

---

# Peach Bottom Atomic Power Station

---



## Updated Final Safety Analysis Report

---



Revision 29, April 2023

**PEACH BOTTOM ATOMIC POWER STATION**  
**Updated Final Safety Analysis Report**  
**General Table of Contents**

Chapter 1	Introduction and General Description of Plant
Chapter 2	Site Characteristics
Chapter 3	Reactor
Chapter 4	Reactor Coolant System and Connected Systems
Chapter 5	Containment
Chapter 6	Core Standby Cooling Systems
Chapter 7	Instrument and Control Systems
Chapter 8	Electrical Power Systems
Chapter 9	Radioactive Waste Systems
Chapter 10	Auxiliary Systems
Chapter 11	Power Conversion Systems
Chapter 12	Structures and Shielding
Chapter 13	Conduct of Operations
Chapter 14	Plant Safety Analysis
Appendix A	Pressure Integrity of Piping and Equipment
Appendix B	Technical Specifications
Appendix C	Structural Design Criteria
Appendix D	Quality Assurance Program
Appendix E	Station Atmospheric Release Limit Calculation
Appendix F	Interaction of Units 2 and 3
Appendix G	Plant Nuclear Safety Operational Analysis
Appendix H	Conformance to AEC (NRC) Criteria
Appendix I	In-Service Inspection Program
Appendix J	Identification Resolution of AEC-ACRS and Staff Concerns
Appendix K	Reactor Pressure Vessel Design Summary Report
Appendix L	Fuel and Core Thermal Hydraulic Design
Appendix M	Containment Report
Appendix N	Peach Bottom Site Meteorology
Appendix O	Emergency Plan and Security Plan
Appendix P	Environmental Technical Specifications
Appendix Q	License Renewal Aging Management UFSAR Supplement
Appendix R	Second License Renewal Aging Management UFSAR Supplement
FFP	Fire Protection Plan

<b><u>Chapter 1</u></b>	<b>Introduction and General Description of Plant</b>
1.1	Project Identification
1.2	Definitions
1.3	Methods of Technical Presentation
1.4	Classification of BWR Systems, Criteria, and Requirements for Safety Evaluation
1.5	Principal Design Criteria
1.6	Plant Description
1.7	Comparison of Principal Design Characteristics
1.8	Summary of Radiation Effects
1.9	Plant Management
1.10	Quality Assurance Program
1.11	Station Research Development and Further Information; Requirements and Resolutions Summary
<b><u>Chapter 2</u></b>	<b>Site Characteristics</b>
2.1	Summary Description
2.2	Site Description
2.3	Meteorology
2.4	Hydrology
2.5	Geology and Seismology
2.6	Environmental Radiation Monitoring Program
2.7	Foundation Analysis
2.8	Slope Stability
<b><u>Chapter 3</u></b>	<b>Reactor</b>
3.1	Summary Description
3.2	Fuel Mechanical Design
3.3	Reactor Vessel Internals Mechanical Design
3.4	Reactivity Control Mechanical Design
3.5	Control Rod Drive Housing Supports
3.6	Nuclear Design
3.7	Thermal and Hydraulic Design
3.8	Standby Liquid Control System
<b><u>Chapter 4</u></b>	<b>Reactor Coolant System and Connected Systems</b>
4.1	Summary Description
4.2	Reactor Vessel and Appurtenances Mechanical Design
4.3	Reactor Recirculation System
4.4	Nuclear System Pressure Relief System
4.5	Main Steam Line Flow Restrictors
4.6	Main Steam Line Isolation Valves
4.7	Reactor Core Isolation Cooling System
4.8	Residual Heat Removal System
4.9	Reactor Water Cleanup System
4.10	Nuclear System Leakage Detection and Leakage Rate Limits
4.11	Main Steam Lines, Feedwater Piping, and Drains

**Chapter 5      Containment**

- 5.1      Summary Description
- 5.2      Primary Containment
- 5.3      Secondary Containment System

**Chapter 6      Core Standby Cooling Systems**

- 6.1      Safety Objective
- 6.2      Safety Design Basis
- 6.3      Summary Description
- 6.4      Description
- 6.5      Safety Evaluation
- 6.6      Inspection and Testing
- 6.7      Conformance of Peach Bottom Atomic Power Station Units  
2 and 3 Emergency Core Cooling Systems to AEC/NRC  
Interim Acceptance Criteria for Light Water Reactors

**Chapter 7      Instrument and Control Systems**

- 7.1      Summary Description
- 7.2      Reactor Protection System
- 7.3      Primary Containment and Reactor Vessel Isolation  
Control System
- 7.4      Core Standby Cooling Systems Control and  
Instrumentation
- 7.5      Neutron Monitoring System
- 7.6      Refueling Interlocks
- 7.7      Reactor Manual Control System
- 7.8      Reactor Vessel Instrumentation
- 7.9      Recirculation Flow Control System
- 7.10      Feedwater Control System
- 7.11      Pressure Regulator and Turbine Generator Control  
System
- 7.12      Process Radiation Monitoring
- 7.13      Area Radiation Monitoring System
- 7.14      Site Environs Radiation Monitoring Program
- 7.15      Health Physics and Laboratory Analysis Radiation  
Monitors
- 7.16      Process Computer System
- 7.17      Nuclear System Stability Analysis
- 7.18      Separate Shutdown Control Panels
- 7.19      Class 1e Equipment Environmental Qualification
- 7.20      Accident Monitoring
- 7.21      Seismic Instrumentation

**Chapter 8      Electrical Power Systems**

- 8.1      Summary Description
- 8.2      Generator
- 8.3      Transmission System
- 8.4      Auxiliary Power Systems
- 8.5      Standby AC Power Supply and Distribution
- 8.6      120 VAC Power System
- 8.7      125/250 VDC Power Supplies and Distribution
- 8.8      24 VDC Power Supply and Distribution

**Chapter 9      Radioactive Waste Systems**

- 9.1      Summary Description
- 9.2      Liquid Radwaste System
- 9.3      Solid Radwaste System
- 9.4      Gaseous Radwaste/Off-Gas System

**Chapter 10     Auxiliary Systems**

- 10.1     Summary Description
- 10.2     New Fuel Storage
- 10.3     Spent Fuel Storage
- 10.4     Tools and Servicing Equipment
- 10.5     Fuel Pool Cooling and Cleanup System
- 10.6     Service Water System
- 10.7     High-Pressure Service Water System
- 10.8     Reactor Building Cooling Water System
- 10.9     Emergency Service Water System
- 10.10    Turbine Building Cooling Water System
- 10.11    Chilled Water System
- 10.12    Fire Protection Program
- 10.13    Main Control Room Air Conditioning
- 10.14    Emergency Ventilating Systems
- 10.15    Plant Heating, Ventilating, and Air Conditioning Systems
- 10.16    Makeup Water Treatment System
- 10.17    Instrument Air, Service Air, and Instrument Nitrogen Systems
- 10.18    Domestic and Sanitary Water System
- 10.19    Plant Equipment and Floor Drainage System
- 10.20    Process Sampling System
- 10.21    Communications Systems
- 10.22    Station Lighting System
- 10.23    Plant Auxiliary Boilers
- 10.24    Emergency Heat Sink

**Chapter 11    Power Conversion Systems**

- 11.1    Summary Description
- 11.2    Turbine-Generator
- 11.3    Main Condenser
- 11.4    Main Condenser Gas Removal and Sealing Steam Systems
- 11.5    Turbine Bypass System
- 11.6    Circulating Water System and Cooling Towers
- 11.7    Condensate Filter-Demineralizer System
- 11.8    Condensate and Feedwater Systems

**Chapter 12    Structures and Shielding**

- 12.1    Summary Description
- 12.2    Design and Description
- 12.3    Radiation Shielding
- 12.4    Radioactive Materials Safety

**Chapter 13    Conduct of Operations**

- 13.1    Summary Description
- 13.2    Organizational Structure
- 13.3    Training
- 13.4    Pre-Operational Test Program
- 13.5    Startup and Power Test Program
- 13.6    Normal Operations and Procedure Control
- 13.7    Records
- 13.8    Operational Review and Audits

**Chapter 14    Plant Safety Analysis**

- 14.1    Analytical Objective
- 14.2    Unacceptable Safety Results for Abnormal Operational Transients
- 14.3    Unacceptable Safety Results for Accidents
- 14.4    Approach To Safety Analysis
- 14.5    Analyses of Abnormal Operational Transients
- 14.6    Analysis of Design Basis Accidents
- 14.7    Conclusions
- 14.8    Analytical Methods
- 14.9    Evaluations Using AEC Method

**Appendix A    Pressure Integrity of Piping and Equipment**

- A.1    Summary Description
- A.2    Classification of Piping and Equipment Pressure Parts
- A.3    Design
- A.4    Materials
- A.5    Welding Procedures and Processes
- A.6    Fabrication and Erection
- A.7    Testing and Inspection Requirements
- A.8    Cleaning
- A.9    Piping Design Requirements
- A.10    High Energy Pipe Break Outside The Primary Containment

**Appendix B      Technical Specifications**

**Appendix C      Structural Design Criteria**

- C.1      Classification of Structures
- C.2      Structural Design Basis
- C.3      Analysis of Class I Structures
- C.4      Implementation of Structural Criteria
- C.5      Components

**Appendix D      Quality Assurance Program**

- D.1      Introduction
- D.2      Deleted
- D.3      Deleted
- D.4      Deleted
- D.5      Deleted
- D.6      Deleted
- D.7      Deleted
- D.8      Deleted
- D.9      Deleted
- D.10     Deleted
- D.11     Quality Assurance During the Operations Phase
- D.12     Deleted

**Appendix E      Station Atmospheric Release Limit Calculation**

- E.1      Analytical Model
- E.2      Verification of Analytical Model
- E.3      Stack Release Limit Calculations for Peach Bottom Site
- E.4      Building Exhaust Vent Release
- E.5      All Sources of Airborne Radioactivity
- E.6      Summary

**Appendix F      Interaction of Units 2 and 3**

- F.1      Summary Description
- F.2      Shared Site Facilities
- F.3      Shared Systems and Equipment
- F.4      Interaction of Units 2 and 3 Following an Accident

**Appendix G      Plant Nuclear Safety Operational Analysis**

- G.1      Analytical Objective
- G.2      Introduction
- G.3      Method of Analysis
- G.4      Display of Operational Analysis Results
- G.5      Operational Analyses for Peach Bottom Atomic Power  
Station
- G.6      Remainder of Nuclear Safety Operational Analysis

**Appendix H      Conformance To AEC (NRC) Criteria**

- H.1      Summary Description
- H.2      Criteria Conformance

**Appendix I      In-Service Inspection Program**

**Appendix J      Identification Resolution of AEC-ACRS and Staff Concerns**

- J.1      Summary Description
- J.2      Areas Specified in the Peach Bottom Units 2 and 3  
AEC-ACRS Construction Permit Letter
- J.3      Areas Specified in the Peach Bottom Units 2 and 3—AEC  
Staff Construction Permit Safety Evaluation Report
- J.4      Areas Specified in Other Related AEC-ACRS Construction  
and Operating Permit Letters
- J.5      Areas Specified In Other Related AEC-Staff  
Construction or Operating Permit Safety Evaluation  
Reports

**Appendix K      Reactor Pressure Vessel Design Summary Report**

- K.1      Design and Fabrication Requirements

**Appendix L      Fuel and Core Thermal Hydraulic Design**

**Appendix M      Containment Report**

- M.1      Introduction and Summary
- M.2      Basis for Containment Design
- M.3      Containment System Design
- M.4      Initial Overload and Leakage Rate Test

**Appendix N      Peach Bottom Site Meteorology**

- N.1      Introduction
- N.2      Two-Year Meteorology Summaries by Location, Wind  
Direction, Wind Speed,  
Turbulence Class, and Season
- N.3      Three-Year Annual Meteorology Summaries by Location,  
Wind Direction, Wind Speed, and Turbulence Class
- N.4      Three-Year Annual Meteorology Summaries by Location,  
Wind Direction, Wind Speed, and Lapse Rate

**Appendix O      Emergency Plan and Security Plan**

- 0.1      Emergency Plan
- 0.2      Security Plan

**Appendix P      Environmental Technical Specifications**



**Appendix Q      License Renewal Aging Management UFSAR Supplement**

- Q.0      Introduction
- Q.1      Existing Aging Management Activities
- Q.2      Enhanced Aging Management Activities
- Q.3      New Aging Management Activities
- Q.4      Time-Limited Aging Analyses Activities
- Q.5      Time-Limited Aging Analyses Summaries
- Q.6      References

**Appendix R      Second License Renewal Aging Management UFSAR Supplement**

- R.1      Introduction
- R.2      Aging Management Programs
- R.3      NUREG-2191 Chapter X Aging Management Programs
- R.4      Time-Limited Aging Analyses
- R.5      Second License Renewal Commitment List

**Fire Protection Plan**

- Chapter 1      Introduction
- Chapter 2      Fire Protection System Description
- Chapter 3      Comparison Between PBAPS Fire Protection Program and NRC Guideline Documents
- Chapter 4      Evaluation of Potential Fire Hazards
- Chapter 5      Analysis of Capability to Achieve Safe Shutdown
- Chapter 6      Special Topics
- Chapter 7      Fire Protection Requirements