal Environment					
Lube oil heat exchanger shells	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Lube oil heat exchanger channel headers (Unit 1 only)	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program
Lube oil heat exchanger channel headers (Unit 2 only)	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Lube oil heat exchanger tubesheets	Pressure boundary	Brass	Treated water - other	Loss of material	Chemistry Control Program
			Lubricating oil	None	None required
Lube oil heat exchanger tubes	Pressure boundary Heat transfer	Brass	Treated water - other	Loss of material Fouling	Chemistry Control Program
			Lubricating oil	None	None required
Lube oil pumps	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Valves Piping/fittings	Pressure boundary	Carbon steel	Lubricating oil Air/gas	None	None required
Valves	Pressure boundary	Bronze	Lubricating oil	None	None required
Valves Piping/fittings Tubing/fittings Sight glasses	Pressure boundary	Stainless steel	Lubricating oil Air/gas	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Lube Oil System (continued)					
Internal Environment (continued)					
Tubing/fittings Filter housings Expansion joints Thermowells	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Filter housings	Pressure boundary	Aluminum	Lubricating oil	None	None required
Filter elements	Filtration	Carbon steel Brass	Lubricating oil	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Lubricating oil Air/gas	None	None required
Flexible hoses	Pressure boundary	Stainless steel	Lubricating oil	None	None required
Sightglasses	Pressure boundary	Glass	Lubricating oil Air/gas	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Lube Oil System (continued)					
External Environment					
Lube oil heat exchangers [VII I.1.1]	Pressure boundary	Carbon steel Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Lube oil pumps [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings Tubing/fittings Expansion joints Filter housings Thermowells [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings Tubing/fittings Sight glasses	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Valves	Pressure boundary	Bronze	Indoor - not air conditioned	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned	None	None required
Filter housings	Pressure boundary	Aluminum	Indoor - not air conditioned	None	None required

TABLE 3.3-4 (continued)
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Lube Oil System (continued)					
External Environment (continued)					
Sight glasses	Pressure boundary	Glass	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-5
EMERGENCY COOLING CANAL

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Valves	Pressure boundary	Aluminum bronze	Raw water - salt water	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings	Pressure boundary	Carbon steel	Raw water - salt water	Loss of material	Periodic Surveillance and Preventive Maintenance Program
External Environment					
Valves	Pressure boundary	Aluminum bronze	Raw water - salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings	Pressure boundary	Carbon steel	Raw water - salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Embedded/encased	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Raw water - salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

TABLE 3.3-6
FIRE PROTECTION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
City water storage tanks	Pressure boundary	Carbon steel	Air/gas[1] Raw water - city water	Loss of material	Fire Protection Program
Reactor coolant pump oil collection tanks [VII G.7.1]	Pressure boundary	Carbon steel	Air/gas Lubricating oil	None	None required
Unit 1 cable spreading room halon tanks	Pressure boundary	Carbon steel	Air/gas	None	None required
Fire water pumps [VII G.6.2]	Pressure boundary	Cast iron	Raw water - city water	Loss of material	Fire Protection Program
Valves [VII G.6.2] Piping/fittings [VII G.6.1]	Pressure boundary	Cast iron	Raw water - city water	Loss of material	Fire Protection Program
Hydrants [VII G.6.2]	Pressure boundary	Cast iron	Raw water - city water	Loss of material	Fire Protection Program
Hydrants	Pressure boundary	Cast iron	Air/gas	Loss of material	Fire Protection Program
Valves [VII G.7.2] Piping/fittings [VII G.7.2]	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required

NOTES: 1. Potentially humid air due to water in the lower portions of the tanks.

TABLE 3.3-6 (continued)
FIRE PROTECTION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Valves [VII G.6.2] Piping/fittings	Pressure boundary	Copper alloy	Raw water - city water	Loss of material	Fire Protection Program
Valves [VII G.6.2] Piping/fittings [VII G.6.1] Tubing/fittings	Pressure boundary	Stainless steel	Raw water - city water	Loss of material	Fire Protection Program
Valves [VII G.6.2] Piping/fittings [VII G.6.1]	Pressure boundary	Carbon steel	Raw water - city water	Loss of material	Fire Protection Program Galvanic Corrosion Susceptibility Inspection Program
Piping/fittings	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Valves Tubing/fittings	Pressure boundary	Copper alloy	Air/gas	None	None required
Sprinkler heads	Pressure boundary Spray	Copper alloy	Raw water - city water	Loss of material	Fire Protection Program
			Air/gas	None	None required
Nozzles	Pressure boundary Spray	Galvanized carbon steel	Air/gas	None	None required
Hose station - nozzles	Pressure boundary Spray	Copper alloy	Air/gas	None	None required
Hose station - fittings	Pressure boundary	Copper alloy	Air/gas	None	None required

TABLE 3.3-6 (continued)
FIRE PROTECTION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Flexible hoses	Pressure boundary	Stainless steel	Lubricating oil Air/gas	None	None required
Drip pans Enclosures	Prevent spread of fire	Stainless steel	Lubricating oil Air/gas	None	None required
Vortex breakers	Vortex prevention	Carbon steel	Raw water - city water	Loss of material	Fire Protection Program
Filters [VII G.6.2]	Filtration	Copper alloy	Raw water - city water	Loss of material	Fire Protection Program
Filters [VII G.6.2]	Filtration	Stainless steel	Raw water - city water	Loss of material	Fire Protection Program
Orifices	Pressure boundary Throttling	Stainless steel	Raw water - city water	Loss of material	Fire Protection Program
Flame arrestors	Prevent spread of fire	Stainless steel Aluminum	Lubricating oil Air/gas	None	None required
Sight glasses	Pressure boundary	Carbon steel Glass	Lubricating oil Air/gas	None	None required

TABLE 3.3-6 (continued)
FIRE PROTECTION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
City water storage tanks [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Fire Protection Program
Reactor coolant pump oil collection tanks [VII I.1.1]	Pressure boundary	Carbon steel	Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 1 cable spreading room halon tanks [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Fire Protection Program
Fire water pumps	Pressure boundary	Cast iron	Outdoor	Loss of material	Fire Protection Program
Valves Piping/fittings Hydrants	Pressure boundary	Cast iron	Outdoor Buried	Loss of material	Fire Protection Program
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Fire Protection Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Piping/fittings Sight glasses [VII I.1.1]	Pressure boundary	Carbon steel	Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Fire Protection Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program

TABLE 3.3-6 (continued)
FIRE PROTECTION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Valves Piping/fittings Tubing/fittings Hose station - fittings	Pressure boundary	Copper alloy	Outdoor Indoor - not air conditioned	None	None required
Valves Piping/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Valves Tubing/fittings Flexible hoses	Pressure boundary	Stainless steel	Outdoor	None	None required
Piping/fittings	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Piping/fittings	Pressure boundary	Cast iron	Embedded/Encased	None	None required
			Indoor - not air conditioned	Loss of material	Fire Protection Program
Nozzles	Pressure boundary Spray	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Hose station - nozzles Sprinkler heads	Pressure boundary Spray	Copper alloy	Outdoor Indoor - not air conditioned	None	None required
Flexible hoses	Pressure boundary	Stainless steel	Containment air	None	None required
Flame arrestors	Prevent spread of fire	Stainless steel Aluminum	Containment air	None	None required
Drip pans Enclosures	Prevent spread of fire	Stainless steel	Containment air	None	None required

TABLE 3.3-6 (continued)
FIRE PROTECTION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Orifices	Pressure boundary Throttling	Stainless steel	Outdoor	None	None required
Sight glasses	Pressure boundary	Glass	Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Containment air Outdoor Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-7
FUEL POOL COOLING

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Spent fuel pool pumps	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Spent fuel pool heat exchanger tubes[1] (Unit 1 only)	Pressure boundary	Stainless steel	Treated water - borated (inside diameter)	Loss of material	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material	Chemistry Control Program
Spent fuel pool heat exchanger tubes (Unit 2 only)	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Spent fuel pool heat exchanger tubesheets	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
			Treated water - other	Loss of material	Chemistry Control Program
Spent fuel pool heat exchanger channel cylinders and flanges, channel cover facings	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program
Spent fuel pool heat exchanger shell and tube supports (Unit 2 only) [VII A3.4.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program

NOTES: 1. Heat transfer is not a license renewal intended function for the Unit 1 spent fuel pool heat exchangers (Subsection 2.3.3.7)

TABLE 3.3-7 (continued)
FUEL POOL COOLING

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Valves Piping/fittings Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Treated water - borated	Loss of material	Chemistry Control Program

TABLE 3.3-7 (continued)
FUEL POOL COOLING

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Spent fuel pool pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Spent fuel pool heat exchanger channel cylinders and flanges	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Spent fuel pool heat exchanger channel covers [VII A3.4.2]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Spent fuel pool heat exchanger shells (Unit 2 only) [VII A3.4.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Piping/fittings Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures) [VII A3.1.1, A3.3.2, A3.4.3, A3.6.1]	Pressure boundary	Carbon steel	Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-8
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Instrument air receivers [VII D.3.1]	Pressure boundary	Carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Instrument air dryers [VII D.6.1]	Pressure boundary	Carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Instrument air compressor cooler tubes	Pressure boundary Heat transfer	Copper	Treated water - other	Loss of material Fouling	Chemistry Control Program
			Air/gas[1] (wetted)	Loss of material Fouling	Periodic Surveillance and Preventive Maintenance Program
Instrument air compressor (A and B) cooler tube sheets	Pressure boundary	Copper alloy	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Instrument air compressor (C and D) cooler tube sheets	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Galvanic Corrosion Susceptibility Inspection Program Chemistry Control Program
			Air/gas[1] (wetted)	Loss of material	Galvanic Corrosion Susceptibility Inspection Program Periodic Surveillance and Preventive Maintenance Program

NOTES: 1. Instrument air upstream of the instrument air dryers is considered to be wetted (moist).

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Instrument air compressor cooler shells	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Valves [VII D.2.1, D.4.1] Silencers Accumulators	Pressure boundary	Carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Strainer housings [VII D.5.1]	Pressure boundary	Carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program Galvanic Corrosion Susceptibility Inspection Program
Filters	Pressure boundary Filtration	Carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Filter housings Strainer housings	Pressure boundary	Stainless steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Filters	Filtration	Stainless steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

NOTES: 1. Instrument air upstream of the instrument air dryers is considered to be wetted (moist).

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Valves	Pressure boundary	Copper alloy Brass Bronze	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Valves	Pressure boundary	Plastic	Air/gas[1] (wetted)	Cracking	Systems and Structures Monitoring Program
Valves Tubing/fittings Thermowells Flexible hoses	Pressure boundary	Stainless steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings [VII D.1.1]	Pressure boundary	Carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program Galvanic Corrosion Susceptibility Inspection Program
Piping/fittings	Pressure boundary	Galvanized carbon steel	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program Galvanic Corrosion Susceptibility Inspection Program
Flexible hoses	Pressure boundary	Rubber	Air/gas[1] (wetted)	Cracking	Systems and Structures Monitoring Program

NOTES: 1. Instrument air upstream of the instrument air dryers is considered to be wetted (moist).

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Sight glasses	Pressure boundary	Copper alloy	Air/gas[1] (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
		Glass	Air/gas[1] (wetted)	None	None required
Valves	Pressure boundary	Copper alloy Brass Bronze Aluminum	Air/gas	None	None required
Valves Piping/fittings Accumulators	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Piping/fittings Tubing/fittings Thermowells Flexible hoses Rupture discs Filter housings Strainers	Pressure boundary	Stainless steel	Air/gas	None	None required
Piping/fittings Accumulators	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required

NOTES: 1. Instrument air upstream of the instrument air dryers is considered to be wetted (moist).

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Tubing/fittings	Pressure boundary	Copper	Air/gas	None	None required
Filters	Filtration	Stainless steel	Air/gas	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Air/gas	None	None required

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Instrument air receivers [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Instrument air dryers [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Instrument air compressor cooler shells [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Outdoor Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Flexible hoses Piping/fittings Tubing/fittings Filter housings Strainer housings	Pressure boundary	Stainless steel	Indoor - not air conditioned Outdoor	None	None required
Valves	Pressure boundary	Copper alloy Brass Bronze Aluminum	Indoor - not air conditioned Outdoor	None	None required

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Valves	Pressure boundary	Plastic	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Accumulators [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Outdoor	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Accumulators	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Filters Silencers [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Filters [VII I.1.1]	Pressure boundary Filtration	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned Outdoor	None	None required
Rupture discs	Pressure boundary	Stainless steel	Outdoor	None	None required
Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Flexible hoses	Pressure boundary	Rubber	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program

TABLE 3.3-8 (continued)
INSTRUMENT AIR

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Sight glasses	Pressure boundary	Copper alloy Glass	Indoor - not air conditioned	None	None required
Piping/fittings	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned Outdoor	None	None required
Tubing/fittings	Pressure boundary	Copper	Outdoor	None	None required
Strainer housings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Outdoor Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program
Bolting (mechanical closures)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required

TABLE 3.3-9
INTAKE COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Intake cooling water pumps	Pressure boundary	Stainless steel Aluminum bronze	Raw water - salt water	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Basket strainers (shell) [VII C1.6.1]	Pressure boundary	Carbon steel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Basket strainers (screen)	Filtration	Stainless steel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Valves (main process lines) [VII C1.2.1]	Pressure boundary	Stainless steel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Valves (main process lines)	Pressure boundary	Carbon steel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Piping/fittings (main process lines) [VII C1.1.1]	Pressure boundary	Stainless steel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Piping/fittings (main process lines)	Pressure boundary	Carbon steel	Raw water - salt water Air/gas[1]	Loss of material	Intake Cooling Water Inspection Program
Valves (strainer bypass, strainer backwash, and spent fuel pool makeup)	Pressure boundary	Carbon steel Cast iron (Unit 1 only)	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
Piping/fittings (strainer bypass, strainer backwash, and spent fuel pool makeup) [VII C1.1.1]	Pressure boundary	Stainless steel	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program

NOTES 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.

TABLE 3.3-9 (continued)
INTAKE COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Piping/fittings (strainer bypass, strainer backwash, and spent fuel pool makeup)	Pressure boundary	Stainless steel	Air/gas	None	None required
		Carbon steel	Raw water - salt water Air/gas[1]	Loss of material	Systems and Structures Monitoring Program
Valves (vents, drains, and instrumentation) [VII C1.2.1]	Pressure boundary	Stainless steel Aluminum bronze Bronze	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
Valves (vents, drains, and instrumentation)	Pressure boundary	Carbon steel Monel	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
Piping/fittings (vents, drains, and instrumentation) [VII C1.1.1]	Pressure boundary	Stainless steel Aluminum bronze	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
Piping/fittings (vents, drains, and instrumentation)	Pressure boundary	Carbon steel Aluminum brass Monel	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
		Fiberglass (Unit 2 only)	Raw water - salt water	Cracking	Systems and Structures Monitoring Program
Tubing/fittings	Pressure boundary	Stainless steel	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
Thermowells	Pressure boundary	Monel	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program

NOTES 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.

TABLE 3.3-9 (continued)
INTAKE COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Orifices (Unit 1 only) [VII C1.4.1]	Pressure boundary Throttling	Stainless steel	Raw water - salt water	Loss of material	Systems and Structures Monitoring Program
Orifices	Pressure boundary Throttling	Titanium	Raw water - salt water	None	None required
Orifices	Pressure boundary Throttling	Monel	Raw water - salt water	Loss of material	Intake Cooling Water Inspection Program
Expansion joints (Unit 1 only)	Pressure boundary	Rubber	Raw water - salt water	Cracking	Periodic Surveillance and Preventive Maintenance Program
Expansion joints (Unit 2 only)	Pressure boundary	Stainless steel	Raw water - salt water	Loss of material	Periodic Surveillance and Preventive Maintenance Program

TABLE 3.3-9 (continued)
INTAKE COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Intake cooling water pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	Loss of material[1]	Periodic Surveillance and Preventive Maintenance Program
			Raw water - salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
		Aluminum bronze	Indoor - not air conditioned	None	None required
			Raw water - salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Basket strainers (shell) [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves	Pressure boundary	Stainless steel Bronze	Outdoor Indoor - not air conditioned	None	None required
		Monel	Outdoor	None	None required
		Aluminum bronze	Indoor - not air conditioned	None	None required
Valves (Unit 1 only)	Pressure boundary	Cast iron	Outdoor	Loss of material	Systems and Structures Monitoring Program

NOTES: 1. Plant experience has identified the potential for intake cooling water pump loss of material due to pitting.

TABLE 3.3-9 (continued)
INTAKE COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Piping/fittings [VII C1.1.2]	Pressure boundary	Carbon steel	Buried	Loss of material	Intake Cooling Water Inspection Program
Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor (ECCS pipe tunnel)	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Piping/fittings (discharge)	Pressure boundary	Carbon steel	Raw water - salt water (submerged)	Loss of material	Intake Cooling Water Inspection Program
Piping/fittings	Pressure boundary	Carbon steel	Embedded/encased	None	None required
		Stainless steel	Outdoor Indoor - not air conditioned Buried (Unit 1 only)	None	None required
		Monel	Outdoor Indoor - not air conditioned	None	None required
		Aluminum brass	Outdoor	None	None required
		Aluminum bronze	Indoor - not air conditioned	None	None required
Piping/fittings (Unit 2 only)	Pressure boundary	Fiberglass	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Orifices (Unit 1 only)	Pressure boundary Throttling	Stainless steel	Outdoor	None	None required

TABLE 3.3-9 (continued)
INTAKE COOLING WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Orifices	Pressure boundary Throttling	Monel Titanium	Outdoor Indoor - not air conditioned	None	None required
Tubing/fittings	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned	None	None required
Thermowells	Pressure boundary	Monel	Outdoor Indoor - not air conditioned	None	None required
Expansion joints (Unit 1 only)	Pressure boundary	Rubber	Indoor - not air conditioned	Cracking	Periodic Surveillance and Preventive Maintenance Program
Expansion joints (Unit 2 only)	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned Buried	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program
		Stainless steel Monel	Indoor - not air conditioned	None	None required
			Raw water - salt water (submerged)	Loss of mechanical closure integrity	Periodic Surveillance and Preventive Maintenance Program

TABLE 3.3-10
MISCELLANEOUS BULK GAS SUPPLY

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Vessels	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Piping/fittings	Pressure boundary	Carbon steel Stainless steel	Air/gas	None	None required
Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
External Environment					
Vessels [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves [VII I.1.1] Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-11
PRIMARY MAKEUP WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Primary water storage tank (Unit 2 only)	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
			Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Primary water pumps (Unit 2 only)	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Piping (Unit 1 only)	Pressure boundary	Nickel alloy	Treated water - other	Loss of material	Chemistry Control Program
Valves (Unit 2 only)	Pressure boundary	Copper alloy	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Hose station - fittings (Unit 2 only)	Pressure boundary	Copper alloy	Air/gas	None	None required
Hose station - nozzles (Unit 2 only)	Pressure boundary Spray	Copper alloy	Air/gas	None	None required
Orifices (Unit 2 only)	Pressure boundary Throttling	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Expansion joints (Unit 2 only)	Pressure boundary	Rubber	Treated water - other	Cracking	Systems and Structures Monitoring Program

NOTES: 1. Potentially humid air due to water in the lower portions of the tanks.

TABLE 3.3-11 (continued)
PRIMARY MAKEUP WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Vortex breaker (Unit 2 only)	Vortex prevention	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program

TABLE 3.3-11 (continued)
PRIMARY MAKEUP WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Primary water storage tank (Unit 2 only) [VII I.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Primary water storage pumps (Unit 2 only)	Pressure boundary	Stainless steel	Outdoor	None	None required
Valves Piping/fittings	Pressure boundary	Stainless steel	Outdoor Containment air Indoor - not air conditioned	None	None required
Piping/fittings	Pressure boundary	Stainless steel	Embedded/encased	None	None required
Piping/fittings	Pressure boundary	Stainless steel	Outdoor (ECCS pipe tunnel)	Loss of material[1] Cracking[1]	Periodic Surveillance and Preventive Maintenance Program
Piping (Unit 1 only)	Pressure boundary	Nickel alloy	Containment air Indoor - not air conditioned	None	None required
Tubing/fittings	Pressure boundary	Stainless steel	Outdoor	None	None required
Valves (Unit 2 only) Hose station - fittings (Unit 2 only)	Pressure boundary	Copper alloy	Containment air Indoor - not air conditioned	None	None required
Hose station - ozzles (Unit 2 only)	Pressure boundary Spray	Copper alloy	Containment air Indoor - not air conditioned	None	None required

NOTES: 1. Plant experience has identified the potential for SCC and loss of material due to pitting corrosion on stainless steel components located in the ECCS pipe tunnel.

TABLE 3.3-11 (continued)
PRIMARY MAKEUP WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Expansion joints (Unit 2 only)	Pressure boundary	Rubber	Outdoor	Cracking	Systems and Structures Monitoring Program
Orifices	Pressure boundary Throttling	Stainless steel	Outdoor	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-12
SAMPLING

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Valves Tubing/fittings	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program
External Environment					
Valves Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

NOTES: 1. Portions of the system >140°F are potentially susceptible to SCC (see Appendix C).

TABLE 3.3-13
SERVICE WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Yard sump pump 2A (Unit 2 only)	Pressure boundary	Stainless steel	Raw water - drains	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Valves Piping/fittings	Pressure boundary	Stainless steel	Raw water - city water	None[1]	None required
Valves (Unit 2 only)	Pressure boundary	Copper alloy	Air/gas (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Piping/fittings (Unit 2 only)	Pressure boundary	Galvanized carbon steel	Air/gas (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

NOTES: 1. Plant experience confirmed by volumetric examinations have indicated that there are no aging effects requiring management.

TABLE 3.3-13 (continued)
SERVICE WATER

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Yard sump pump 2A (Unit 2 only)	Pressure boundary	Stainless steel	Raw water - drains (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
			Outdoor (ECCS pipe tunnel)	Loss of material[1] Cracking[1]	Periodic Surveillance and Preventive Maintenance Program
Valves Piping/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Valves (Unit 2 only)	Pressure boundary	Copper alloy	Outdoor	None	None required
Piping/fittings (Unit 2 only)	Pressure boundary	Galvanized carbon steel	Outdoor	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

NOTES: 1. Plant experience has identified the potential for SCC and loss of material due to pitting corrosion on stainless steel components located in the ECCS pipe tunnel.

TABLE 3.3-14
TURBINE COOLING WATER (UNIT 1 ONLY)

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Instrument air compressor cooling water head tank	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas	None	None required
Instrument air compressor cooling water recirculation pump	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Instrument air fan cooler heads	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Instrument air fan cooler tubes	Pressure boundary Heat transfer	Brass	Treated water - other	Loss of material Fouling	Chemistry Control Program
Valves Piping/fittings Sight glasses	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Thermowells	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Sight glasses	Pressure boundary	Glass	Treated water - other	None	None required

TABLE 3.3-14 (continued)
TURBINE COOLING WATER (UNIT 1 ONLY)

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Instrument air compressor cooling water head tank [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Instrument air compressor cooling water recirculation pump [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Instrument air fan cooler heads [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Instrument air fan cooler tubes	Pressure boundary Heat transfer	Brass	Indoor - not air conditioned	None	None required
Instrument air fan cooler fins	Heat transfer	Brass	Indoor - not air conditioned	Loss of material[1] Fouling[1]	Systems and Structures Monitoring Program
Valves Piping/fittings Sight glasses [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Sight glasses	Pressure boundary	Glass	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

NOTES: 1. Plant experience shows a history of loss of material and fouling due to corrosion on fins.

TABLE 3.3-15
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Control Room Air Conditioning					
Internal Environment					
Control room air conditioner heat exchanger condenser shell, vents, drains, baffles, and support plates (Unit 2 only)	Pressure boundary	Carbon steel	Air/gas	None	None required
Control room air conditioner heat exchanger channel, vents, and drains (Unit 2 only)	Pressure boundary	Copper nickel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Control room air conditioner heat exchanger tubes (Unit 2 only)	Pressure boundary Heat transfer	Copper nickel	Treated water - other (inside diameter)	Loss of material Fouling	Chemistry Control Program
			Air/gas (outside diameter)	None	None required
Control room air conditioner heat exchanger tubesheets (Unit 2 only)	Pressure boundary	Copper nickel	Treated water - other	Loss of material	Chemistry Control Program
			Air/gas	None	None required
Valves (Unit 2 only)	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program
Piping/fittings (Unit 2 only) [VII F1.3.1]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Control Room Air Conditioning (continued)					
Internal Environment (continued)					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Valves Piping/fittings Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Air/gas	None	None required
Piping/fittings (Unit 2 only)	Pressure boundary	Stainless steel	Treated water - other	Loss of material	Chemistry Control Program
Tubing/fittings	Pressure boundary	Copper	Air/gas	None	None required
Filter housings [VII F1.4.1]	Pressure boundary	Carbon steel	Air/gas	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Ducts [VII F1.1.2]	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Orifices	Pressure boundary Throttling	Galvanized carbon steel	Air/gas	None	None required
Flexible connections [VII F1.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Control Room Air Conditioning (continued)					
External Environment					
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Tubing/fittings	Pressure boundary	Copper	Indoor - not air conditioned	None	None required
Control room air conditioner heat exchanger condenser shell, vents, drains (Unit 2 only) [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Control room air conditioner heat exchanger channel, vents, drains (Unit 2 only)	Pressure boundary	Copper nickel	Indoor - not air conditioned	None	None required
Filter housings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Control Room Air Conditioning (continued)					
External Environment (continued)					
Orifices	Pressure boundary Throttling	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Emergency Core Cooling Systems Area Ventilation					
Internal Environment					
Valves Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Air/gas	None	None required
Filter housings Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Orifices	Pressure boundary Throttling	Galvanized carbon steel	Air/gas	None	None required
Flexible connections [VII F2.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Emergency Core Cooling Systems Area Ventilation (continued)					
External Environment					
Valves Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Filter housings	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Orifices	Pressure boundary Throttling	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Fuel Handling Building Ventilation (Unit 2 only)					
Internal Environment					
Valves Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Flexible connections [VII F2.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program
External Environment					
Valves Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Miscellaneous Ventilation (Unit 1 only)					
Internal Environment					
Filter housings Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Flexible connections [VII F2.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program
External Environment					
Filter housings Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Reactor Auxiliary Building Electrical and Battery Room Ventilation					
Internal Environment					
Shell for HVS-5A and HVS-5B plenum and filters (Unit 1 only)	Pressure boundary	Galvanized carbon steel	Air/gas[1]	Loss of material[2]	Periodic Surveillance and Preventive Maintenance Program
Internal structural supports for HVS-5A and HVS-5B plenum and fans	Structural support	Galvanized carbon steel	Air/gas[1]	Loss of material[2]	Periodic Surveillance and Preventive Maintenance Program
Internal structural supports for HVS-5A and HVS-5B plenum and fans [VII F2.4.1]	Structural support	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Filter holding frames [VII F2.4.1]	Pressure boundary	Stainless steel	Air/gas	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Flexible connections [VII F2.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program
Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required

NOTES: 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.
2. Plant experience has identified the potential for loss of material due to general corrosion.

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Reactor Auxiliary Building Electrical and Battery Room Ventilation (continued)					
External Environment					
Unit 1 shell (housing) for HVS-5A and HVS-5B filters Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Filter holding frames	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Reactor Auxiliary Building Main Supply and Exhaust					
Internal Environment					
Shell for HVS-4A and HVS-4B plenum and filters	Pressure boundary	Galvanized carbon steel	Air/gas[1]	Loss of material[2]	Periodic Surveillance and Preventive Maintenance Program
Internal structural supports for HVS-4A and HVS-4B plenum and fans	Structural support	Galvanized carbon steel	Air/gas[1]	Loss of material[2]	Periodic Surveillance and Preventive Maintenance Program
Internal structural supports for HVS-4A and HVS-4B plenum and fans [VII F2.4.1]	Structural support	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Filter holding frames [VII F2.4.1]	Pressure boundary	Stainless steel	Air/gas	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required
Flexible connections [VII F2.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program
Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required

NOTES:
1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.
2. Plant experience has identified the potential for loss of material due to general corrosion.

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Reactor Auxiliary Building Main Supply and Exhaust (continued)					
External Environment					
Shell (housing) for HVS-4A and HVS-4B filters	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Filter holding frames	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Shield Building Ventilation					
Internal Environment					
Valves Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Air/gas	None	None required
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Filter housings [VII F2.4.1]	Pressure boundary	Carbon steel	Air/gas[1]	Loss of material	Periodic Surveillance and Preventive Maintenance Program
Demisters	Moisture removal	Stainless steel	Air/gas	None	None required
Flexible connections [VII F2.1.3]	Pressure boundary	Rubber coated cloth	Air/gas	Cracking	Systems and Structures Monitoring Program
Tubing/fittings	Pressure boundary	Copper	Air/gas	None	None required
Ducts	Pressure boundary	Galvanized carbon steel	Air/gas	None	None required

NOTES: 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.

TABLE 3.3-15 (continued)
VENTILATION

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Shield Building Ventilation (continued)					
External Environment					
Valves Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Tubing/fittings	Pressure boundary	Copper	Indoor - not air conditioned	None	None required
Filter housings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Flexible connections	Pressure boundary	Rubber coated cloth	Indoor - not air conditioned	Cracking	Systems and Structures Monitoring Program
Ducts	Pressure boundary	Galvanized carbon steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned	None	None required

TABLE 3.3-16
WASTE MANAGEMENT

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Valves Piping/fittings	Pressure boundary	Stainless steel	Raw water - drains Air/gas	None	None required
Piping	Pressure boundary	Nickel alloy	Air/gas	None	None required
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Cleanout plugs	Pressure boundary	Carbon steel	Air/gas[1]	Loss of material	Systems and Structures Monitoring Program
Cleanout plugs	Pressure boundary	Bronze	Air/gas	None	None required
Strainers	Pressure boundary	Stainless steel	Air/gas	None	None required
Strainer elements	Filtration	Copper alloy	Air/gas	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Air/gas	None	None required

NOTES: 1. Internal air/gas environment is outside air with uncontrolled humidity and temperature.

TABLE 3.3-16 (continued)
WASTE MANAGEMENT

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Valves Piping/fittings	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Piping/fittings	Pressure boundary	Stainless steel	Embedded/encased	None	None required
Piping	Pressure boundary	Nickel alloy	Containment air Indoor - not air conditioned	None	None required
Valves Piping/fittings [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Cleanout plugs [VII I.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Cleanout plugs	Pressure boundary	Bronze	Indoor - not air conditioned	None	None required
Strainers	Pressure boundary	Stainless steel	Indoor - not air conditioned Embedded/encased	None	None required
Strainer elements	Filtration	Copper alloy	Indoor - not air conditioned	None	None required

TABLE 3.3-16 (continued)
WASTE MANAGEMENT

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures)	Pressure boundary	Stainless steel	Indoor - not air conditioned Containment air	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Indoor - not air conditioned Containment air	None	None required
			Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

3.4 STEAM AND POWER CONVERSION SYSTEMS

The following systems are included in this section:

- Main Steam, Auxiliary Steam, and Turbine
- Main Feedwater and Steam Generator Blowdown
- Auxiliary Feedwater and Condensate

Subsection 2.3.4 provides a description of these systems and identifies the components requiring an aging management review for license renewal. Appendix C contains the process that identified the aging effects requiring management for non-Class 1 components.

The Steam and Power Conversion Systems scoping, screening, and aging management review results were compared to the GALL Report [Reference 3.4-1]. The following components/commodity groups identified in the GALL Report do not require an aging management review for St. Lucie Units 1 and 2 for the reasons noted.

- Turbine Piping and Fittings (VIII A.1) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.
- Extraction Steam (VIII C) - This system does not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore is not within the scope of license renewal.
- Feedwater Pumps (VIII D1.3) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.
- Condensate Systems (VIII E) - The only components from these systems that perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 are the condensate storage tanks and associated components that support the Auxiliary Feedwater Systems. The condensate storage tanks and associated components are included with Auxiliary Feedwater on Table 3.4-3.
- Blowdown Pumps (VIII F.3) - The St. Lucie Unit 1 and 2 designs do not include these components.
- Blowdown Heat Exchangers (VIII F.4) - These components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.

For component/commodity groups that require an aging management review that are also included in the GALL Report, differences in materials and environments are described in Subsection 3.4.1. Aging management programs that are consistent with the GALL Report and those that are plant specific are identified in Subsection 3.4.4 and detailed in the appropriate subsections of Appendix B. Component/commodity groups identified in Tables 3.4-1 through 3.4-3 provide a GALL Report reference in brackets, where applicable, indicating that the St. Lucie Unit 1 and 2 component/commodity group, material, and

environment are the same. If no GALL Report reference is included, the component/commodity group is plant specific.

3.4.1 MATERIALS AND ENVIRONMENT

The Steam and Power Conversion Systems are exposed to internal environments of treated water - secondary, lubricating oil, and air/gas; and external environments of outdoor, indoor - not air conditioned, containment air, buried, embedded/encased, and potential borated water leaks (see Tables 3.0-1 and 3.0-2). For corresponding component/commodity groups included in the GALL Report, FPL identified air/gas and lubricating oil as additional internal environments for valves, piping, and fittings; and air/gas as an additional internal environment for the condensate storage tanks at St. Lucie Units 1 and 2.

The tanks, pumps, heat exchangers, piping, tubing, valves, and associated components and commodity groups for these systems are constructed of carbon steel, stainless steel, nickel alloy, and glass. The components and commodity groups, their intended functions, the materials, and environments for the Steam and Power Conversion Systems are summarized in Tables 3.4-1 through 3.4-3. For corresponding component/commodity groups included in the GALL Report, FPL identified stainless steel as an additional material for valves, piping, and fittings at St. Lucie Units 1 and 2.

The only parts of systems or components considered to be inaccessible for inspection are those that are buried or embedded/encased in concrete. These environments are addressed as part of the aging management review process; see Table 3.0-2, "External Service Environments." Potential aging effects associated with these environments are reviewed and those aging effects requiring management are identified along with the credited aging management program(s). All other parts of systems and components can be accessed, if required. The only Steam and Power Conversion System containing inaccessible piping parts is Auxiliary Feedwater, which contains sections of buried and embedded stainless steel piping.

3.4.2 AGING EFFECTS REQUIRING MANAGEMENT

The aging effects requiring management and the programs and activities that manage the aging effects for each applicable environment and material combination are provided in Tables 3.4-1 through 3.4-3. The aging effects requiring management for each system are summarized in the following paragraphs.

Main Steam, Auxiliary Steam, and Turbines - The aging effects requiring management are loss of material for carbon steel, stainless steel, and nickel alloy components, and cracking for certain stainless steel and nickel alloy components. The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity. Note that fatigue of main steam piping and fittings is identified in the GALL Report as an aging effect. At St. Lucie, fatigue is a TLAA and is addressed in Subsection 4.3.2.

Main Feedwater and Steam Generator Blowdown - The aging effects requiring management are loss of material for carbon steel and stainless steel components, and cracking for certain stainless steel components. The aging effect requiring management for carbon steel mechanical closure bolting is loss of mechanical closure integrity. Note that fatigue of main feedwater piping and fittings is identified in the GALL Report as an aging effect. At St. Lucie, fatigue is a TLAA and is addressed in Subsection 4.3.2.

Auxiliary Feedwater and Condensate - The aging effects requiring management are loss of material for carbon steel and stainless steel components. Note that fatigue of auxiliary feedwater piping and fittings is identified in the GALL Report as an aging effect. At St. Lucie, fatigue is a TLAA and is addressed in Subsection 4.3.2.

3.4.3 OPERATING EXPERIENCE

3.4.3.1 INDUSTRY EXPERIENCE

A review of industry operating history and a review of NRC generic communications were performed to validate the set of aging effects that require management. The industry correspondence that was reviewed for operating experience related to Steam and Power Conversion Systems includes the following:

- NRC Bulletin 79-13, "Cracking in Feedwater System Piping"
- NRC Bulletin 82-02, "Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of PWR Plants"
- NRC Bulletin 87-01, "Thinning of Pipe Walls in Nuclear Power Plants"
- NRC Generic Letter 79-20, "Information Requested on PWR Feedwater Lines"
- NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants"
- NRC Generic Letter 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning"
- NRC Generic Letter 91-17, "Generic Issue 29, Bolting Degradation or Failure in Nuclear Power Plants"
- NRC Information Notice 80-29, "Broken Studs on Terry Turbine Steam Inlet Flanges"
- NRC Information Notice 81-04, "Cracking in Main Steam Lines"
- NRC Information Notice 81-38, "Potentially Significant Equipment Failures Resulting from Contamination of Air-Operated Systems"
- NRC Information Notice 82-22, " Failures in Turbine Exhaust Lines"
- NRC Information Notice 84-32, "Auxiliary Feedwater Sparger and Pipe Hanger Damage"
- NRC Information Notice 84-87, "Piping Thermal Deflection Induced by Stratified Flow"
- NRC Information Notice 86-106, "Feedwater Line Break"
- NRC Information Notice 87-36, "Significant Unexpected Erosion of Feedwater Lines"
- NRC Information Notice 88-17, "Summary of Responses to NRC Bulletin 87-01, Thinning of Pipe Walls in Nuclear Power Plants"
- NRC Information Notice 88-37, "Flow Blockage of Cooling Water to Safety System Components"
- NRC Information Notice 88-87, "Pump Wear and Foreign Objects in Plant Piping Systems"
- NRC Information Notice 89-01, "Valve Body Erosion"
- NRC Information Notice 90-65, "Recent Orifice Plate Problems"

- NRC Information Notice 91-18, "High-Energy Piping Failures Caused by Wall Thinning"
- NRC Information Notice 91-38, "Thermal Stratification in Feedwater System Piping"
- NRC Information Notice 93-20, "Thermal Fatigue Cracking of Feedwater Piping to Steam Generators"
- NRC Information Notice 93-21, "Summary of Observations Compiled During Engineering Audits or Inspections of Licensee Erosion/Corrosion Programs"
- NRC Information Notice 95-11, "Failure of Condensate Piping Because of Erosion/Corrosion at a Flow-Straightening Device"
- NRC Information Notice 97-84, " Rupture in Extraction Steam Piping as a Result of Flow-Accelerated Corrosion"
- NRC Information Notice 99-19, "Rupture of the Shell Side of a Feedwater Heater at the Point Beach Plant"
- NRC Information Notice 2001-09, "Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor"

No aging effects requiring management were identified from the above documents beyond those already identified in Subsection 3.4.2.

3.4.3.2 PLANT-SPECIFIC EXPERIENCE

St. Lucie Units 1 and 2 operating experience was also reviewed to validate the identified aging effects requiring management. This review included a survey of St. Lucie non-conformance reports, licensee event reports, and condition reports for any documented instances of Steam and Power Conversion Systems component aging, in addition to interviews with responsible engineering personnel. No aging effects requiring management were identified from this review beyond those identified in Subsection 3.4.2.

3.4.4 CONCLUSION

The review of industry information, NRC generic communications, and St. Lucie Units 1 and 2 operating experience identified no additional aging effects beyond those discussed in Subsection 3.4.2. Tables 3.4-1 through 3.4-3 contain the results of the aging management review for the Steam and Power Conversion Systems and summarize the aging effects requiring management.

The aging effects requiring management are adequately managed by the following programs:

St. Lucie programs consistent with the corresponding programs in the GALL Report:

- Boric Acid Wastage Surveillance Program
- Chemistry Control Program
- Flow Accelerated Corrosion Program

St. Lucie plant-specific programs:

- Galvanic Corrosion Susceptibility Inspection Program
- Periodic Surveillance and Preventive Maintenance Program
- Systems and Structures Monitoring Program
- Condensate Storage Tank Cross Connect Buried Pipe Inspection
- Pipe Wall Thinning Inspection Program

Based on the evaluations provided in Appendix B for the programs listed above, aging effects are adequately managed so that the intended functions of the Steam and Power Conversion Systems components listed in Tables 3.4-1 through 3.4-3 are maintained consistent with the St. Lucie Units 1 and 2 CLBs for the period of extended operation.

3.4.5 REFERENCES

3.4-1 NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," U. S. Nuclear Regulatory Commission, April 2001.

TABLE 3.4-1
MAIN STEAM, AUXILIARY STEAM, AND TURBINE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Valves [VIII A.2.1] [VIII B1.2.1] Piping/fittings [VIII B1.1.1 - B1.1.6]	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Flow Accelerated Corrosion Program Galvanic Corrosion Susceptibility Inspection Program
Valves Tubing/fittings Thermowells	Pressure boundary	Stainless steel	Treated water - secondary	Loss of material Cracking	Chemistry Control Program
Steam traps	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Flow Accelerated Corrosion Program
		Stainless steel	Treated water - secondary	Loss of material Cracking	Chemistry Control Program
Strainer housings	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Flow Accelerated Corrosion Program Galvanic Corrosion Susceptibility Inspection Program
Strainer elements	Filtration	Stainless steel	Treated water - secondary	Loss of material Cracking	Chemistry Control Program

TABLE 3.4-1 (continued)
MAIN STEAM, AUXILIARY STEAM, AND TURBINE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Orifices	Pressure boundary Throttling	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Flow Accelerated Corrosion Program Galvanic Corrosion Susceptibility Inspection Program
Orifices[1]	Throttling	Stainless steel	Treated water - secondary	Loss of material Cracking	Chemistry Control Program
		Nickel alloy	Treated water - secondary	Loss of material Cracking	Chemistry Control Program

NOTES: 1. The stainless steel and nickel alloy orifice components are internal inserts and do not have a pressure boundary function.

TABLE 3.4-1 (continued)
MAIN STEAM, AUXILIARY STEAM, AND TURBINE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Valves Piping/fittings [VIII H.1.1]	Pressure boundary	Carbon steel	Containment air Indoor - not air conditioned Outdoor	None[1]	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Piping/fittings [VIII H.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned Outdoor	Loss of material[2]	Flow Accelerated Corrosion Program[3]
Strainer housings [VIII H.1.1]	Pressure boundary	Carbon steel	Indoor - not air conditioned	None[1]	None required
Valves Tubing/fittings	Pressure boundary	Stainless steel	Containment air Indoor - not air conditioned Outdoor	None	None required
Thermowells	Pressure boundary	Stainless steel	Outdoor	None	None required
Steam traps [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Steam traps	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned	None	None required

NOTES:
1. Carbon steel components that normally operate at high temperatures are not susceptible to loss of material (see Appendix C).
2. Applies to various drain lines isolated from high operating temperatures.
3. Flow Accelerated Corrosion Program addresses external general corrosion via use of radiographic examinations.

TABLE 3.4-1 (continued)
MAIN STEAM, AUXILIARY STEAM, AND TURBINE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Orifices [VIII H.1.1]	Pressure boundary Throttling	Carbon steel	Containment air	None[1]	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Bolting (mechanical closures) [VIII H.2.1]	Pressure boundary	Carbon steel	Containment air Indoor - not air conditioned Outdoor	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

NOTES: 1. Carbon steel components that normally operate at high temperatures are not susceptible to loss of material (see Appendix C).

TABLE 3.4-2
MAIN FEEDWATER AND STEAM GENERATOR BLOWDOWN

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Main feedwater isolation valve accumulators hydraulic end (Unit 2 only)	Pressure boundary	Carbon steel	Lubricating oil	Loss of material[1]	Periodic Surveillance and Preventive Maintenance Program Galvanic Corrosion Susceptibility Inspection Program
Main feedwater isolation valve accumulators pneumatic end (Unit 2 only)	Pressure boundary	Carbon steel	Air/gas[2]	None	None required
Valves [VIII D1.2.1] Piping/fittings [VIII F.1.1 and F.1.2]	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Flow Accelerated Corrosion Program Galvanic Corrosion Susceptibility Inspection Program
Valves [VIII F.2.1] Piping/fittings [VIII D1.1.1]	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Flow Accelerated Corrosion Program
Valves	Pressure boundary	Carbon steel	Lubricating oil	Loss of material[1]	Periodic Surveillance and Preventive Maintenance Program

NOTES:
1. Plant experience has identified the potential for loss of material due to lubricating oil moisture contamination.
2. Main feedwater isolation valve accumulators utilize high purity nitrogen.

TABLE 3.4-2 (continued)
MAIN FEEDWATER AND STEAM GENERATOR BLOWDOWN

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Valves Tubing/fittings	Pressure boundary	Stainless steel	Lubricating oil	Loss of material[1]	Periodic Surveillance and Preventive Maintenance Program
Valves Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Treated water - secondary	Loss of material Cracking	Chemistry Control Program
Valves Tubing/fittings	Pressure boundary	Stainless steel	Air/gas[2]	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Treated water - secondary	Loss of material Cracking	Chemistry Control Program

NOTES:
1. Plant experience has identified the potential for loss of material due to lubricating oil moisture contamination.
2. Main feedwater isolation valve accumulators and associated valves, tubing, and fittings utilize high purity nitrogen.

TABLE 3.4-2 (continued)
MAIN FEEDWATER AND STEAM GENERATOR BLOWDOWN

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Main feedwater isolation valve accumulators (Unit 2 only) [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings [VIII H.1.1]	Pressure boundary	Carbon steel	Containment air Indoor - not air conditioned Outdoor	None[1]	None required
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Valves Tubing/fittings	Pressure boundary	Stainless steel	Containment air Indoor - not air conditioned Outdoor	None	None required
Orifices	Pressure boundary Throttling	Stainless steel	Indoor - not air conditioned	None	None required
Thermowells	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Bolting (mechanical closures) [VIII H.2.1]	Pressure boundary	Carbon steel	Containment air Indoor - not air conditioned Outdoor	None	None required
Bolting (mechanical closures)	Pressure boundary	Carbon steel	Borated water leaks	Loss of mechanical closure integrity	Boric Acid Wastage Surveillance Program

NOTES: 1. Carbon steel components that normally operate at high temperatures are not susceptible to loss of material (see Appendix C).

TABLE 3.4-3
AUXILIARY FEEDWATER AND CONDENSATE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment					
Condensate storage tanks [VIII G.4.1]	Pressure boundary	Carbon steel	Air/gas[1]	None	None required
			Treated water - secondary	Loss of material	Chemistry Control Program
Auxiliary feedwater pumps [VIII G.2.1]	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Auxiliary feedwater turbines	Pressure boundary	Carbon steel	Air/gas (Unit 1 only)	None	None required
			Treated water - secondary[2] (Unit 2 only)	None	None required
Auxiliary feedwater lube oil tanks (Unit 2 only)	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Lube oil pump (Unit 2 only)	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Lube oil cooler (Unit 2 only) shell [VIII G.5.1]	Pressure boundary	Carbon steel	Lubricating oil	None	None required
Lube oil cooler (Unit 2 only) channel head	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program

NOTES:
1. A nitrogen blanket is maintained inside each Condensate Storage Tank.
2. The Unit 2 Auxiliary Feedwater Pump Turbine is maintained with limited amount of bypass steam flow during standby operation.

TABLE 3.4-3 (continued)
AUXILIARY FEEDWATER AND CONDENSATE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Lube oil cooler (Unit 2 only) tubes [VIII G.5.2]	Heat transfer Pressure boundary	Stainless steel	Treated water - secondary (inside diameter)	Loss of material	Chemistry Control Program
			Lubricating oil (outside diameter)	None	None required
Lube oil cooler (Unit 2 only) tube sheet [VIII G.5.3]	Pressure boundary	Stainless steel	Treated water - secondary	Loss of material	Chemistry Control Program
			Lubricating oil	None	None required
Valves [VIII G.3.1] Piping/fittings [VIII G.1.1]	Pressure boundary	Carbon steel	Treated water - secondary	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Valves Tubing/fittings	Pressure boundary	Stainless steel	Treated water - secondary	Loss of material	Chemistry Control Program
Piping/fittings	Pressure boundary	Stainless steel	Treated water - secondary	Loss of material	Chemistry Control Program Pipe Wall Thinning Inspection Program[1]
Valves Piping/fittings	Pressure boundary	Carbon steel	Lubricating oil	None	None required

NOTES: 1. Plant experience has identified the potential for loss of material due to erosion of the stainless steel pipe downstream of the recirculation orifices due to localized high flow velocities.

TABLE 3.4-3 (continued)
AUXILIARY FEEDWATER AND CONDENSATE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
Internal Environment (continued)					
Valves Piping/fittings	Pressure boundary	Carbon steel	Air/gas	None	None required
Sightglasses	Pressure boundary	Glass	Lubricating oil Air/gas	None	None required
		Carbon Steel	Lubricating oil Air/gas	None	None required
Vortex breakers	Vortex prevention	Carbon steel	Treated water-secondary	Loss of material	Chemistry Control Program
Orifices	Pressure boundary Throttling	Stainless steel	Treated water-secondary	Loss of material	Chemistry Control Program

TABLE 3.4-3 (continued)
AUXILIARY FEEDWATER AND CONDENSATE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment					
Unit 1 condensate storage tank [VIII G.4.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Unit 2 condensate storage tank	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Auxiliary feedwater pumps [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Auxiliary feedwater turbines [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Lube oil tanks (Unit 2 only) [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Lube oil pump (Unit 2 only) [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Lube oil cooler (Unit 2 only) [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
Valves Piping/fittings	Pressure boundary	Stainless steel	Outdoor Indoor - not air conditioned	None	None required

TABLE 3.4-3 (continued)
AUXILIARY FEEDWATER AND CONDENSATE

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/Activity
External Environment (continued)					
Piping/fittings	Pressure boundary	Stainless steel	Buried[1]	Loss of material	Condensate Storage Tank Cross Connect Buried Pipe Inspection
Piping/fittings	Pressure boundary	Stainless steel	Buried[2] Embedded/encased[2]	None	None required
Tubing/fittings	Pressure boundary	Stainless steel	Outdoor	None	None required
Sightglasses	Pressure boundary	Glass	Outdoor	None	None required
Sightglasses [VIII H.1.1]	Pressure boundary	Carbon steel	Outdoor	Loss of material	Systems and Structures Monitoring Program
Orifices	Pressure boundary Throttling	Stainless steel	Outdoor	None	None required
Bolting (mechanical closures) [VIII H.2.1]	Pressure boundary	Carbon steel	Outdoor Indoor - not air conditioned	None	None required

NOTES:
1. Condensate storage tank cross-connect piping is susceptible to wetting.
2. Unit 1 auxiliary feedwater pump suction and recirculation piping is buried in sand beneath the Turbine Building and is not susceptible to wetting. Unit 2 auxiliary feedwater pump suction and recirculation piping is embedded/encased in concrete.