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Revision Log

Revision	Description of Changes
0	Initial Issue.

Executive Summary

This white paper is intended to lay out the proposed SMR-160 Construction Permit Application (CPA), Preliminary Safety Analysis Report (PSAR), and Environmental Report (ER) Table of Contents (TOCs) to facilitate discussion with the NRC staff and receive feedback on the proposed lay out of the CPA.

Proposed CPA Parts

From DNRL-ISG-2022-01, Safety Review of Light-Water Power Reactor Construction Permit Applications – Interim Staff Guidance, Appendix A:

"An applicant may use the information in Regulatory Guide (RG) 1.70… and RG 1.206, on the format, content, and level of detail to develop a license application submitted under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50… or 10 CFR Part 52… . Although the guidance in RG 1.70 dates from the 1970s and the guidance in RG 1.206 is relevant to license applications submitted under 10 CFR Part 52, the information in these RGs supports a construction permit (CP) application structure consistent with NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (SRP); helps to ensure the completeness of the information in the application; and provides insights on the information that should be included in applications to support the U.S. Nuclear Regulatory Commission (NRC) staff's safety review and evaluation."

Based on the above, the proposed parts of the SMR-160 CPA are summarized in the table below. This table is informed by RG 1.70 and RG 1.206. An 'X' denotes that the part will be included in the application.

Application Part	COL	ESP	DC	SMR-160 CPA
Transmittal Letter	X	X	X	X
Part 1: General and Financial Information	X	X (financial info not req'd)	X (financial info not req'd)	X
Part 2: Safety Analysis Report	X	X	X	X
Part 3: Environmental Report	X	X	X	X
Part 4: Technical Specifications	X	NA	X	PSAR CH 16
Part 5: Emergency Plans	X	Limited Scope	Limited Scope	PSAR CH 13 (Limited Scope)
Part 6: Security Plans	X	Limited Scope	Limited Scope	*PSAR CH 13 (Limited Scope)
Part 7: Exemptions, Departures, and Variances	X	X	X	X
Part 8: License Conditions; ITAAC	X	X	Only ITAAC	X (Only License Conditions)
Part 9: Withheld Information	X	X	X	X
Part 10: Quality Assurance Program Description	X	X	X	PSAR CH 17
Part 11: Supplemental Information	X	X	X	X

*Separate Submittal Letter Containing SGI: Security, Cyber Security, and Safeguards Contingency Plan

Proposed PSAR Chapters

The proposed PSAR Chapters below is based, in part, on RG 1.70, RG 1.206, DNRL-ISG-2022-01, and NUREG-0800 SRP.

Ch	RG 1.70	RG 1.206	SMR-160 PSAR
1	Introduction and General Description of Plant	Introduction and Interfaces	Introduction and General Description of Plant
2	Site Characteristics	Site Characteristics and Site Parameters	*Site Characteristics and Site Parameters
3	*Design of Structures, Components, Equipment, and Systems		
4	Reactor		
5	Reactor Coolant System and Connected Systems		
6	Engineered Safety Features		
7	*Instrumentation and Controls		
8	*Electric Power		
9	Auxiliary Systems		
10	Steam and Power Conversion System		
11	*Radioactive Waste Management		
12	Radiation Protection		
13	*Conduct of Operations		
14	Initial Test Program	Initial Test Program and ITAAC	Initial Test Program
15	Accident Analyses	*Transient and Accident Analysis	
16	Technical Specifications		
17	Quality Assurance		
18		Human Factors Engineering	
19		Severe Accidents	PRA and Severe Accident Evaluation
20			Mitigation of Beyond-Design-Basis Events

*Chapter title specifically referenced and discussed in DNRL-ISG-2022-01.

Proposed PSAR TOC (including Sections and Subsections)

The proposed PSAR table of contents below is based, in part, on RG 1.70, RG 1.206, DNRL-ISG-2022-01, and NUREG-0800 SRP.

Ch 1	Introduction and General Description of Plant
1.1	Introduction and Interfaces
1.1.1	Introduction
1.1.2	Plant Location
1.1.3	Containment Type
1.1.4	Reactor Type
1.1.5	Power Output
1.1.6	Schedule
1.1.7	Format and Content
1.2	General Plant Description
1.2.1	Design Criteria, Operating Characteristics, and Safety Conclusions
1.2.2	Reactor Coolant System Design
1.2.3	Steam and Power Conversion Design
1.2.4	Engineered Safety Features
1.2.5	Auxiliary Systems
1.2.6	Instrumentation and Control System Design
1.2.7	Electrical System Design
1.2.8	Control Room Design
1.2.9	Site Description
1.2.10	Plant Arrangement
1.2.11	On-site Interim Spent Fuel Storage
1.3	Comparison with Other Facilities
1.4	Identification of Agents and Contractors
1.4.1	Applicant and Program Manager
1.4.2	Division of Responsibility
1.4.3	Principal Consultants and other Participants
1.5	Performance of New Safety Features
1.6	Requirements for Additional Technical Information
1.7	Material Referenced
1.8	Drawings and Other Detailed Information
1.7.1	Electrical and Instrumentation and Control Diagrams
1.7.2	Piping and Instrumentation Diagrams
1.9	Conformance with Regulatory Criteria
1.9.1	Conformance with Regulatory Guides
1.9.2	Conformance with Standard Review Plan
1.9.3	Generic Issues
1.9.4	Operational Experience (Generic Communications)
1.9.5	Advanced and Evolutionary Light-water Reactor Design Issues
1.10	References
1.10.1	US Code of Federal Regulations
1.10.2	USNRC NUREGs, RGs, SECYs, and Generic Communications
1.10.3	Mechanical Codes and Standards

1.10.4	Civil-Structural Codes and Standards
1.10.5	Fire Protection Codes and Standards
1.10.6	Architectural Codes and Standards
1.10.7	Electrical & Instrumentation and Controls Codes and Standards
1.10.8	Probabilistic Safety Analysis Codes and Standards
1.10.9	Quality Codes and Standards
1.10.10	Academic References
1.10.11	Industry References
1.10.12	Holtec International References
1.10.13	Computer Codes and Manuals
1.10.14	Site Specific References
Ch 2	Site Characteristics and Site Parameters
2.1	Geography and Demography
2.1.1	Site Location and Description
2.1.2	Exclusion Area Authority and Control
2.1.3	Population Density
2.2	Nearby Industrial, Transportation, and Military Facilities
2.2.1	Identification of Potential Hazards in Site Vicinity
2.2.2	Evaluation of Potential Accidents
2.3	Meteorology
2.3.1	Regional Climatology
2.3.2	Local Meteorology
2.3.3	Onsite Meteorological Measurements Program
2.3.4	Short-term Dispersion Estimates for Accident Releases
2.3.5	Long-term Atmospheric Dispersion Estimates for Routine Releases
2.4	Hydrologic Engineering
2.4.1	Hydrologic Description
2.4.2	Floods
2.4.3	Probable Maximum Flood (PMF) on Streams and Rivers
2.4.4	Potential Dam Failures
2.4.5	Probable Maximum Surge and Seiche Flooding
2.4.6	Probable Maximum Tsunami Hazards
2.4.7	Ice Effects
2.4.8	Cooling Water Canals and Reservoirs
2.4.9	Channel Migration or Diversion
2.4.10	Flooding Protection Requirements
2.4.11	Low Water Considerations
2.4.12	Groundwater
2.4.13	Accidental Releases of Radioactive Liquid Effluents in Ground / Surface Waters
2.4.14	Technical Specifications and Emergency Operation Requirements
2.5	Geology, Seismology, and Geotechnical Engineering
2.5.1	Basic Geologic and Seismic Information
2.5.2	Vibratory Ground Motion
2.5.3	Surface Faulting or Deformation
2.5.4	Stability of Subsurface Materials and Foundations
2.5.5	Stability of Slopes
Ch 3	Design of Structures, Components, Equipment, and Systems
3.1	Conformance with U.S. NRC General Design Criteria

3.1.1	Overall Requirements
3.1.2	Protection by Multiple Fission Product Barriers
3.1.3	Protection and Reactivity Controls Systems
3.1.4	Fluid Systems
3.1.5	Reactor Containment
3.1.6	Fuel and Radioactivity Control
3.2	Classification of Structures, Systems, and Components
3.2.1	Seismic Classification
3.2.2	System Quality Group Classification
3.3	Wind and Tornado Loadings
3.3.1	Severe Wind Loadings
3.3.2	Extreme Wind Loadings (Tornado and Hurricane Loads)
3.3.3	Interaction of Non-Seismic Category I (SCI) Structures with SCI Structures
3.4	Water Level (Flood) Design
3.4.1	Internal Flood Protection for Onsite Equipment Failures
3.4.2	Analysis Procedures
3.5	Missile Protection
3.5.1	Missile Selection and Description
3.5.1.1	Internally Generated Missiles (Outside Containment)
3.5.1.2	Internally Generated Missiles (Inside Containment)
3.5.1.3	Turbine Missiles
3.5.1.4	Missiles Generated by Tornadoes and Extreme Winds
3.5.1.5	Site Proximity Missiles (Except Aircraft)
3.5.1.6	Aircraft Hazards
3.5.2	SSCs to be Protected from Externally Generated Missiles
3.5.3	Barrier Design Procedures
3.6	Protection Against Dynamic Effect Associated with Postulated Rupture of Piping
3.6.1	Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment
3.6.2	Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping
3.6.3	Leak-Before-Break Evaluation Procedures
3.7	Seismic Design
3.7.1	Seismic Design Parameters
3.7.2	Seismic System Analysis
3.7.3	Seismic Subsystem Analysis
3.7.4	Seismic Instrumentation
3.8	Design of Category I Structures
3.8.1	Concrete Containment
3.8.2	Steel Containment
3.8.3	Concrete and Steel Internal Structures of Steel or Concrete Containments
3.8.4	Other Seismic Category I Structures
3.8.5	Foundations
3.9	Mechanical Systems and Components
3.9.1	Special Topics for Mechanical Components
3.9.2	Dynamic Testing and Analysis of Systems, Structures, and Components
3.9.3	ASME Code Class 1, 2, and 3 Components, and Component Supports, and Core Support Structures

3.9.4	Control Rod Drive Systems
3.9.5	Reactor Pressure Vessel Internals
3.9.6	Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints
3.9.7	Risk-Informed Inservice Testing of Pumps and Valves
3.9.8	Risk-Informed Inservice Inspection of Piping
3.10	Seismic and Dynamic Qualification of Mechanical and Electrical Equipment
3.11	Environmental Qualification of Mechanical and Electrical Equipment
3.12	Piping Design Review
3.13	Threaded Fasteners (ASME Code Class 1, 2, 3)
Ch 4	Reactor
4.1	Description
4.2	Fuel System Design
4.2.1	Design Bases
4.2.2	Description and Design Drawings
4.2.3	Design Evaluation
4.2.4	Testing and Inspection Plan
4.3	Nuclear Design
4.3.1	Design Basis
4.3.2	Nuclear Design Description
4.3.3	Analytical Methods
4.4	Thermal and Hydraulic Design
4.4.1	Design Basis
4.4.2	Description of the Thermal and Hydraulic Design of the Reactor Core
4.4.3	Description of the Thermal and Hydraulic Design of the Reactor Coolant System
4.4.4	Evaluation
4.4.5	Testing and Verification
4.4.6	Instrumentations Requirements
4.4.7	Flow Stability
4.5	Reactor Materials
4.5.1	Control Rod Drive Structural Materials
4.5.2	Reactor Internal and Core Support Structure Materials
4.6	Functional Design of Control Rod Drive System
4.6.1	Description
4.6.2	Evaluations
4.6.3	Testing and Verification
4.6.4	Information for Combined Performance of Reactivity Systems
4.6.5	Evaluations of Combined Performance
Ch 5	Reactor Coolant System and Connected Systems
5.1	Summary Description
5.1.1	Design Basis
5.1.2	System Description
5.1.3	System Components
5.1.4	System Evaluation
5.2	Integrity of Reactor Coolant Boundary
5.2.1	Compliance with Codes and Code Cases
5.2.1.1	Compliance with the Codes and Standards Rule, 10 CFR 50.55a
5.2.1.2	Applicable Code Cases

5.2.2	Overpressure Protection
5.2.3	Reactor Coolant Pressure Boundary Materials
5.2.4	Reactor Coolant Pressure Boundary Inservice Inspection and Testing
5.2.5	Reactor Coolant Pressure Boundary Leakage Detection
5.3	Reactor Vessel
5.3.1	Reactor Vessel Materials
5.3.2	P-T Limits, Upper-Shelf Energy, and Pressurized Thermal Shock
5.3.3	Reactor Vessel Integrity
5.4	Reactor Coolant System Component and Subsystem Design
5.4.1	Steam Generator Materials and Design
5.4.2	Steam Generator Program
5.4.3	Residual Heat Removal (RHR) System
5.4.4	Pressurizer Relief Tank
5.4.5	Reactor Coolant System High Point Vents
Ch 6	Engineered Safety Features
6.1	Coatings - Metallic and Organic Materials
6.2	Containment Systems
6.2.1	Containment Functional Design
6.2.2	Containment Heat Removal Systems
6.2.3	Secondary Containment Functional Design
6.2.4	Containment Isolation System
6.2.5	Combustible Gas Control in Containment
6.2.6	Containment Leakage Testing
6.2.7	Fracture Prevention of Containment Pressure Boundary
6.3	Passive Core Cooling System (ECCS)
6.3.1	Primary Decay Heat Removal (PDHR) System
6.3.2	Secondary Decay Heat Removal (SDHR) System
6.3.3	Automatic Depressurization System (ADS)
6.3.4	Passive Core Makeup Water System (PCMWS)
6.4	Control Room Habitability
6.5	Fission Product Removal and Control System
6.6	Inservice Inspection and Testing of Class 2 and 3 Components
Ch 7	Instrumentation and Controls
7.1	Introduction and Overview
7.1.1	Regulatory Requirements
7.1.2	System Architecture and Descriptions
7.2	Fundamental Design Principles
7.2.1	Design Bases and Additional Design Considerations
7.2.2	Independence
7.2.3	Redundancy
7.2.4	Predictability and Repeatability
7.2.5	Diversity and Defense-In-Depth
7.2.6	Safety Evaluation
7.2.7	Simplicity
7.2.8	Hazards Analysis
7.3	System Features
7.3.1	Quality
7.3.2	Equipment Qualification

7.3.3	Reliability, Integrity, and Completion of Protective Action
7.3.4	Operating and Maintenance Bypasses
7.3.5	Interlocks
7.3.6	Deviation of System Inputs
7.3.7	Setpoints
7.3.8	Auxiliary Features
7.3.9	Control of Access, Identification, and Repair
7.3.10	Interaction between Sense and Command Features and Other System
7.3.11	Automatic and Manual Control
7.3.12	Displays and Monitoring
7.3.13	Human Factors Considerations
7.3.14	Capability for Test and Calibration
Ch 8	Electric Power
8.1	Introduction
8.1.1	Utility Power Grid and Offsite Power System Description
8.1.2	Onsite Power System Description
8.1.3	Safety-Related Loads
8.1.4	Design Bases
8.2	Offsite Power System
8.3	Onsite Power Systems
8.4	Station Blackout
Ch 9	Auxiliary Systems
9.1	Fuel Storage and Handling
9.1.1	Criticality Safety of Fresh and Spent Fuel Storage and Handling
9.1.2	New and Spent Fuel Storage
9.1.3	Spent Fuel Pool Cooling and Cleanup System
9.1.4	Light Load Handling System and Related Refueling Operations
9.1.5	Overhead Heavy Load Handling Systems
9.2	Water Systems
9.2.1	Station Service Water
9.2.2	Component Cooling Water Systems
9.2.3	Demineralized Water Makeup System
9.2.4	Potable and Sanitary Water Systems
9.2.5	Annular Reservoir (Ultimate Heat Sink)
9.2.6	Condensate Storage Facilities
9.2.7	Site Cooling, Chilled, and Utility Water Systems
9.3	Process Auxiliaries
9.3.1	Compressed Air System
9.3.2	Process and Post-Accident Sampling Systems
9.3.3	Equipment and Floor Drain System
9.3.4	Chemical and Volume Control and Boron Recovery Systems
9.3.6	Containment Evacuation and Flooding and Drain Systems
9.4	Air Conditioning, Heating, Cooling, and Ventilation Systems
9.4.1	Control Room Area Ventilation System
9.4.2	Auxiliary and Radwaste Area Ventilation System
9.4.3	Turbine Area Ventilation System
9.4.4	Engineered Safety Feature Ventilation System
9.5	Other Auxiliary Systems

9.5.1	Fire Protection Program
9.5.2	Communication Systems
9.5.3	Lighting Systems
9.5.4	Standby Diesel System, Subsystems and Supporting Systems
9.6	Fire Hazards Analysis
Ch 10	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
10.4.1	Main Condensers
10.4.2	Condenser Air Removal System
10.4.3	Turbine Gland Sealing System
10.4.4	Turbine Bypass System
10.4.5	Circulating Water System
10.4.6	Condensate Cleanup System
10.4.7	Condensate and Feedwater System
10.4.8	Steam Generator Blowdown System
10.4.9	Secondary Decay Heat Removal System (SDHR; like LWR AFW System)
10.4.10	Auxiliary Boiler System
10.4.11	Feedwater Treatment System
Ch 11	Radioactive Waste Management
11.1	Coolant Source Terms
11.2	Liquid Waste Management System
11.3	Gaseous Waste Management System
11.4	Solid Waste Management System
11.5	Process and Effluent Radiological Monitoring Instr. and Sampling Systems
11.6	Instrumentation and Control Design Features for Process and Effluent Radiological Monitoring, and Area Radiation and Airborne Radioactivity Monitoring
Ch 12	Radiation Protection
12.1	Assuring that Occupational Radiation Exposures are ALARA
12.2	Radiation Sources
12.3	Radiation Protection Design Features
12.4	Dose Assessment
12.5	Operational Radiation Protection Program
Ch 13	Conduct of Operations
13.1	Organizational Structure
13.1.1	Management and Technical Support Organization
13.1.2	Operating Organization
13.1.3	Qualifications of Nuclear Plant Personnel
13.2	Training
13.2.1	Reactor Operator Requalification Program; Reactor Operator Training
13.2.2	Non-Licensed Plant Staff Training
13.3	Emergency Planning
13.4	Operational Programs
13.5	Plant Procedures
13.5.1	Administrative Procedures

13.5.2	Operating and Emergency Operating Procedures
13.5.3	Maintenance and Other Operating Procedures
13.6	Physical Security
13.6.1	Physical Security
13.6.4	Access Authorization
13.6.6	Cyber Security Plan
13.7	Fitness for Duty - Introduction
13.7.1	Fitness for Duty
Ch 14	Initial Test Program
14.1	Scope of the Initial Plant Test Program (PSAR and FSAR)
14.1.1	Structural and Systems Engineering
14.1.2	Piping Systems and Components
14.1.3	Reactor Systems
14.1.4	Instrumentation and Controls
14.1.5	Electrical Systems
14.1.6	Plant Systems
14.1.7	Radiation Protection
14.1.8	Human Factors Engineering
14.1.9	Emergency Planning
14.1.10	Containment Systems
14.1.11	Physical Security Hardware
14.2	Special, Unique and FOAK Plant Design Features
14.3	Regulatory Guidance
14.4	Utilization of Plant Operating and Testing Experience at Other Reactor Facilities
14.5	Test Program Schedule
14.6	Trial Use of Plant Operating and Emergency Procedures
14.7	Augmenting Staff During Test Program
Ch 15	Transient and Accident Analyses
15.1	Transient and Accident Analyses
15.1.1	Radiological Consequence Analyses Using Alternate Source Terms
15.1.2	Review of Transient and Accident Analyses
15.1.3	DBA Radiological Consequences of Analyses for Advanced LWR
15.1.4	Safe, Stabilized Condition
15.1.5	Long Term Decay and Residual Heat Removal
15.1.6	Evaluation of a Return to Power
15.2	Increase in Heat Removal by the Secondary System
15.2.1	Decrease in Feedwater Temperature
15.2.2	Increase in Feedwater Flow
15.2.3	Increase in Steam Flow
15.2.4	Inadvertent Opening of a Steam Generator Relief or Safety Valve
15.2.5	Steam System Piping Failures Inside and Outside of Containment
15.2.6	Loss of Containment Vacuum/Containment Flooding
15.3	Decrease in Heat Removal by the Secondary Side
15.3.1	Loss of External Load
15.3.2	Turbine Trip
15.3.3	Loss of Condenser Vacuum
15.3.4	Closure of Main Steam Isolation Valve
15.3.5	Steam Pressure Regulator Failure (Closed)

15.3.6	Loss of Nonemergency AC Power to the Station Auxiliaries
15.3.7	Loss of Normal Feedwater Flow
15.3.8	Feedwater System Pipe Breaks Inside and Outside Containment
15.3.9	Inadvertent Operation of the PDHR and/or SDHR Systems
15.4	Decrease in RCS Flow Rate
15.5	Reactivity and Power Distribution Anomalies
15.5.1	Uncontrolled CRA Withdrawal from a Subcritical or Low Power Startup Condition
15.5.2	Uncontrolled CRA Withdrawal at Power
15.5.3	Control Rod Misoperation (System Malfunction or Operator Error)
15.5.4	Inadvertent Decrease in Boron Concentration in the RCS
15.5.7	Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position
15.5.8	Spectrum of Rod Ejection Accidents
15.6	Increase in Reactor Coolant Inventory
15.6.1	Inadvertent Operation of ECCS and CVCS
15.6.2	Malfunction that Increases Reactor Coolant Inventory
15.7	Decrease in Reactor Coolant Inventory
15.7.1	Inadvertent Opening of a Pressurizer PRV
15.7.2	Failure of Small Lines Carrying Primary Coolant Outside Containment
15.7.3	Steam Generator Tube Failure
15.7.4	LOCAs Resulting from Spectrum of Postulated Piping Breaks Within the RCPB
15.7.5	Inadvertent Operation of the ECCS
15.8	Radioactive Release from a Subsystem or Component
15.8.1	Gaseous and/or Liquid Waste Management System Leak or Failure
15.8.2	Postulated Radioactive Releases Due to Liquid-Containing Tank Failures
15.8.3	Fuel Handling Accidents
15.8.4	Spent Fuel Cask Drop Accidents
15.9	Anticipated Transients without Scram
15.10	Thermal Hydraulic Stability Review
15.10.1	Consideration of Thermal Hydraulic Stability
15.10.2	Stability Analyses
15.11	Core Damage Event
Ch 16	Technical Specifications
16.1	Technical Specifications (TSs)
16.1.1	Introduction to TSs
16.1.2	TS Development and Screening Process
16.2	TSs and Bases
Ch 17	Quality Assurance
17.1	Quality Assurance During the Design and Construction Phases
17.2	Quality Assurance During the Operations Phase
17.3	Quality Assurance Program Description (QAPD)
17.4	Reliability Assurance Program (RAP)
17.5	Maintenance Rule
Ch 18	Human Factors Engineering
18.1	Human Factors Engineering Overview and Program Management
18.2	Operating Experience Review
18.3	Functional Requirements Analysis and Function Allocation
18.4	Task Analysis
18.5	Staffing and Qualifications

18.6	Treatment of Important Human Actions
18.7	Human-System Interface Design
18.8	Procedure Development
18.9	Training Program Development
18.10	Human Factors Verification and Validation
18.11	Design Implementation
18.12	Human Performance Monitoring
18.13	Guidance for Crediting Manual Operator Actions in D3 Analyses
Ch 19	Probabilistic Risk Assessment and Severe Accident Evaluation
19.1	Probabilistic Risk Assessment
19.2	Severe Accident Evaluation
19.3	Regulatory Treatment of Non-Safety Systems (RTNSS)
19.4	Strategies and Guidance to Address Loss-of-Large Areas of the Plant due to Explosions and Fires
19.5	Adequacy of Design Features and Functional Capabilities Identified and Described for Withstanding Aircraft Impacts
Ch 20	Mitigation of Beyond-Design-Basis Events
20.1	Mitigating Strategies for Beyond-Design-Basis Events
20.1.1	Extended Loss of AC Power Event
20.1.2	Spent Fuel Pool Instrumentation
20.2	Loss of Large Areas of the Plant due to Explosions and Fires
20.2.1	Phase 1 – Enhanced Fire Fighting Capabilities
20.2.2	Phase 2 – Measures to Mitigate Damage to Fuel in the Spent Fuel Pool
20.2.3	Phase 3 – Measures to Mitigate Damage to Fuel in the Reactor Vessel and Minimize Radiological Release

Proposed ER Chapters

The proposed ER Chapters below are based, in part, on RG 4.2 and NUREG-1555 SRP.

Ch	SMR-160 ER	RG 4.2, R3, App. C - Considerations
1	Introduction	Use Ch 1 guidance. Purpose and need may vary from just the production of electricity.
2	Affected Environment	Use Ch 2 guidance. Hydrology and ecology (aquatic life) characterizations may vary based on design depth and dry cooling use.
3	Site Layout and Project Description	Use Ch 3 guidance. Describe unique features, include SMR plot plan.
4	Construction Impacts at the Proposed Site	Use Ch 4 guidance. Discuss potential for additional units and infrastructure to support future construction activities.
5	Operational Impacts at the Proposed Site	Use Ch 5 guidance. See considerations above.
6	Fuel Cycle, Transportation, and Decommissioning	Use Ch 6 guidance.
7	Cumulative Impacts	Use Ch 7 guidance. See considerations above.
8	Need for Power	Use Ch 8 guidance.
9	Environmental Impacts of Alternatives	Use Ch 9 guidance. Alternatives may vary from typical LLWRs based on capacity and reliability.
10	Conclusion and Recommendation	Use Ch 10 guidance.
11	Reference Guidance	Use Ch 11 guidance.

Proposed ER TOC (including Sections and Subsections)

The proposed ER table of contents below is based, in part, on RG 4.2 and NUREG-1555 SRP.

Ch 1	Introduction
1.1	Plant Owners and Reactor Type
1.2	Description of the Proposed Action and the Purpose and Need
1.3	Planned Activities and Schedules
1.4	Status of Compliance
Ch 2	Affected Environment
2.1	Land Use
2.1.1	Site, Vicinity, and Region
2.1.2	Transmission-Line Corridors and Other Offsite Areas
2.2	Water Resources (Surface Water and Groundwater)
2.2.1	Hydrology
2.2.2	Water Use
2.2.3	Water Quality
2.2.4	Water Monitoring
2.3	Ecological Resources
2.3.1	Terrestrial Ecology
2.3.2	Aquatic Ecology
2.4	Socioeconomics
2.4.1	Demographics
2.4.2	Community Characteristics
2.5	Environmental Justice
2.5.1	Identification of Potentially Affected EJ Populations
2.5.2	Identification of Potential Pathways and Communities with Unique Characteristics
2.6	Historical and Cultural Resources
2.6.1	Cultural Background
2.6.2	Historic and Cultural Resources at the Site and in the Vicinity
2.6.3	Consultation
2.7	Air Resources
2.7.1	Climate
2.7.2	Air Quality
2.7.3	Atmospheric Dispersion
2.7.4	Meteorological Monitoring
2.8	Nonradiological Health
2.8.1	Public and Occupational Health
2.8.2	Noise
2.8.3	Transportation
2.8.4	Electromagnetic Fields
2.9	Radiological Environment and Radiological Monitoring
Ch 3	Site Layout and Project Description
3.1	External Appearance and Plant Layout
3.2	Proposed Plant Structures, Systems and Components
3.3	Building Activities
3.4	Operational Activities

3.4.1	Plant-Environment Interfaces during Operation
3.4.2	Radioactive Waste Management
3.4.3	Nonradioactive Waste Management
Ch 4	Construction Impacts at the Proposed Site
4.1	Land-Use
4.1.1	Onsite Impacts
4.1.2	Offsite Impacts
4.2	Water Resources (Surface Water and Groundwater)
4.2.1	Hydrologic Alterations
4.2.2	Water-Use Impacts
4.2.3	Water-Quality Impacts
4.2.4	Water Monitoring
4.3	Ecological Resources
4.3.1	Terrestrial and Wetland Impacts
4.3.2	Aquatic Impacts
4.4	Socioeconomics
4.4.1	Physical Impacts
4.4.2	Demographic Impacts
4.4.3	Economic Impacts to the Community
4.4.4	Community Infrastructure Impacts
4.5	Environmental Justice
4.5.1	Environmental Impacts
4.5.2	Human-Health Effects
4.5.3	Subsistence, Special Conditions, and Unique Characteristics
4.6	Historic and Cultural Resources
4.7	Air Resources
4.8	Nonradiological Health
4.8.1	Public and Occupational Health
4.8.2	Noise
4.8.3	Transportation of Construction Materials and Personnel to and from the Proposed Site
4.9	Radiological Health
4.9.1	Direct Radiation Exposures
4.9.2	Radiation Exposures from Gaseous Effluents
4.9.3	Radiation Exposures from Liquid Effluents
4.9.4	Total Dose to Construction Workers
4.10	Nonradioactive Waste Management
4.10.1	Impacts to Land
4.10.2	Impacts to Water
4.10.3	Impacts to Air
4.11	Measures and Controls to Limit Adverse Impacts During Construction Activities
Ch 5	Operational Impacts at the Proposed Site
5.1	Land-Use
5.1.1	Onsite Impacts
5.1.2	Offsite Impacts
5.2	Water Resources (Surface Water and Groundwater)
5.2.1	Hydrologic Alterations
5.2.2	Water-Use Impacts
5.2.3	Water-Quality Impacts

5.2.4	Water Monitoring
5.3	Ecological Resources
5.3.1	Terrestrial and Wetland Impacts
5.3.2	Aquatic Impacts
5.4	Socioeconomics
5.4.1	Physical Impacts
5.4.2	Demographic Impacts
5.4.3	Economic Impacts to the Community
5.4.4	Community Infrastructure Impacts
5.5	Environmental Justice
5.5.1	Environmental Impacts
5.5.2	Human-Health Effects
5.5.3	Subsistence, Special Conditions, and Unique Characteristics
5.6	Historic and Cultural Resources
5.7	Air Resources
5.7.1	Cooling-System Impacts
5.7.2	Air-Quality Impacts
5.7.3	Transmission-Line Impacts
5.8	Nonradiological Health
5.8.1	Etiological Agents and Emerging Contaminants
5.8.2	Noise Impacts
5.8.3	Electric Shock Impacts
5.8.4	Chronic Effects of Electromagnetic Fields
5.8.5	Occupational Health
5.8.6	Human Health Impacts from Transportation
5.9	Radiological Health during Normal Operation and Radioactive Waste Management
5.9.1	Exposure Pathways
5.9.2	Radiation Doses to Members of the Public
5.9.3	Impacts to Members of the Public
5.9.4	Occupational Doses to Workers
5.9.5	Doses to Nonhuman Biota
5.9.6	Radiological Monitoring
5.9.7	Solid Waste Management and Onsite Spent Fuel Storage
5.10	Nonradioactive Waste Management
5.10.1	Impacts to Land
5.10.2	Impacts to Water
5.10.3	Impacts to Air
5.11	Environmental Impacts of Postulated Accidents
5.11.1	Design-Basis Accidents
5.11.2	Severe Accidents
5.11.3	Severe Accident Mitigation Alternatives
5.12	Measures and Controls to Limit Adverse Impacts during Operation
Ch 6	Fuel Cycle, Transportation and Decommissioning
6.1	Fuel-Cycle Impacts and Waste Management
6.1.1	Land Use
6.1.2	Water Use
6.1.3	Fossil Fuel Impacts
6.1.4	Chemical Effluents

6.1.5	Radiological Effluents
6.1.6	Radiological Wastes
6.1.7	Occupational Dose
6.1.8	Transportation Dose
6.2	Transportation of Fuel and Wastes
6.2.1	Components of a Full Description and a Detailed Analysis of Transportation Impacts
6.2.2	Estimating the Number of Shipments and Normalization of Shipments
6.3	Decommissioning
Ch 7	Cumulative Impacts
7.1	Past, Present, and Reasonably Foreseeable Future Projects
7.2	Impact Assessment
Ch 8	Need for Power
8.1	Description of the Applicant's Power Market
8.2	Power Demand
8.3	Power Supply
8.4	Summary of the Need for Power Analysis and Conclusions
Ch 9	Environmental Impacts of Alternatives
9.1	No-Action Alternative
9.2	Energy Alternatives
9.3	Site-Selection Process
9.3.1	The Region of Interest
9.3.2	Candidate Areas
9.3.3	Potential Sites
9.3.4	Candidate Sites
9.3.5	Proposed and Alternative Sites
9.4	System Alternatives
9.4.1	Heat Dissipation
9.4.2	Circulating-Water System Alternatives
9.4.3	Other System Alternatives
Ch 10	Conclusion and Recommendation
10.1	Impacts of the Proposed Actions
10.2	Unavoidable Adverse Environmental Effects
10.3	Relationship - Local Short-Term Use of the Environment and Long-Term Productivity
10.4	Irreversible and Irretrievable Commitments of Resources
10.5	Alternatives to the Proposed Action
10.6	Benefits and Costs
10.6.1	Benefits
10.6.2	Costs
10.6.3	Benefit-Cost Balance
Ch 11	Reference Guidance

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