

**Chapter 6
Table of Contents**

List of Tables	6.0-v
List of Figures	6.0-vii
6 Engineered Safety Features.....	6.0-1
6.0 General.....	6.0-1
6.1 Engineered Safety Feature Materials.....	6.1-1
6.1.1 Metallic Materials.....	6.1-1
6.1.1.1 Materials Selection and Fabrication	6.1-1
6.1.1.2 Composition, Compatibility and Stability of Containment and Core Coolants	6.1-2
6.1.2 Organic Materials	6.1-3
6.1.2.1 Protective Coatings.....	6.1-3
6.1.2.2 Other Organic Materials	6.1-3
6.1.2.3 Safety Analysis	6.1-3
6.2 Containment Systems.....	6.2-1
6.2.1 Containment Functional Design	6.2-1
6.2.1.1 Pressure Suppression Containment	6.2-1
6.2.1.2 Containment Subcompartments.....	6.2-29
6.2.1.3 Mass and Energy Release Analyses for Postulated Loss-of-Coolant Accidents	6.2-30
6.2.1.4 Mass and Energy Release Analysis for Postulated Secondary System Pipe Ruptures Inside Containment (PWR).....	6.2-31
6.2.1.5 Maximum Containment Pressure Analysis for Performance Capability Studies on Emergency Core Cooling System (PWR).....	6.2-31
6.2.1.6 Testing and Inspection.....	6.2-31
6.2.1.7 Instrumentation Requirements.....	6.2-32
6.2.2 Containment Heat Removal System.....	6.2-34
6.2.2.1 Design Bases.....	6.2-34
6.2.2.2 Containment Cooling System Design.....	6.2-34
6.2.2.3 Design Evaluation of the Containment Cooling System.....	6.2-35
6.2.2.4 Test and Inspections	6.2-37
6.2.2.5 Instrumentation Requirements.....	6.2-38
6.2.3 Secondary Containment Functional Design	6.2-38
6.2.3.1 Design Bases.....	6.2-38
6.2.3.2 System Design	6.2-40
6.2.3.3 Design Evaluation.....	6.2-43
6.2.3.4 Tests and Inspections.....	6.2-46
6.2.3.5 Instrumentation Requirements.....	6.2-46
6.2.3.6 Containment Monitoring System.....	6.2-46
6.2.4 Containment Isolation System.....	6.2-46
6.2.4.1 Design Bases.....	6.2-47
6.2.4.2 System Design	6.2-48
6.2.4.3 Design Evaluation.....	6.2-51
6.2.4.4 Test and Inspections	6.2-59

Table of Contents (Continued)

6.2.5	Combustible Gas Control in Containment	6.2-59
6.2.5.1	Design Bases.....	6.2-60
6.2.5.2	System Design	6.2-62
6.2.5.3	Design Evaluation.....	6.2-68
6.2.5.4	Tests and Inspections.....	6.2-70
6.2.5.5	Instrumentation Requirements.....	6.2-71
6.2.5.6	Personnel Safety	6.2-72
6.2.6	Containment Leakage Testing	6.2-73
6.2.6.1	Containment Integrated Leakage Rate Test.....	6.2-74
6.2.6.2	Containment Penetration Leakage Rate Test (Type B).....	6.2-78
6.2.6.3	Containment Isolation Valve Leakage Rate Test (Type C).....	6.2-79
6.2.6.4	Scheduling and Reporting of Periodic Tests	6.2-80
6.2.6.5	Special Testing Requirements	6.2-80
6.2.7	References	6.2-81
6.3	Emergency Core Cooling Systems	6.3-1
6.3.1	Design Bases and Summary Description	6.3-1
6.3.1.1	Design Bases.....	6.3-1
6.3.1.2	Summary Descriptions of ECCS	6.3-4
6.3.2	System Design.....	6.3-5
6.3.2.1	Schematic Piping and Instrumentation Diagrams	6.3-5
6.3.2.2	Equipment and Component Descriptions	6.3-6
6.3.2.3	Applicable Codes and Classifications	6.3-11
6.3.2.4	Materials Specifications and Compatibility	6.3-11
6.3.2.5	System Reliability.....	6.3-12
6.3.2.6	Protection Provisions.....	6.3-12
6.3.2.7	Provisions for Performance Testing.....	6.3-12
6.3.2.8	Manual Actions.....	6.3-12
6.3.3	ECCS Performance Evaluation	6.3-13
6.3.3.1	ECCS Bases for Technical Specifications.....	6.3-13
6.3.3.2	Acceptance Criteria for ECCS Performance	6.3-14
6.3.3.3	Single-Failure Considerations	6.3-14
6.3.3.4	System Performance During the Accident	6.3-15
6.3.3.5	Use of Dual Function Components for ECCS.....	6.3-16
6.3.3.6	Limits on ECCS Parameters.....	6.3-16
6.3.3.7	ECCS Analyses for LOCA	6.3-16
6.3.3.8	LOCA Analysis Conclusions.....	6.3-20
6.3.3.9	LOCA Analyses to Support ECCS Technical Specifications for Allowable Outage Times	6.3-20
6.3.3.10	Severe Accident Considerations.....	6.3-20
6.3.4	Tests and Inspections.....	6.3-21
6.3.4.1	ECCS Performance Tests	6.3-21
6.3.4.2	Reliability Tests and Inspections.....	6.3-21
6.3.5	Instrumentation Requirements.....	6.3-23
6.3.6	Reference.....	6.3-23
6.4	Habitability Systems.....	6.4-1
6.4.1	Design Basis	6.4-2

Table of Contents (Continued)

6.4.1.1	Safety Design Basis	6.4-2
6.4.1.2	Power Generation Design Bases.....	6.4-4
6.4.2	System Design	6.4-4
6.4.2.1	Main Control Area Envelope.....	6.4-4
6.4.2.2	Control Room Habitability Area HVAC System Design.....	6.4-5
6.4.2.3	Leaktightness	6.4-5
6.4.2.4	Interaction with Other Zones and Pressure-Containing Equipment.....	6.4-5
6.4.2.5	Shielding Design.....	6.4-6
6.4.3	System Operation Procedures.....	6.4-7
6.4.4	Design Evaluations.....	6.4-8
6.4.4.1	Radiological Protection	6.4-8
6.4.4.2	Smoke and Toxic Gas Protection	6.4-8
6.4.4.3	Life Support.....	6.4-9
6.4.5	Testing and Inspection.....	6.4-9
6.4.6	Instrumentation Requirements.....	6.4-10
6.5	Fission Product Removal and Control	6.5-1
6.5.1	Fission Product Removal.....	6.5-1
6.5.1.1	Design Basis	6.5-1
6.5.1.2	System Design	6.5-2
6.5.1.3	Design Evaluation.....	6.5-3
6.5.1.4	Tests and Inspection	6.5-8
6.5.1.5	Instrumentation.....	6.5-9
6.5.1.6	Materials	6.5-9
6.5.1.7	Operability and Effectiveness.....	6.5-9
6.5.2	Containment Spray	6.5-10
6.5.3	Fission Product Control.....	6.5-11
6.5.3.1	Primary Containment Vessel (PCV).....	6.5-11
6.5.3.2	Secondary Containment.....	6.5-12
6.5.4	References	6.5-12
6.6	Preservice and Inservice Inspection and Testing of Class 2 and 3 Components and Piping	6.6-1
6.6.1	Class 2 and 3 System Boundaries.....	6.6-1
6.6.1.1	Class 2 System Boundary Description	6.6-2
6.6.1.2	Class 3 System Boundary Description	6.6-2
6.6.2	Accessibility	6.6-3
6.6.2.1	Class 2 RHR Heat Exchangers	6.6-3
6.6.2.2	Class 2 Piping, Pumps Valves and Supports	6.6-3
6.6.3	Examination Categories and Methods.....	6.6-4
6.6.3.1	Examination Categories.....	6.6-4
6.6.3.2	Examination Methods.....	6.6-5
6.6.4	Inspection Intervals	6.6-6
6.6.4.1	Class 2 Systems	6.6-6
6.6.4.2	Class 3 Systems	6.6-7
6.6.5	Evaluation of Examination Results	6.6-7
6.6.6	System Pressure Tests	6.6-7
6.6.6.1	System Inservice Test.....	6.6-7

Table of Contents (Continued)

6.6.6.2	System Functional Test	6.6-7
6.6.6.3	Hydrostatic Pressure Tests.....	6.6-8
6.6.7	Augmented Inservice Inspection	6.6-8
6.6.7.1	High-Energy Piping.....	6.6-8
6.6.7.2	Erosion-Corrosion	6.6-8
6.6.8	Code Exemptions.....	6.6-9
6.7	Nitrogen Supply System (N ₂).....	6.7-1
6.7.1	Functions	6.7-1
6.7.2	System Description.....	6.7-1
6.7.3	System Evaluation	6.7-2
6.7.4	Inspection and Testing Requirements	6.7-3
6.7.5	Instrumentation Requirements.....	6.7-3
6.7.6	Analysis and Testing of ADS Accumulator Capacity	6.7-4

Appendices

6A	Regulatory Guide 1.52, Section C, Compliance Assessment	6A-1
6B	SRP 6.5.1, Table 6.5.1-1 Compliance Assessment.....	6B-1
6C	Containment Debris Protection for ECCS Strainers.....	6C-1
6D	Additional Bypass Leakage Considerations	6D-1