

## CHAPTER 10—STEAM AND POWER CONVERSION SYSTEM TABLE OF CONTENTS

10.0	STEAM AND POWER CONVERSION SYSTEM.....	10.1-1
10.1	Summary Description .....	10.1-1
10.1.1	General Description.....	10.1-2
10.1.2	Protective Features .....	10.1-2
10.1.2.1	Loss of External Electrical Load and/or Turbine Trip .....	10.1-2
10.1.2.2	Overpressure Protection .....	10.1-3
10.1.2.3	Loss of Main Feedwater Flow .....	10.1-3
10.1.2.4	Turbine Overspeed Protection .....	10.1-3
10.1.2.5	Turbine Missile Protection .....	10.1-3
10.1.2.6	Radioactivity Protection.....	10.1-4
10.1.2.7	Flow-Accelerated Corrosion Protection.....	10.1-4
10.1.3	References .....	10.1-4
10.2	Turbine-Generator.....	10.2-1
10.2.1	Design Bases .....	10.2-1
10.2.2	General Description.....	10.2-2
10.2.2.1	Component Description.....	10.2-2
10.2.2.2	TG Foundation .....	10.2-7
10.2.2.3	Cycle Description .....	10.2-8
10.2.2.4	Excitation System.....	10.2-9
10.2.2.5	TG Control System.....	10.2-9
10.2.2.6	Speed Control .....	10.2-11
10.2.2.7	Load Control.....	10.2-11
10.2.2.8	Valve Control.....	10.2-11
10.2.2.9	Overspeed Protection.....	10.2-12
10.2.2.10	Turbine Supervisory Instrumentation .....	10.2-16
10.2.2.11	Other Protective Systems.....	10.2-16
10.2.2.12	Turbine Inservice Inspection and Testing.....	10.2-17

10.2.3	Turbine Rotor Integrity.....	10.2-18
10.2.3.1	Materials Selection.....	10.2-18
10.2.3.2	Fracture Toughness.....	10.2-19
10.2.3.3	High Temperature Properties.....	10.2-20
10.2.3.4	Turbine Rotor Design.....	10.2-20
10.2.3.5	Turbine Rotor Preservice Inspections and Testing	10.2-21
10.2.3.6	Turbine Rotor Inservice Inspection Program Plan.	10.2-22
10.2.4	Safety Evaluation.....	10.2-23
10.2.5	References.....	10.2-24
10.3	Main Steam Supply System.....	10.3-1
10.3.1	Design Bases.....	10.3-1
10.3.2	System Description.....	10.3-2
10.3.2.1	General Description.....	10.3-2
10.3.2.2	Component Description.....	10.3-3
10.3.2.3	System Operation.....	10.3-7
10.3.3	Safety Evaluation.....	10.3-9
10.3.4	Inspection and Testing Requirements.....	10.3-12
10.3.5	Secondary Side Water Chemistry Program.....	10.3-13
10.3.5.1	Chemistry Control Basis.....	10.3-13
10.3.5.2	Chemistry Control Program.....	10.3-14
10.3.5.3	Contaminant Ingress.....	10.3-16
10.3.5.4	Condensate Polishing.....	10.3-17
10.3.5.5	Primary to Secondary Leakage.....	10.3-17
10.3.5.6	Chemical Addition System.....	10.3-18
10.3.6	Steam and Feedwater System Materials.....	10.3-18
10.3.6.1	Material Selection and Fabrication.....	10.3-18
10.3.6.2	Fracture Toughness.....	10.3-19
10.3.6.3	Flow-Accelerated Corrosion.....	10.3-19
10.3.7	References.....	10.3-20
10.4	Other Features of Steam and Power Conversion System.....	10.4-1
10.4.1	Main Condensers.....	10.4-1
10.4.1.1	Design Basis.....	10.4-1
10.4.1.2	System Description.....	10.4-1

---

10.4.1.3	Safety Evaluation .....	10.4-3
10.4.1.4	Inspection and Testing Requirements.....	10.4-4
10.4.1.5	Instrumentation Requirements .....	10.4-4
10.4.2	Main Condenser Evacuation System .....	10.4-6
10.4.2.1	Design Basis .....	10.4-6
10.4.2.2	System Description .....	10.4-6
10.4.2.3	System Operation.....	10.4-8
10.4.2.4	Safety Evaluation .....	10.4-8
10.4.2.5	Inspection and Testing Requirements.....	10.4-9
10.4.2.6	Instrumentation Requirements .....	10.4-10
10.4.2.7	References .....	10.4-10
10.4.3	Turbine Gland Sealing System.....	10.4-13
10.4.3.1	Design Bases .....	10.4-13
10.4.3.2	System Description .....	10.4-13
10.4.3.3	Safety Evaluation .....	10.4-15
10.4.3.4	Inspection and Testing Requirements.....	10.4-15
10.4.3.5	Instrumentation Requirements .....	10.4-15
10.4.4	Turbine Bypass System.....	10.4-17
10.4.4.1	Design Bases .....	10.4-17
10.4.4.2	System Description .....	10.4-17
10.4.4.3	Safety Evaluation .....	10.4-19
10.4.4.4	Inspection and Testing Requirements.....	10.4-20
10.4.4.5	Instrumentation Requirements .....	10.4-20
10.4.4.6	References .....	10.4-20
10.4.5	Circulating Water System .....	10.4-21
10.4.5.1	Design Bases .....	10.4-21
10.4.5.2	System Description .....	10.4-21
10.4.5.3	Safety Evaluation .....	10.4-25
10.4.5.4	Inspection and Testing Requirements.....	10.4-25
10.4.5.5	Instrumentation Requirements .....	10.4-25
10.4.5.6	References .....	10.4-25
10.4.6	Condensate Polishing System.....	10.4-28
10.4.6.1	Design Bases .....	10.4-28

---

10.4.6.2	System Description .....	10.4-28
10.4.6.3	System Operation.....	10.4-29
10.4.6.4	Safety Evaluation .....	10.4-30
10.4.6.5	Inspection and Testing Requirements.....	10.4-30
10.4.6.6	Instrumentation Requirements .....	10.4-30
10.4.6.7	References .....	10.4-30
10.4.7	Condensate and Feedwater System .....	10.4-32
10.4.7.1	Design Bases .....	10.4-32
10.4.7.2	System Description .....	10.4-33
10.4.7.3	Safety Evaluation .....	10.4-43
10.4.7.4	Inspection and Testing Requirements.....	10.4-47
10.4.7.5	Instrumentation Requirements .....	10.4-47
10.4.7.6	References .....	10.4-48
10.4.8	Steam Generator Blowdown System (PWR).....	10.4-56
10.4.8.1	Design Bases .....	10.4-56
10.4.8.2	System Description .....	10.4-56
10.4.8.3	System Operation.....	10.4-61
10.4.8.4	Safety Evaluation .....	10.4-63
10.4.8.5	Inspection and Testing Requirements.....	10.4-64
10.4.8.6	Instrumentation Requirements .....	10.4-64
10.4.8.7	References .....	10.4-65
10.4.9	Emergency Feedwater System .....	10.4-73
10.4.9.1	Design Bases .....	10.4-73
10.4.9.2	System Description .....	10.4-74
10.4.9.3	Safety Evaluation .....	10.4-81
10.4.9.4	Inspection and Testing Requirements.....	10.4-85
10.4.9.5	Instrumentation Requirements .....	10.4-86
10.4.9.6	References .....	10.4-87