TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
1. Reactor coolant pressure boundary components			
System No *1005*	Reactor Vessel And Internals System		
Carbon Steel	Containment Air, Borated Water Leakage	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Cast Austenitic Stainles	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Nickel-based Alloy	Containment Air	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
	Containment Air, Borated Water Leakage	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Stainless Steel	Containment Air, Borated Water Leakage	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No *1055*	Rx Vessel Level Instrumentation / ICCM System		
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No *2005*	Reactor Coolant System (RC)		
Carbon Steel	Air and Gas	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
	Containment Air, Borated Water Leakage	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Clad Carbon Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No *2045*	Residual Heat Removal System (RHR)		
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No *2060*	Chemical And Volume Control System		
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No *2080*	Safety Injection System		
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
1. Reactor coolant pressure boundary components			
System No *2115*	Primary Sampling System (PS)		
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No *3005*	Steam Generator		
Carbon Steel	Containment Air, Borated Water Leakage	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Nickel-based Alloy	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Stainless Steel	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
2. Steam generator shell assembly			
System No *3005*	Steam Generator		
Carbon Steel	Treated Water (including steam)	Loss of Material from Crevice Corrosion	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Material from Crevice Corrosion	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from General Corrosion	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Material from General Corrosion	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Pitting Corrosion	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Material from Pitting Corrosion	Water Chemistry Program
3. Pressure vessel ferritic materials that have a neutron fluence greater than 1017 n/cm2 (E>1 MeV)			
System No *1005*	Reactor Vessel And Internals System		
Carbon Steel	Containment Air, Borated Water Leakage	Change in Material Properties from Irradiation Embrittlement	Neutron Irradiation Embrittlement is a TLAA to be eval
4. Reactor vessel beltline shell and welds			
System No *1005*	Reactor Vessel And Internals System		
Carbon Steel	Containment Air, Borated Water Leakage	Change in Material Properties from Irradiation Embrittlement	Reactor Vessel Surveillance Program

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
5. Westinghouse and B&W baffle/former bolts			
System No *1005*	Reactor Vessel And Internals System		
Stainless Steel	Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	PWR Vessel Internals Program
6. Small-bore reactor coolant system and connected systems piping			
System No *1005*	Reactor Vessel And Internals System		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No *1055*	Rx Vessel Level Instrumentation / ICCM System		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No *2005*	Reactor Coolant System (RC)		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No *2060*	Chemical And Volume Control System		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No *2115*	Primary Sampling System (PS)		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
8. Reactor internals			
System No *1005*	Reactor Vessel And Internals System		
Cast Austenitic Stainles	Treated Water (including steam)	Change in Dimensions from Void Swelling	PWR Vessel Internals Program
Nickel-based Alloy	Treated Water (including steam)	Change in Dimensions from Void Swelling	PWR Vessel Internals Program
Stainless Steel	Treated Water (including steam)	Change in Dimensions from Void Swelling	PWR Vessel Internals Program
10. Cast austenitic stainless steel (CASS) reactor coolant system piping			

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
10. Cast austenitic stainless steel (CASS) reactor coolant system piping			
System No *2005*	Reactor Coolant System (RC)		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
12. Westinghouse and B&W baffle former bolts			
System No *1005*	Reactor Vessel And Internals System		
Stainless Steel	Treated Water (including steam)	Cracking from IASCC	PWR Vessel Internals Program
	Treated Water (including steam)	Cracking from IASCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	PWR Vessel Internals Program
13. Westinghouse and B&W baffle former bolts			
System No *1005*	Reactor Vessel And Internals System		
Stainless Steel	Treated Water (including steam)	Loss of Pre-load from Irradiation Creep	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Pre-load from Irradiation Creep	PWR Vessel Internals Program
15. (Alloy 600) Steam generator tubes, repair sleeves, and plugs			
System No *3005*	Steam Generator		
Nickel-based Alloy	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	Steam Generator Tube Integrity Program
	Treated Water (including steam)	Loss of Material from Crevice Corrosion	Steam Generator Tube Integrity Program
	Treated Water (including steam)	Loss of Material from Crevice Corrosion	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Fretting	Steam Generator Tube Integrity Program
	Treated Water (including steam)	Loss of Material from Fretting	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Pitting Corrosion	Water Chemistry Program

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
15. (Alloy 600) Steam generator tubes, repair sleeves, and plugs			
Nickel-based Alloy	Treated Water (including steam)	Loss of Material from Pitting Corrosion	Steam Generator Tube Integrity Program
17. Carbon steel tube support plate			
System No *3005*	Steam Generator		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Steam Generator Tube Integrity Program
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Crevice Corrosion	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Crevice Corrosion	Steam Generator Tube Integrity Program
	Treated Water (including steam)	Loss of Material from Erosion	Steam Generator Tube Integrity Program
	Treated Water (including steam)	Loss of Material from Erosion	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Pitting Corrosion	Water Chemistry Program
	Treated Water (including steam)	Loss of Material from Pitting Corrosion	Steam Generator Tube Integrity Program
19. CASS pump casing and valve body			
System No *2005*	Reactor Coolant System (RC)		
Stainless Steel	Treated Water (including steam)	Reduction of Fracture Toughness from Thermal Embrittlement	ASME Section XI, Subsections IWB, IWC and IWD In
System No *2060*	Chemical And Volume Control System		
Stainless Steel	Treated Water (including steam)	Reduction of Fracture Toughness from Thermal Embrittlement	Thermal Aging Embrittlement Of Cast Austenitic Stainl
System No *2080*	Safety Injection System		
Stainless Steel	Treated Water (including steam)	Reduction of Fracture Toughness from Thermal Embrittlement	Thermal Aging Embrittlement Of Cast Austenitic Stainl
20. CASS piping			

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
20. CASS piping			
System No *2005*	Reactor Coolant System (RC)		
Stainless Steel	Treated Water (including steam)	Reduction of Fracture Toughness from Thermal Embrittlement	Thermal Aging Embrittlement Of Cast Austenitic Stainl
21. BWR piping and fittings; steam generator components			
System No *3005*	Steam Generator		
Carbon Steel	Treated Water (including steam)	Loss of Material from FAC	Flow-Accelerated Corrosion Program
22 Reactor coolant pressure boundary (RCPB) valve closure bolting, manway and holding bolting, and closure bolting in high pressure and high temperature systems			
System No *2005*	Reactor Coolant System (RC)		
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	Bolting Integrity Program
	Containment Air, Borated Water Leakage	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
	Containment Air, Borated Water Leakage	Loss of Pre-load from Stress Relaxation	Bolting Integrity Program
	Containment Air, Borated Water Leakage	Loss of Pre-load from Stress Relaxation	Preventive Maintenance Program (Site Specific)
Stainless Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Material from Wear	Bolting Integrity Program
	Treated Water (including steam)	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
System No *2060*	Chemical And Volume Control System		
Stainless Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Loss of Material from Wear	Bolting Integrity Program
System No *2080*	Safety Injection System		
Stainless Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
22 Reactor coolant pressure boundary (RCPB) valve closure bolting, manway and holding bolting, and closure bolting in high pressure and high temperature systems			
Stainless Steel	Treated Water (including steam)	Loss of Material from Wear	Bolting Integrity Program
23. CRD nozzle			
System No *1005*	Reactor Vessel And Internals System		
Nickel-based Alloy	Treated Water (including steam)	Cracking from SCC	Nickel-Alloy Nozzles And Penetrations Program
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
24. Reactor vessel nozzles safe ends and CRD housing; reactor coolant system components (except CASS and bolting)			
System No *1005*	Reactor Vessel And Internals System		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	ASME Section XI, Subsections IWB, IWC and IWD In
System No *2005*	Reactor Coolant System (RC)		
Clad Carbon Steel	Treated Water (including steam)	Cracking from SCC	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	ASME Section XI, Subsections IWB, IWC and IWD In
System No *2045*	Residual Heat Removal System (RHR)		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No *2080*	Safety Injection System		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
26. External surfaces of carbon steel components in reactor coolant system pressure boundary			

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
26. External surfaces of carbon steel components in reactor coolant system pressure boundary			
System No *1005*	Reactor Vessel And Internals System		
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Aggressive Chemical Attack	Boric Acid Corrosion Program
System No *2005*	Reactor Coolant System (RC)		
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Aggressive Chemical Attack	Boric Acid Corrosion Program
	Containment Air, Borated Water Leakage	Loss of Material from Aggressive Chemical Attack	ASME Section XI, Subsections IWB, IWC and IWD In
	Containment Air, Borated Water Leakage	Loss of Mechanical Closure Integrity from Loss of Material due to Aggressive Chemical Attack	Boric Acid Corrosion Program
Clad Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Aggressive Chemical Attack	Boric Acid Corrosion Program
	Containment Air, Borated Water Leakage	Loss of Material from Aggressive Chemical Attack	ASME Section XI, Subsections IWB, IWC and IWD In
System No *2045*	Residual Heat Removal System (RHR)		
Carbon Steel	Indoor - Not Air Conditioned, Containment Air, Borated Water Leakage	Loss of Mechanical Closure Integrity from Loss of Material due to Aggressive Chemical Attack	Boric Acid Corrosion Program
System No *2060*	Chemical And Volume Control System		
Carbon Steel	Indoor - Not Air Conditioned, Containment Air, Borated Water Leakage	Loss of Mechanical Closure Integrity from Loss of Material due to Aggressive Chemical Attack	Boric Acid Corrosion Program
System No *2080*	Safety Injection System		
Carbon Steel	Indoor - Not Air Conditioned, Containment Air, Borated Water Leakage	Loss of Mechanical Closure Integrity from Loss of Material due to Aggressive Chemical Attack	Boric Acid Corrosion Program
System No *2115*	Primary Sampling System (PS)		
Carbon Steel	Indoor - Not Air Conditioned, Containment Air, Borated Water Leakage	Loss of Mechanical Closure Integrity from Loss of Material due to Aggressive Chemical Attack	Boric Acid Corrosion Program
System No *3005*	Steam Generator		
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Aggressive Chemical Attack	Boric Acid Corrosion Program
	Containment Air, Borated Water Leakage	Loss of Mechanical Closure Integrity from Loss of Material due to Aggressive Chemical Attack	Boric Acid Corrosion Program

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	Environment	Aging Effect/ Mechanism	Program
26. External surfaces of carbon steel components in reactor coolant system pressure boundary			
28. Reactor internals, reactor vessel closure studs, and core support pads			
System No *1005*	Reactor Vessel And Internals System		
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
Nickel-based Alloy	Treated Water (including steam)	Loss of Material from Wear	Flux Thimble Eddy Current Inspection Program
	Treated Water (including steam)	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
Stainless Steel	Treated Water (including steam)	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD In
31. Reactor vessel internals in fuel zone region (except Westinghouse and Babcock & Wilcox [B&W] baffle bolts)			
System No *1005*	Reactor Vessel And Internals System		
Nickel-based Alloy	Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	PWR Vessel Internals Program
Stainless Steel	Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	PWR Vessel Internals Program
32 Steam generator upper and lower heads; tubesheets; primary nozzles and safe ends			
System No *3005*	Steam Generator		
Stainless Steel	Treated Water (including steam)	Cracking from SCC	ASME Section XI, Subsections IWB, IWC and IWD In
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
33. Vessel internals (except Westing-house and B&W baffle former bolts)			
System No *1005*	Reactor Vessel And Internals System		
Cast Austenitic Stainles	Treated Water (including steam)	Cracking from SCC	PWR Vessel Internals Program
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
Nickel-based Alloy	Treated Water (including steam)	Cracking from IASCC	Water Chemistry Program

TABLE 3.1-1 TABLE 1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

Reactor Vessel, Internals, and Reactor Coolant

Material	*Environment*	*Aging Effect/ Mechanism*	*Program*
33. Vessel internals (except Westing-house and B&W baffle former bolts)			
Nickel-based Alloy	Treated Water (including steam)	Cracking from IASCC	PWR Vessel Internals Program
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	PWR Vessel Internals Program
Stainless Steel	Treated Water (including steam)	Cracking from IASCC	PWR Vessel Internals Program
	Treated Water (including steam)	Cracking from IASCC	Water Chemistry Program
	Treated Water (including steam)	Cracking from SCC	PWR Vessel Internals Program
	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
34. Reactor vessel closure studs and stud assembly			
System No *1005*	Reactor Vessel And Internals System		
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	Reactor Head Closure Studs Program