Material		Environment	Aging Effect/ Mechanism	Program
1. Reactor	coola	nt pressure boundary component	S	
System No	1005	Reactor Vessel And Internal		
Carbon Steel		Containment Air, Borated Water Leakage	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Cast Austenitic S	Stainles	Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
Nickel-based Allo	у	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 Instrument	ation / 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 (RO	C)	
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 Stee	el	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 Sys	tem (RHR)	
Stainless Steel		Treated Water (including steam)	Cracking from Thermal Fatigue	Fatigue is a TLAA to be evaluated
System No	2060	Chemical And Volume Con	trol 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

Material		Environment	Aging Effect/ Mechanism	Program
1. Reactor	· coola	nt pressure boundary components	s	
		•		
System No	2115	Primary Sampling System (F		
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 Allo	ру	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
		tor 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. Pressur	e vesse	el ferritic materials that have a ne	utron fluence greater than 1017 n/cm2 (E>1 M	eV)
System No	1005	Reactor Vessel And Internal	s System	
Carbon Steel		Containment Air, Borated Water Leakage	Change in Material Properties from Irradiation Embrittlement	Neutron Irradiation Embrittlement is a TLAA to be eva
4. Reactor	vesse	beltline shell and welds		
System No	1005	Reactor Vessel And Internal	s System	

Material		Environment	Aging Effect/ Mechanism	Program
5. Westing	ghouse	e and B&W baffle/former bolts		
System No	1005	Reactor Vessel And Intern	als System	
Stainless Steel		Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	PWR Vessel Internals Program
6. Small-b	ore re	actor coolant system and connec	eted systems piping	
System No	1005	Reactor Vessel And Intern	als System	
Stainless Steel		Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No	1055	Rx Vessel Level Instrumer	ntation / ICCM System	
Stainless Steel		Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No	2005	Reactor Coolant System (F	RC)	
Stainless Steel		Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No	2060	Chemical And Volume Co	ntrol 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	inter	nals		
System No	1005	Reactor Vessel And Intern	als System	
Cast Austenitic S	Stainles	Treated Water (including steam)	Change in Dimensions from Void Swelling	PWR Vessel Internals Program
Nickel-based Allo	ру	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

Material	Environment	Aging Effect/ Mechanism	Program
10. Cast au	stenitic stainless steel (CASS) rea	ctor coolant system piping	
System No	•		W - Q B
Stainless Steel	Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
12. Westing	ghouse and B&W baffle former b	olts	
System No	1005 Reactor Vessel And I	nternals 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
System No	ghouse and B&W baffle former b 1005 Reactor Vessel And l		
	To a stand Martin of Construction on the sure	Language Day Land Court Land Calling Court	A ONATE OF SCHOOL VI. ON IN A SCHOOL DAVID DAVID OF SCHOOL DAVID DAVID
Stainless Steel	Treated Water (including steam)	Loss of Pre-load from Irradiation Creep	
Stainless Steel	Treated Water (including steam)  Treated Water (including steam)	Loss of Pre-load from Irradiation Creep  Loss of Pre-load from Irradiation Creep	ASME Section XI, Subsections IWB, IWC and IWD In PWR Vessel Internals Program
		Loss of Pre-load from Irradiation Creep	ASME Section XI, Subsections IWB, IWC and IWD II PWR Vessel Internals Program
15. (Alloy 6	Treated Water (including steam)	Loss of Pre-load from Irradiation Creep	
15. (Alloy 6	Treated Water (including steam)  500) Steam generator tubes, repair  3005 Steam Generator	Loss of Pre-load from Irradiation Creep	
15. (Alloy 6	Treated Water (including steam)  500) Steam generator tubes, repair  3005 Steam Generator	Loss of Pre-load from Irradiation Creep  r sleeves, and plugs	PWR Vessel Internals Program
15. (Alloy 6	Treated Water (including steam)  500) Steam generator tubes, repair  3005 Steam Generator  Treated Water (including steam)	r sleeves, and plugs  Cracking from SCC	PWR Vessel Internals Program  Water Chemistry Program
15. (Alloy 6	Treated Water (including steam)  500) Steam generator tubes, repair  3005 Steam Generator  y Treated Water (including steam)  Treated Water (including steam)	r sleeves, and plugs  Cracking from SCC  Cracking from SCC	PWR Vessel Internals Program  Water Chemistry Program  Steam Generator Tube Integrity Program
15. (Alloy 6	Treated Water (including steam)  500) Steam generator tubes, repair  3005 Steam Generator  Treated Water (including steam)  Treated Water (including steam)  Treated Water (including steam)	r sleeves, and plugs  Cracking from SCC Cracking from SCC Loss of Material from Crevice Corrosion	PWR Vessel Internals Program  Water Chemistry Program  Steam Generator Tube Integrity Program  Steam Generator Tube Integrity Program
15. (Alloy 6 System No Nickel-based Alloy	Treated Water (including steam)  500) Steam generator tubes, repair  3005 Steam Generator  y Treated Water (including steam)  Treated Water (including steam)  Treated Water (including steam)  Treated Water (including steam)  Treated Water (including steam)	r sleeves, and plugs  Cracking from SCC Cracking from SCC Loss of Material from Crevice Corrosion Loss of Material from Crevice Corrosion	Water Chemistry Program Steam Generator Tube Integrity Program Steam Generator Tube Integrity Program Water Chemistry Program

Material		Environment	Aging Effect/ Mechanism	Program
15. (Alloy (	500) Si	team generator tubes, repair sleeve	es, and plugs	
Nickel-based Allo		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 <sub>I</sub>	oump (	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 Contr	ol System	
Stainless Steel		Treated Water (including steam)	Reduction of Fracture Toughness from Thermal Embrittlement	Thermal Aging Embrittlement Of Cast Austenitic Stain
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 Stain

Reactor Vessel, Internals, and Reactor Coolant

Containment Air, Borated Water Leakage

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 Stain
21. BWR p	piping	and fittings; steam generator comp	onents	
System No	3005	Steam Generator		
Carbon Steel		Treated Water (including steam)	Loss of Material from FAC	Flow-Accelerated Corrosion Program
Carbon Steel		Containment Air, Borated Water Leakage	Loss of Material from Wear	Bolting Integrity Program
System No	2005	Reactor Coolant System (RC)		
Carbon Steel				0 0 , 0
		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 Contro	ol 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

Loss of Material from Wear

ASME Section XI, Subsections IWB, IWC and IWD In

Material		Environment	Aging Effect/ Mechanism	Program
		nt pressure boundary (RCPB) ing in high pressure and high t	valve closure bolting, manway and hold emperature systems	ling bolting,
Stainless Steel		Treated Water (including steam)	Loss of Material from Wear	Bolting Integrity Program
23. CRD r	ozzle			
System No	1005	Reactor Vessel And Inte	rnals System	
Nickel-based Al	oy	Treated Water (including steam)	Cracking from SCC	Nickel-Alloy Nozzles And Penetrations Program
		Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
CASS and	boltin	ng)	ousing; reactor coolant system compone	nts (except
System No	1005	Reactor Vessel And Inte	rnals 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 Ste	eel	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
	2045	Residual Heat Removal	System (RHR)	
System No		Treated Water (including steam)	Cracking from SCC	Water Chemistry Program
System No Stainless Steel				
•	2080	Safety Injection System		

Material		Environment	Aging Effect/ Mechanism	Program
26. Extern	al surf	aces of carbon steel components in r	reactor coolant system pressure boundary	
System No	1005	Reactor Vessel And Internals S	-	
Carbon Steel	1002	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 Ste	el	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	n (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

Material	Environment	Aging Effect/ Mechanism	Program
26. External s	surfaces of carbon steel components	in reactor coolant system pressure boundary	
28. Reactor in	iternals, reactor vessel closure studs	, and core support pads	
System No 1	Reactor Vessel And Interna	als System	
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	ASME Section XI, Subsections IWB, IWC and IWD II
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 Ir
System No. 1	005 Reactor Vessel And Interne	ale System	
baffle bolts)		xcept Westinghouse and Babcock & Wilcox [Bo	-
System No 1	Reactor Vessel And Interna	als System	
	7005 Reactor Vessel And International Treated Water (including steam)	Als System  Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	PWR Vessel Internals Program
Nickel-based Alloy		Reduction of Fracture Toughness from Neutron Irradiation	PWR Vessel Internals Program PWR Vessel Internals Program
Nickel-based Alloy Stainless Steel	Treated Water (including steam)  Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation	ů,
Nickel-based Alloy Stainless Steel  32 Steam gen	Treated Water (including steam)  Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	ů,
Nickel-based Alloy Stainless Steel  32 Steam gen  System No 3	Treated Water (including steam)  Treated Water (including steam)  erator upper and lower heads; tubes	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement	PWR Vessel Internals Program
Nickel-based Alloy Stainless Steel  32 Steam gen System No 3	Treated Water (including steam)  Treated Water (including steam)  erator upper and lower heads; tubes  Steam Generator	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement  sheets; primary nozzles and safe ends	PWR Vessel Internals Program
Nickel-based Alloy Stainless Steel  32 Steam gen System No 3 Stainless Steel	Treated Water (including steam)  Treated Water (including steam)  erator upper and lower heads; tuber  Oos Steam Generator  Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement  Sheets; primary nozzles and safe ends  Cracking from SCC Cracking from SCC	PWR Vessel Internals Program  ASME Section XI, Subsections IWB, IWC and IWD In
Nickel-based Alloy Stainless Steel  32 Steam gen System No 3 Stainless Steel  33. Vessel int	Treated Water (including steam)  Treated Water (including steam)  Perator upper and lower heads; tuber  Oos Steam Generator  Treated Water (including steam)  Treated Water (including steam)	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement  Sheets; primary nozzles and safe ends  Cracking from SCC Cracking from SCC  Cracking from SCC  &W baffle former bolts)	PWR Vessel Internals Program  ASME Section XI, Subsections IWB, IWC and IWD In
Stainless Steel  32 Steam gen System No 3 Stainless Steel  33. Vessel int System No 1	Treated Water (including steam)  Treated Water (including steam)  Perator upper and lower heads; tuber  Treated Water (including steam)  Treated Water (including steam)  Treated Water (including steam)  Pernals (except Westing-house and B  The steam of	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement  Sheets; primary nozzles and safe ends  Cracking from SCC Cracking from SCC  Cracking from SCC  &W baffle former bolts)	PWR Vessel Internals Program  ASME Section XI, Subsections IWB, IWC and IWD In
Nickel-based Alloy Stainless Steel  32 Steam gen System No 3 Stainless Steel  33. Vessel int	Treated Water (including steam)  Treated Water (including steam)  Perator upper and lower heads; tubes  Treated Water (including steam)  Treated Water (including steam)  Treated Water (including steam)  Pernals (except Westing-house and B  Reactor Vessel And Internal	Reduction of Fracture Toughness from Neutron Irradiation Embrittlement Reduction of Fracture Toughness from Neutron Irradiation Embrittlement  Sheets; primary nozzles and safe ends  Cracking from SCC Cracking from SCC W baffle former bolts)  als System	PWR Vessel Internals Program  ASME Section XI, Subsections IWB, IWC and IWD II Water Chemistry Program

Material	Environment	Aging Effect/ Mechanism	Program
33. Vessel inte	rnals (except Westing-house and l	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 ve	ssel closure studs and stud assemb	bly	
System No 10	05 Reactor Vessel And Inter	nals System	
Carbon Steel	Containment Air, Borated Water Leakage	Loss of Material from Wear	Reactor Head Closure Studs Program