I

Table of Contents

- 1.0 Introduction and General Description of Plant
 - 1.1 Introduction
 - 1.2 General Plant Description
 - 1.3 Comparison Tables
 - 1.4 Identification of Agents and Contractors
 - 1.5 Requirements for Further Technical Information
 - 1.6 GE Topical Reports and Other Documents
 - 1.7 Drawings
 - 1.8 Conformance with Standard Review Plan and Applicability of Codes and Standards
 - 1.9 COL License Information
 - 1A Response to TMI Related Matters
 - 1AA Plant Shielding to Provide Access to Vital Areas
 - 1B Not Used
 - 1C ABWR Station Blackout Considerations
- 2.0 Site Characteristics
 - 2.1 Limits Imposed on SRP Section II Acceptance Criteria by ABWR Standard Plant
 - 2.2 Requirements for Determination of ABWR Site Acceptability
 - 2.3 COL License Information
 - 2A Input to CRAC 2 Computer Code for Determination of ABWR Site Acceptability
- 3.0 Design of Structures, Components, Equipment and Systems
 - 3.1 Conformance with NRC General Design Criteria
 - 3.2 Classification of Structures, Components, and Systems
 - 3.3 Wind and Tornado Loadings
 - 3.4 Water Level (Flood) Design
 - 3.5 Missile Protection
 - 3.6 Protection Against Dynamic Effects Associated with the Postulated Rupture of Piping
 - 3.7 Seismic Design
 - 3.8 Seismic Category I Structures
 - 3.9 Mechanical Systems and Components
 - 3.10 Seismic and Dynamic Qualification of Mechanical and Electrical Equipment
 - 3.11 Environmental Qualification of Safety-Related Mechanical and Electrical Equipment
 - 3.12 Safety-Related Tunnels
 - 3.13 Secondary Containment and Divisional Separation Zones-Barrier Considerations
 - 3A Seismic Soil Structure Interaction Analysis
 - 3B Containment Hydrodynamic Loads
 - 3C Computer Programs Used in the Design and Analysis of Seismic Category I Stuctures
 - 3D Computer Programs Used in the Design of Components, Equipment and Structures
 - 3E Guidelines for LBB Application
 - 3F Not Used
 - 3G Response of Structures to Containment Loads
 - 3H Design Details and Evaluation Results of Seismic Category I Structures
 - 3I Equipment Qualification Environmental Design Criteria
 - 3J Not Used
 - 3K Designated NEDE-24326-1-P Material Which May Not Change Without Prior NRC

I

Table of Contents (Continued)

Rev. 1

- Staff Approval
- 3L Evaluation of Postulated Ruptures in High Energy Pipes
- 3M Resolution of Intersystem LOCA for ABWR

4.0 Reactor

- 4.1 Summary Description
- 4.2 Fuel System Design
- 4.3 Nuclear Design
- 4.4 Thermal–Hydraulic Design
- 4.5 Reactor Materials
- 4.6 Functional Design of Reactivity Control System
- 4A Typical Control Rod Patterns and Associated Power Distribution for ABWR
- 4B Fuel Licensing Acceptance Criteria
- 4C Control Rod Licensing Acceptance Criteria
- 4D Reference Fuel Design Compliance with Acceptance Criteria
- 5.0 Reactor Coolant System and Connected Systems
 - 5.1 Summary Description
 - 5.2 Integrity of Reactor Coolant Pressure Boundary
 - 5.3 Reactor Vessel
 - 5.4 Component and Subsystem Design
 - 5A Method Of Compliance For Regulatory Guide 1.150
 - 5B RHR Injection Flow And Heat Capacity Analysis Outlines
- 6 Engineered Safety Features
 - 6.0 General
 - 6.1 Engineered Safety Feature Materials
 - 6.2 Containment Systems
 - 6.3 Emergency Core Cooling Systems
 - 6.4 Habitability Systems
 - 6.5 Fission Products Removal and Control Systems
 - 6.6 Preservice and Inservice Inspection and Testing of Class 2 and 3 Components and Piping
 - 6.7 High Pressure Nitrogen Gas Supply System
 - 6A Regulatory Guide 1.52, Section C, Compliance Assessment
 - 6B SRP 6.5.1, Table 6.5.1-1 Compliance Assessment
 - 6C Containment Debris Protection for ECCS Strainers
 - 6D HPCF Analysis Outlines
 - 6E Additional Bypass Leakage Considerations
- 7.0 Instrumentation and Control Systems
 - 7.1 Introduction
 - 7.2 Reactor Protection (Trip) System (RPS)—Instrumentation and Controls
 - 7.3 Engineered Safety Feature Systems, Instrumentation and Control
 - 7.4 Systems Required for Safe Shutdown
 - 7.5 Information Systems Important to Safety
 - 7.6 All Other Instrumentation Systems Required for Safety
 - 7.7 Control Systems Not Required for Safety

Table of Contents (Continued)

Rev. 0

- 7.8 COL License Information
- 7A Design Response to Appendix B, ABWR LRB Instrumentation and Controls
- 7B Implementation Requirements for Hardware/Software Development
- 7C Defense Against Common-Mode Failure in Safety-Related, Software-Based I&C
- 8.0 Electric Power
 - 8.1 Introduction
 - 8.2 Offsite Power Systems
 - 8.3 Onsite Power Systems
 - 8A Miscellaneous Electrical Systems
- 9.0 Auxiliary Systems
 - 9.1 Fuel Storage and Handling
 - 9.2 Water Systems
 - 9.3 Process Auxiliaries
 - 9.4 Air Conditioning, Heating, Cooling and Ventilation Systems
 - 9.5 Other Auxiliary Systems
 - 9A Fire Hazard Analysis
 - 9B Summary of Analysis Supporting Fire Protection Design Requirements
 - 9C Regulatory Guide 1.52, Section C, Compliance Assessment
 - 9D SRP 6.5.1, Table 6.5.1-1 Compliance Assessment
- 10.0 Steam and Power Conversion System
 - 10.1 Summary Description
 - 10.2 Turbine Generator
 - 10.3 Main Steam Supply System
 - 10.4 Other Features of Steam and Power Conversion System
- 11.0 Radioactive Waste Management
 - 11.1 Source Terms
 - 11.2 Liquid Waste Management
 - 11.3 Gaseous Waste Management System
 - 11.4 Solid Waste Management System
 - 11.5 Process and Effluent Radiological Monitoring and Sampling Systems
 - 11.6 Offsite Radiological Monitoring Program
 - 11A Radioactive Waste Management Additional Information
- 12.0 Radiation Protection
 - 12.1 Ensuring that Occupational Radiation Exposures are ALARA
 - 12.2 Radiation Sources
 - 12.3 Radiation Protection Design Features
 - 12.4 Dose Assessment
 - 12.5 Health Physics Program
 - 12A Appendix 12A Calculation of Airborne Radionuclides
- 13.0 Conduct of Operations
 - 13.1 Organizational Structure of Applicant
 - 13.2 Training

I

Table of Contents (Continued)

Rev. 1

- 13.3 Emergency Planning
- 13.4 Review and Audit
- 13.5 Plant Procedures
- 13.6 Physical Security
- 14.0 Initial Test Program
 - 14.1 Specific Information to be Included in Preliminary Safety Analysis Reports
 - 14.2 Specific Information to be Included in Final Safety Analysis Reports
 - 14.3 Tier 1 Selection Criteria and Processes
- 15.0 Accident and Analysis
 - 15.1 Decrease in Reactor Coolant Temperature
 - 15.2 Increase in Reactor Pressure
 - 15.3 Decrease in Reactor Coolant System Flow Rate
 - 15.4 Reactivity and Power Distribution Anomalies
 - 15.5 Increase in Reactor Coolant Inventory
 - 15.6 Decrease in Reactor Coolant Inventory
 - 15.7 Radioactive Release from Subsystems and Components
 - 15.8 Anticipated Transients Without Scram
 - 15A Plant Nuclear Safety Operational Analysis (NSOA)
 - 15B Failure Modes and Effects Analysis (FMEA)
 - 15C Not Used
 - 15D Probability Analysis of Pressure Regulator Downscale Failure
 - 15E ATWS Performance Evaluation
 - 15F LOCA Inventory Curves
- 16.0 Technical Specifications
 - 1.0 Use and Application
 - 2.0 Safety Limits (SLs)
 - 3.0 Limiting Condition for Operation (LCO) Applicability
 - 3.0 Surviellance Requirement (SR) Applicability
 - 4.0 Design Features
 - 5.0 Administrative Controls
- 17 Quality Assurance
 - 17.0 Introduction
 - 17.1 Quality Assurance During Design and Construction
 - 17.2 Quality Assurance During the Operations Phase
 - 17.3 Reliability Assurance Program During Design Phase
- 18.0 Human Factors Engineering
 - 18.1 Introduction
 - 18.2 Design Goals and Design Bases
 - 18.3 Planning, Development, and Design
 - 18.4 Control Room Standard Design Features
 - 18.5 Remote Shutdown System
 - 18.6 Systems Integration
 - 18.7 Detailed Design of the Operator Interface System

Table of Contents (Continued)

- 18.8 COL License Information
- 18A Emergency Procedure Guidelines
- 18B Differences Between BWROG EPG Revision 4 and ABWR EPG
- 18C Operator Interface Equipment Characterization
- 18D Emergency Procedures Guidelines—Input Data and Calculation Results
- 18E ABWR Human-System Interface Design Implementation Process
- 18F Emergency Operation Information and Controls
- 18G Design Development and Validation Testing
- 18H Supporting Analysis for Emergency Operation Information and Controls

19.0 Response to Severe Accident Policy Statement

- 19.1 Purpose and Summary
- 19.2 Introduction
- 19.3 Internal Event Analysis
- 19.4 External Event Analysis and Shutdown Risk Analysis
- 19.5 Source Term Sensitivity Studies
- 19.6 Measurement Against Goals
- 19.7 PRA as a Design Tool
- 19.8 Important Features Identified by the ABWR PRA
- 19.9 COL License Information
- 19.10 Assumptions and Insights Related to Systems Outside of ABWR Design Certification
- 19.11 Human Action Overview
- 19.12 Input to the Reliability Assurance Program
- 19.13 Summary of Insights Gained from the PRA
- 19A Response to CP/ML Rule 10CFR50.34(f)
- 19B Resolution of USIs and GSIs
- 19C Design Considerations Reducing Sabotage Risk
- 19D Probabilistic Evaluations
- 19E Deterministic Evaluations
- 19EA Direct Containment Heating
- 19EB Fuel Coolant Interactions
- 19EC Debris Coolability and Core Concrete Interaction
- 19ED Corium Shield
- 19EE Suppression Pool Bypass
- 19F Containment Ultimate Strength
- 19FA Containment Ultimate Strength
- 19G Not Used
- 19H Seismic Capacity Analysis
- 19I Seismic Margins Analysis
- 19J Not Used
- 19K PRA-Based Reliability and Maintenance
- 19L ABWR Shutdown Risk Evaluation
- 19M Fire Protection Probabilistic Risk Assessment
- 19N Analysis of Common-Cause Failure of Multiplex Equipment
- 190 Not Used
- 19P Evaluation of Potential Modifications to the ABWR Design
- 19Q ABWR Shutdown Risk Assessment

Table of Contents (Continued)

Rev. 0

- 19QA Fault Trees
- 19QB DHR Reliability Study
- 19QC Review of Significant Shutdown Events: Electrical Power and Decay Heat Removal
- 19R Probabilistic Flooding Analysis
- 20.0 Question and Response Guide
 - 20.1 Question Index
 - 20.2 Questions
 - 20.3 Questions/Responses
 - 20.4 References
 - 20A ODYNA/REDYA
 - 20B Equipment Data Base
- 21.0 Engineering Drawings