

PBAPS UFSAR

APPENDIX A - PRESSURE INTEGRITY OF PIPING AND EQUIPMENT PRESSURE PARTS

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>
A.1	<u>SUMMARY DESCRIPTION</u>
A.1.1	Code and Specifications
A.2	<u>CLASSIFICATION OF PIPING AND EQUIPMENT PRESSURE PARTS</u>
A.3	<u>DESIGN</u>
A.3.1	Piping Design
A.3.1.1	Allowable Stresses
A.3.1.2	Wall Thickness
A.3.1.3	Reactor Vessel Nozzle Load
A.3.1.4	Seismic Design
A.3.1.4.1	Supplementary Analysis of Seismic Class I Piping
A.3.1.5	Analysis of Piping
A.3.1.6	Analysis of Recirculation and RHR Shutdown Cooling Piping Inside the Containment
A.3.1.7	Analysis of Torus Attached Piping
A.3.2	Valve Design
A.3.3	Pump Design
A.4	<u>MATERIALS</u>
A.4.1	Brittle Fracture Control for Ferritic Steels
A.4.2	Furnace-Sensitized Stainless Steel Materials
A.4.3	Mitigation of Intergranular Stress Corrosion Cracking
A.5	<u>WELDING PROCEDURES AND PROCESSES</u>
A.5.1	General
A.5.2	Procedures and Processes
A.5.3	Dissimilar Metal Welds
A.5.4	Electroslag Welding
A.6	<u>FABRICATION AND ERECTION</u>
A.6.1	Welded Construction
A.6.2	Branch Connections
A.6.3	Bending
A.6.4	Heat Treatment
A.6.4.1	Heat Treatment of Welds
A.6.4.2	Carbon and Low Alloy Steel

PBAPS UFSAR

TABLE OF CONTENTS (cont'd)

<u>SECTION</u>	<u>TITLE</u>
A.6.4.3	Austenitic Stainless Steel
A.6.5	Defect Repair
A.6.5.1	General
A.6.5.2	Repair Welding
A.6.5.3	Inspection of Repair Welds
A.6.5.4	Heat Treatment after Repair by Welding
A.7	<u>TESTING AND INSPECTION REQUIREMENTS</u>
A.7.1	Radiography
A.7.1.1	Welds
A.7.1.2	Castings
A.7.2	Ultrasonic Examination
A.7.2.1	Forgings
A.7.2.1.1	Normal Beam Testing - Acceptance Standards
A.7.2.1.2	Angle Beam Testing - Acceptance Standards
A.7.2.2	Piping and Fittings
A.7.3	Liquid Penetrant Testing
A.7.4	Magnetic Particle Testing
A.7.5	Ferrite Testing
A.7.6	Hydrostatic Testing
A.8	<u>CLEANING</u>
A.8.1	Stainless Steel Piping
A.8.2	Carbon Steel and Low Alloy Piping
A.9	<u>PIPING DESIGN REQUIREMENTS</u>
A.9.1	General
	Schedule I
	Schedule II
	Schedule III
A.10	<u>HIGH ENERGY PIPE BREAK OUTSIDE THE PRIMARY CONTAINMENT</u>
A.10.1	Introduction
A.10.2	Criteria for Consideration of the Effects of a Piping System Break Outside Containment
A.10.3	Summary of Assumptions
A.10.4	General Approach
A.10.5	General Comments Concerning Inherent Safety Features of Peach Bottom Atomic Power Station Units 2 and 3

PBAPS UFSAR

TABLE OF CONTENTS (cont'd)

<u>SECTION</u>	<u>TITLE</u>
A.10.6	Analytical Techniques
A.10.6.1	Structural Loading
A.10.6.2	Jet Impingement Loading
A.10.6.3	Factors to Account for Geometrical Shape of Jet Impingement Target
A.10.6.4	Jet Thrust Forces
A.10.6.5	Compartment Pressure Analysis Model
A.10.7	Detailed System Analysis
A.10.7.1	Main Steam System
A.10.7.2	Feedwater Systems
A.10.7.3	High Pressure Coolant Injection
A.10.7.4	Reactor Core Isolation Cooling
A.10.7.5	Reactor Water Cleanup System
A.10.7.6	High Energy Sampling and Instrument Sensing Lines
A.10.7.6.1	Sample System
A.10.7.6.2	Instrument Sensing Lines
A.10.7.7	Reactor Recirculation System
A.10.8	Design Description of Main Steam Line Restraints
A.10.8.1	Description
A.10.8.2	Location
A.10.8.3	Method of Analysis
A.10.8.4	Design Criteria
A.10.8.5	Materials
A.10.9	Relationship of Mass Blowdown Rates Versus Time for Circumferential and Longitudinal Breaks
A.10.10	Summary of Plant Modifications Required to Mitigate the Effects of a Postulated High Energy Pipe Failure Outside the Primary Containment
A.10.11	Summary of Conclusions

PBAPS UFSAR

PBAPS
APPENDIX A PRESSURE INTEGRITY OF PIPING AND EQUIPMENT PRESSURE
PARTS

LIST OF TABLES

<u>TABLE</u>	<u>TITLE</u>
A.3.1	Fixed Base Mathematical Model Analysis Results
A.9.1	Summary Classification of Piping Systems
A.9.2	Summary of Equipment Design Codes
A.10.1	Equipment Required for Safe Shutdown Following a Main Steam Line Break
A.10.2	Equipment Required for Safe Shutdown Following a Feedwater Line Break
A.10.3	Equipment Required for Safe Shutdown Following a High Pressure Coolant Injection Steam Line Break
A.10.4	Equipment Required for Safe Shutdown Following a Reactor Core Isolation Cooling Steam Line Break
A.10.5	Equipment Required for Safe Shutdown Following a Reactor Water Cleanup Line Break
A.10.6	Summary of Design Criteria Results of Analysis for the Main Steam Line Tunnel

PBAPS UFSAR

PBAPS
APPENDIX A PRESSURE INTEGRITY OF PIPING AND EQUIPMENT PRESSURE
PARTS

LIST OF FIGURES

<u>FIGURE</u>	<u>TITLE</u>
A.2.1	Piping Code Classification (NSSS)
A.3.1	Seismic Analysis Model
A.10.1	Main Steam and Feed Pump Steam Supply Lines
A.10.2	Main Steam, Feedwater, RCIC Steam Supply, HPCI Pump Discharge, and RCIC Pump Discharge Lines in Steam Pipe Tunnel
A.10.3	Main Steam Line Restraints Reactor Building Steam Pipe Tunnel
A.10.4	Feedwater Lines
A.10.5	HPCI Steam Supply Line <small>Security-Related Information Withheld under 10 CFR 2.390</small>
A.10.6	HPCI Steam Supply Line in Torus Compartment <small>Security-Related Information</small>
A.10.6a	HPCI Steam Supply Line in Torus Compartment <small>Security-Related Information</small>
A.10.7	HPCI Steam Supply Line in Torus Compartment <small>Security-Related Information Withheld</small>
A.10.8	HPCI Pump Discharge and HPCI Steam Supply Lines in HPCI Pump Room <small>Security-Related Information Withheld under 10 CFR 2.390</small>
A.10.9	HPCI Pump Discharge, RCIC Steam Supply, and RCIC Pump Discharge Lines in Torus Compartment <small>Security-Related Information Withheld under 10 CFR 2.390</small>
A.10.10	HPCI Pump Discharge, RCIC Steam Supply, and RCIC Pump Discharge Lines in Torus Compartment <small>Security-Related Information Withheld under 10 CFR 2.390</small>
A.10.10a	HPCI Pump Discharge, RCIC Steam Supply, and RCIC Pump Discharge Lines in Torus Compartment <small>Security-Related Information Withheld under 10 CFR 2.390</small>

PBAPS UFSAR

LIST OF FIGURES (cont'd)

<u>FIGURE</u>	<u>TITLE</u>
A.10.11	HPCI Steam Supply, HPCI Pump Discharge, RCIC Steam Supply, and RCIC Pump Discharge Lines <small>Security-Related Information Withheld under 10 CFR 2.3</small>
A.10.12	Deleted
A.10.13	Deleted
A.10.14	Relative Location of Main Steam Line Restraints in Steam Pipe Tunnel
A.10.15	Main Steam Line Tunnel Showing Structural Details
A.10.16	Circumferential Failure Model - Main Steam System
A.10.17	Full Area Longitudinal Break Model - Main Steam System