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1.1 INTRODUCTION

This Site Safety Analysis Report (SSAR) supports Tennessee Valley Authority's (TVA's) Early Site Permit Application (ESPA) for the Clinch River Nuclear (CRN) Site. The SSAR addresses issues related to suitability of the CRN Site, in compliance with the regulations contained in 10 CFR 52, Subpart A, Early Site Permits. Specifically, the SSAR provides information related to site safety, emergency preparedness, and quality assurance.

The CRN Site is located in the City of Oak Ridge, Tennessee, and is the site of the former Clinch River Breeder Reactor Project. The CRN Site is comprised of approximately 935 acres, which are adjacent to the Clinch River arm of the Watts Bar Reservoir. TVA has not yet selected a reactor design to be constructed at the CRN Site; however, to facilitate the NRC's determination regarding suitability of the site for new nuclear units, TVA has provided a set of bounding plant parameters, referred to as the plant parameter envelope (PPE). The PPE was developed based on four small modular reactor (SMR) designs. An overview of the SMR designs used to develop the PPE is provided in Section 1.11, and Section 2.0 identifies the PPE and site characteristic values, which may be used as the basis for the NRC's determinations.

Where practicable, the SSAR section numbers correspond to those identified in NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition* (SRP). Because the scope of an ESPA is reduced as compared to a Combined License Application (COLA), there are gaps in the numbering sequence of the SSAR. Maintaining SSAR section numbering consistent with the SRP facilitates future integration of the ESPA information with reactor design certification information during COLA development.

A summary of the contents of the SSAR is as follows:

- Chapter 1, *Introduction and General Description of the Plant*, provides a general site description, an overview of reactor technologies considered in the development of the PPE, and a summary of SSAR compliance with regulations and conformance with regulatory guidance. A list of acronyms, abbreviations, and initialisms pertinent to the SSAR is included as Table 1.1-1.

- Chapter 2, *Site Characteristics*, outlines the PPE and provides information related to geography and demography; hazards from nearby industrial, transportation, and military facilities (including aircraft hazards); and the meteorological, hydrologic, geologic, and seismic characteristics of the site.

- Chapter 3, *Design of Structures, Components, Equipment, and Systems*, references information on aircraft hazards provided in Section 2.2.

- Chapter 11, *Radioactive Waste Management*, provides the analysis of doses due to liquid and gaseous effluents from normal operations.

- Chapter 13, *Conduct of Operations*, provides emergency planning and industrial security information.

- Chapter 15, *Accident Analyses*, provides accident and dose consequence analyses required by 10 CFR 52.17(a)(1), 50.34(a)(1) and 100.21(c)(2), based on information provided in the PPE.

- Chapter 17, *Quality Assurance*, provides a description of the quality assurance program (QAP) under which the ESPA was prepared and the proposed Quality Assurance Program Description to address the requirements of 10 CFR 52.17(a)(1)(xi).

Table 1.1-1 (Sheet 1 of 8)
Acronyms, Abbreviations, and Initialisms

1D	One Dimensional
2D	Two Dimensional
3D	Three Dimensional
AASHTO	American Association of State Highway and Transportation Officials
ac	Acre
ac-ft	Acre-feet
AFDD	Accumulated Freezing Degree-Days
AHEX	Atlantic Highly Extended Crust
ALOHA	Areal Locations of Hazardous Atmospheres
ALWR	Advanced Light Water Reactor
AM	Ante Meridiem
ANS	American Nuclear Society
ANSI	American National Standards Institute
ANSS	Advanced National Seismic System
APT	Aquifer Pumping Test
AQS	Air Quality System
ASCE	American Society of Civil Engineers
ASOS	Automated Survey Observing System
ASTM	ASTM International
atm	Atmospheres
ATV	Acoustic Televiewer
BCF	Block-centered Flow
BDBE	Beyond Design Basis Event
BP	Before Present
bpf	blows per foot
BPT	Brownian Passage Time
Btu	British Thermal Unit
BTP	Branch Technical Position
BWXT	BWX Technologies, Inc.
CAMP	Central Atlantic Magmatic Province
CAV	Cumulative Absolute Velocity
CDF	Core Damage Frequency
CEMP	Comprehensive Emergency Management Plan
CENA	Central and Eastern North America
CERI	Center for Earthquake Research and Information
CEUS	Central and Eastern United States
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CH	High Plasticity
Ci	Curies

Table 1.1-1 (Sheet 2 of 8)
Acronyms, Abbreviations, and Initialisms

cm	Centimeter
CNO	Chief Nuclear Officer
COCORP	Consortium for Continental Reflection Profiling
COL	Combined License
COLA	Combined License Application
CPA	Construction Permit Application
CPG	Comprehensive Preparedness Guide
CRBRP	Clinch River Breeder Reactor Project
CRM	Clinch River Mile
CRN	Clinch River Nuclear
CU	Consolidated Undrained
DBA	Design Basis Accident
DBT	Design Basis Tornado
DCF	Dose Conversion Factor
DEM	Digital Elevation Model
DO	Dissolved Oxygen
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRS	Design Response Spectra
DSF	Day-second-feet
EAB	Exclusion Area Boundary
EAL	Emergency Action Level
EAS	Emergency Alert System
ECC-AM	Extended Continental Crust – Atlantic Margin
ECC-GC	Extended Continental Crust – Gulf Coast
ECL	Effluent Concentration Limit
ECMA	East Coast Magnetic Anomaly
EDS	Environmental Data Station
EIS	Environmental Impact Statement
El	Elevation
EP	Emergency Preparedness
EPA	U.S. Environmental Protection Agency
EPFS	Eastern Piedmont Fault System
EPRI	Electric Power Research Institute
EPRI-SOG	Electric Power Research Institute – Seismicity Owners Group
EPZ	Emergency Planning Zone
EQNO	Earthquake Number
ER	Environmental Report
ERB	Effluent Release Boundary
ERH	Estimated Horizontal Location Uncertainty
ERM-N	Eastern Rift Margin - North

Table 1.1-1 (Sheet 3 of 8)
Acronyms, Abbreviations, and Initialisms

ERM-S	Eastern Rift Margin - South
ESP	Early Site Permit
ESPA	Early Site Permit Application
ETE	Evacuation Time Estimate
ETR	Energy Transfer Ratio
ETSZ	Eastern Tennessee Seismic Zone
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FAS	Fourier Amplitude Spectrum
FDD	Freezing Degree Day
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FOSID	First Onset of Significant Inelastic Deformation
FP	Fossil Plant
fps	Feet per Second
FS	Factor of Safety
FSAR	Final Safety Analysis Report
ft	Foot or Feet
ftbgs	Feet Below Ground Surface
ftbtc	Feet Below Top of Casing
Ga	Giga Annum
GCVSZ	Giles County, Virginia, Seismic Zone
GHEX	Gulf Coast Highly Extended Crust
GI-LLI	Gastrointestinal Tract – Lower Large Intestine
GIS	Geographic Information Systems
GMH	Great Meteor Hotspot
GmP	Generation mPower, LLC
GMPE	Ground Motion Prediction Equations
GMRS	Ground Motion Response Spectrum
gpd	Gallons per Day
GMM	Ground Motion Models
gpm	Gallons per Minute
GPS	Global Positioning System
GS	Ground Surface
GSC	Geological Survey of Canada
GSI	Geological Strength Index
HCI	Hydrochloric Acid
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HF	High-frequency
HHA	Hierarchical Hazard Assessment
HiRAT	High Resolution Acoustic Televiewer

Table 1.1-1 (Sheet 4 of 8)
Acronyms, Abbreviations, and Initialisms

HI-SMUR™	Holtec Inherently-Safe Modular Underground Reactor
HMR	NOAA Hydro-Meteorological Report
HP	Hydro Plant
hr	Hour
Hz	Hertz
IBEB	Illinois Basin Extended Basement
IDLH	Immediately Dangerous to Life or Health
IEEE	Institute of Electrical and Electronics Engineers
in.	Inch
iPWR	Integral Pressurized Water Reactor
IRM	Iapetan Rifted Margin
ISFSI	Independent Spent Fuel Storage Installation
ISG	Interim Staff Guidance
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
JFD	Joint Frequency Distribution
ka	Kilo Annum
kg	Kilogram
km	Kilometer
K-S-B	Kijko-Sellevoll-Bayes
ksf	Kilopound per Square Foot
LCD	Local Climatological Data
LDO	Lamont-Doherty Cooperative Seismographic Network Catalog
LEL	Lower Explosive Limit
LF	Low-frequency
LFL	Lower Flammability Limit
LiDAR	Light Detection and Ranging
LIP	Local Intense Precipitation
LMDCT	Linear Mechanical Draft Cooling Tower
LOA	Letter of Agreement
LOCA	Loss-of-Coolant Accident
LPZ	Low Population Zone
m	Meter
M	Moment Magnitude
Ma	Mega Annum
MAFE	Mean Annual Frequency of Exceedance
MBDBE	Mitigation of Beyond Design Basis Events
MEI	Maximally Exposed Individual
MESE	Mesozoic and Younger Extension
MESE-N	Narrow Mesozoic and Younger Extension
MESE-W	Wide Mesozoic and Younger Extension
mgd	Million Gallons per Day

Table 1.1-1 (Sheet 5 of 8)
Acronyms, Abbreviations, and Initialisms

mg/L	Milligrams per Liter
mi	Mile
MidC	Midcontinent-Craton
ML	Local Magnitude
mmHg	Millimeters of Mercury
MMI	Modified Mercalli Intensities
MOA	Military Operations Area
mph	Miles per Hour
msl	Mean Sea Level
MWe	Megawatt Electric
MWt	Megawatt Thermal
NAAQS	National Ambient Air Quality Standards
NAD27	North American Datum of 1927
NAD83	North American Datum of 1983
NAMT	North America Moment Tensor
NAP	Northern Appalachian
NAVD88	North American Vertical Datum of 1988
NAWQA	National Water-Quality Assessment Program
NBI	National Bridge Inventory
NCDC	National Climatic Data Center
NEDB	National Earthquake Database (of Canada)
NEI	Nuclear Energy Institute
NEIC	National Earthquake Information Center
NGVD29	National Geodetic Vertical Datum of 1929
NID	National Inventory of Dams
NIOSH	National Institute of Occupational Safety and Health
NMESE	Not Experienced Mesozoic and Younger Extension
NMFS	New Madrid Fault System
NMN	New Madrid North
NMS	New Madrid South
NOAA	National Oceanic and Atmospheric Administration
NP	Nuclear Plant
NQAP	Nuclear Quality Assurance Plan
NRC	Nuclear Regulatory Commission
NSHMP	National Seismic Hazards Mapping Program
NTU	Nephelometric Turbidity Unit
NWS	National Weather Service
NY–AL	New York–Alabama
ODUSD	Office of the Deputy Under Secretary of Defense
OKA	Oklahoma Aulacogen
OKO	Oklahoma Geological Survey Catalog

Table 1.1-1 (Sheet 6 of 8)
Acronyms, Abbreviations, and Initialisms

OMG	Operations Management Group
ORNL	Oak Ridge National Laboratory
ORO	Offsite Response Organization
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
OSL	Optically Stimulated Luminescence
OW	Observation Well
PAC	Protective Action Criteria
PAG	Protective Action Guide
PBA	Power Block Area
pcf	Pounds per Cubic Foot
PDE	Preliminary Determination of Epicenters
PEP	Plume Exposure Pathway
PEZ	Paleozoic Extended Crust
PEZ-N	Paleozoic Extended Crust Narrow
PEZ-W	Paleozoic Extended Crust Wide
PGA	Peak Ground Acceleration
PI	Plasticity Index
PM	Post Meridiem
PMC	Project Management Corporation
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PMWP	Probable Maximum Winter Precipitation
PPE	Plant Parameter Envelope
PPRP	Participatory Peer Review Panel
PRA	Probabilistic Risk Assessment
PSAR	Preliminary Safety Analysis Report
psf	Pounds per Square Foot
PSHA	Probabilistic Seismic Hazard Analysis
psi	Pounds per Square Inch
psia	Pound per Square Inch Absolute
psig	Pounds per Square Inch Gage
PW	Pumping Well
PWR	Pressurized Water Reactor
QA	Quality Assurance
QAP	Quality Assurance Program
QC	Quality Control
Qc	Colluvium or Colluvial
Qha	Holocene Alluvium
Qhaf	Holocene Alluvial Fan
Qht	Holocene

Table 1.1-1 (Sheet 7 of 8)
Acronyms, Abbreviations, and Initialisms

Qpt	Pleistocene
RCTS	Resonant Column Torsional Shear
rem	Roentgen Equivalent in Man
RFT	Reelfoot Thrust
RG	Regulatory Guide
RH	Relative Humidity
RLME	Repeated Large Magnitude Earthquake
RMP	Risk Management Program
RMR	Rock Mass Rating
RMSE	Root Mean Square Error
ROS	Reservoir Operations Study
RQD	Rock Quality Designation
RR	Reelfoot Rift
RR-RCG	Reelfoot Rift Rough Creek Graben
RSB	Reactor Service Building
RTD	Resistance Temperature Detector
RVT	Random Vibration Theory
SACTI	Seasonal/Annual Cooling Tower Impacts
SARA	Superfund Amendments and Reorganization Act
SCCW	Supplemental Condenser Cooling Water
SCR	Stable Continental Regions
SCSN	South Carolina Seismic Network
SDWIS	Safe Drinking Water Information System
SI	Subsurface Investigation
SLR	Saint Lawrence Rift Zone
SLU	St. Louis University
SMR	Small Modular Reactor
SNM	Special Nuclear Material
SPT	Standard Penetration Test
SRP	Standard Review Plan
SSAR	Site Safety Analysis Report
SSC	Seismic Source Characterization
SSCs	Structures, Systems, and Components
SSE	Safe-Shutdown Earthquake
SSHAC	Senior Seismic Hazards Analysis Committee
STEL	Short Term Exposure Limit
SUSN	Southeastern United States Network
TAF	Terminal Area Forecast
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TDS	Total Dissolved Solids

Table 1.1-1 (Sheet 8 of 8)
Acronyms, Abbreviations, and Initialisms

TEDE	Total Effective Dose Equivalent
TI	Technical Integration
TLV	Threshold Limit Value
TN	Tennessee
TNT	Trinitrotoluene
TRM	Tennessee River Mile
TVA	Tennessee Valley Authority
TVAN	Tennessee Valley Authority Nuclear
TWA	Time-weighted Average
µS	Microsiemens
UFL	Upper Flammability Limit
UHRS	Uniform Hazard Response Spectra
UHS	Ultimate Heat Sink
URD	Utility Requirements Document
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
UU	Unconsolidated Undrained
V/H	Vertical to Horizontal
Vs	Shear Wave Velocity
WBN	Watts Bar Nuclear Plant
WTP	Water Treatment Plant
WUS	Western United States
X/Q	Atmospheric Dispersion
yr or yrs	Year or Years

1.2 GENERAL SITE DESCRIPTION

1.2.1 Site Location

The Clinch River Nuclear (CRN) Site is located in Oak Ridge, Tennessee, and comprises approximately 935 acres of land adjacent to the Clinch River arm of the Watts Bar Reservoir. The CRN Site is the location of the former Clinch River Breeder Reactor Project. A more detailed description of the site location is provided in Section 2.1.

The site is bounded on the east, south, and west by the Clinch River arm of the Watts Bar Reservoir and on the north by the Grassy Creek Habitat Protection Area. Communities located near the site include Kingston (approximately 6.8 miles [mi] west), Harriman (9.2 mi west-northwest), Lenoir City (approximately 8.8 mi southeast), and Knoxville (approximately 25.6 mi east-northeast).

Figures 2.1-3 and 2.1-4 show the CRN Site location and the surrounding 5-mi vicinity and 50-mi region, respectively.

1.2.2 Site Development

TVA has not selected a reactor technology to be constructed at the CRN Site. Instead, a set of bounding plant parameter values has been identified, based upon the available information from various light-water-cooled, small modular reactor (SMR) designs. This set of bounding values, referred to as the plant parameter envelope (PPE), is presented in Section 2.0 and provides the basis for future site development at the CRN Site. The PPE is based on construction and operation at the CRN Site of two or more SMRs with a maximum rated thermal power for a single unit of 800 MWt. The combined nuclear generating capacity from the site is not to exceed 2420 MWt (800 MWe). Because a specific reactor technology has not been selected, an area, referred to as the “power block area,” has been proposed as the location of the reactor modules on the site. The CRN Site location is shown in Figure 1.2-1, while the general plant areas, including the power block area, are illustrated in Figure 1.2-2.

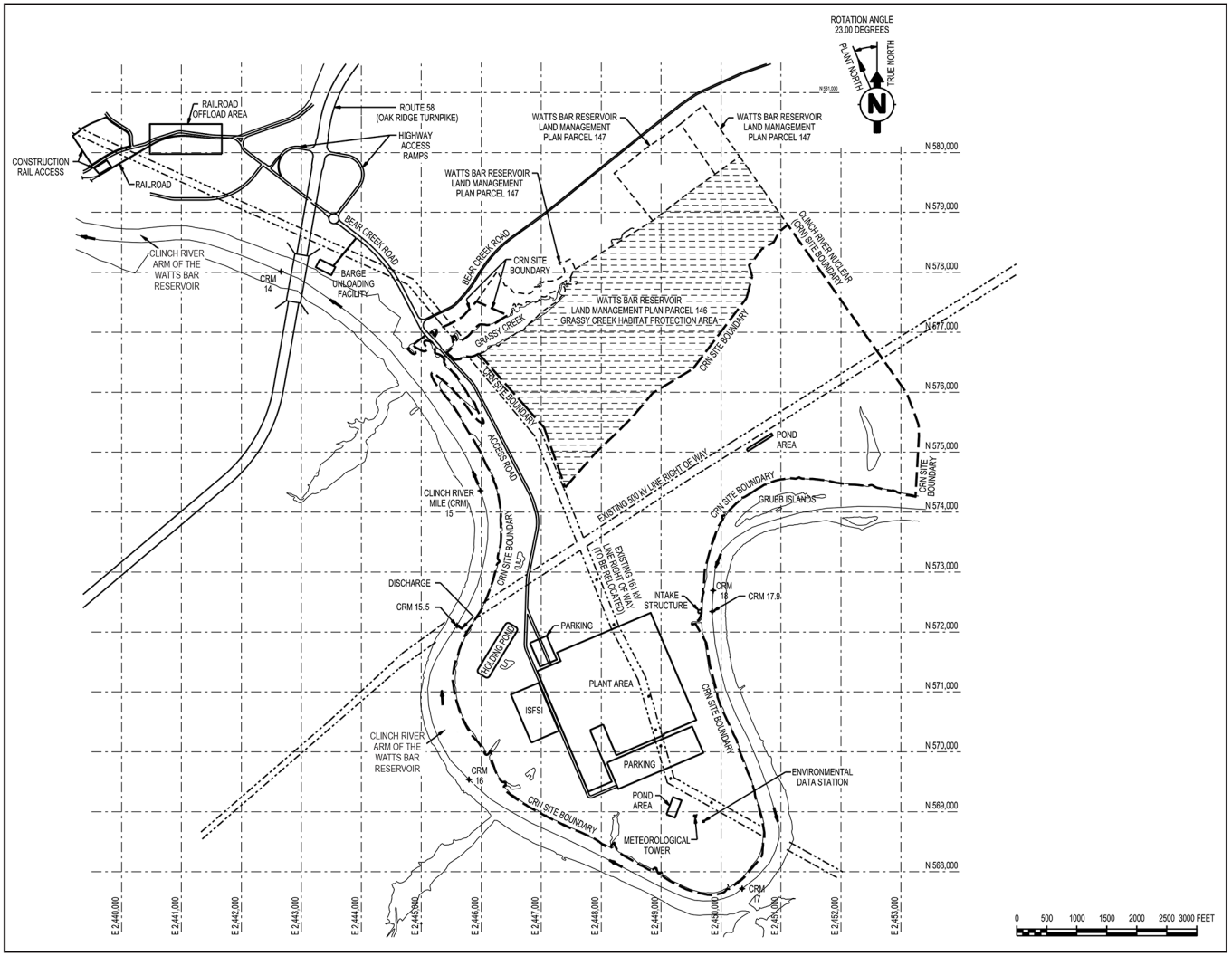

Figure 1.2-1. Clinch River Nuclear Site Location

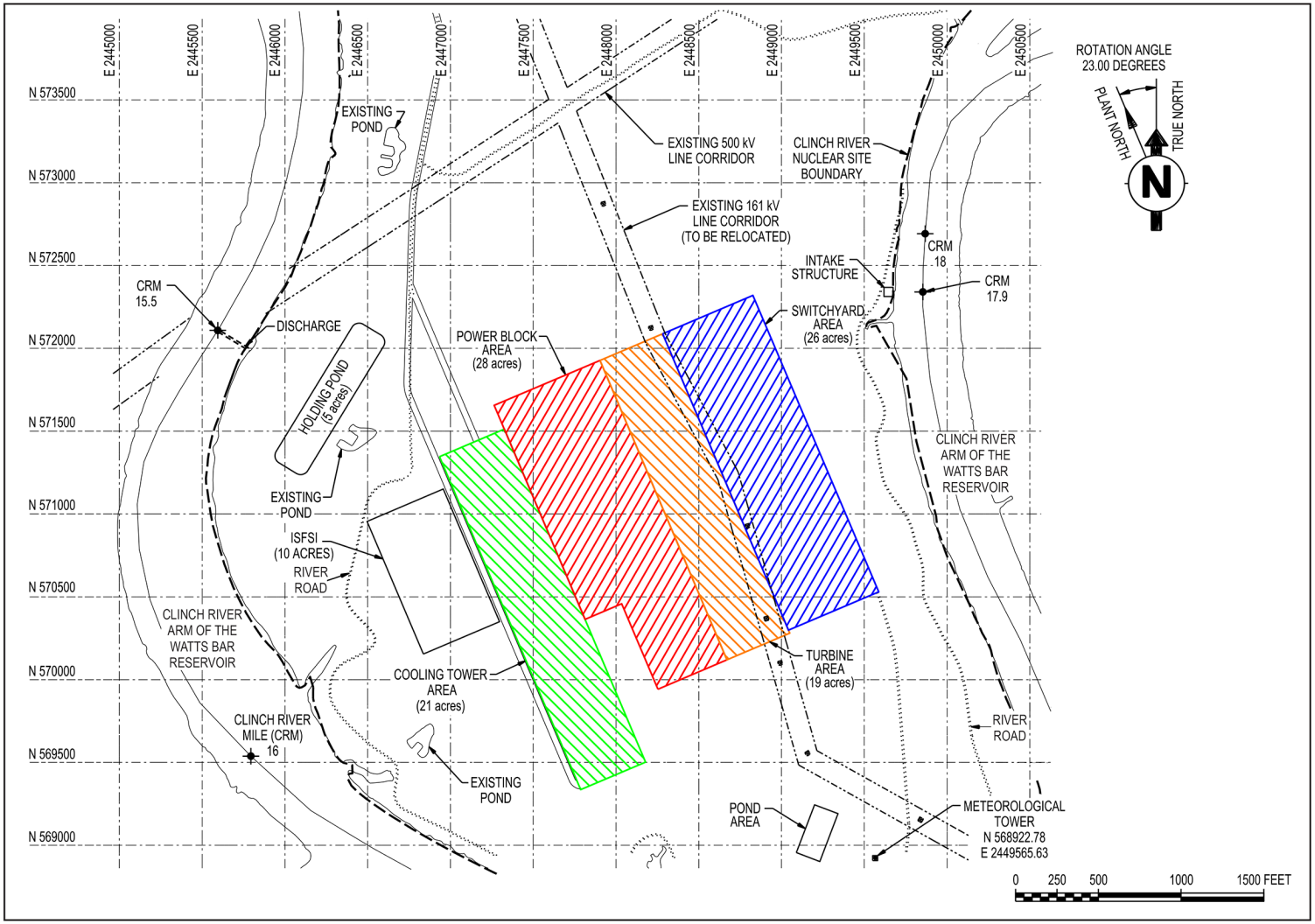

Figure 1.2-2. Clinch RiverNuclear Site Plant Areas

1.3 COMPARISON WITH OTHER FACILITIES

This section is not applicable to an Early Site Permit Application using the plant parameter envelope approach.

1.4 IDENTIFICATION OF AGENTS AND CONTRACTORS

1.4.1 Applicant/Program Manager

The Tennessee Valley Authority (TVA) is the Applicant for an Early Site Permit (ESP) at the Clinch River Nuclear (CRN) Site. TVA is the United States' largest public power provider. It was established by Congress in 1933, among other things, to improve navigation on the Tennessee River, reduce the damage from destructive floodwaters within the Tennessee River system and downstream on the lower Ohio and Mississippi Rivers, further the economic development of TVA's service area, and sell the electricity generated at the facilities TVA operates. TVA's service territory, which includes most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia, serves more than nine million people. TVA sells electricity to 155 local power company customers and directly serves approximately 52 large industrial facilities and 8 Federal facilities.

1.4.2 Principal Contractors and Participants

1.4.2.1 BWX Technologies, Inc.

TVA has a contract with BWX Technologies (BWXT) to provide technical information to TVA in support of the ESP Application (ESPA).

1.4.2.2 Generation mPower LLC

BWXT has contracted Generation mPower (GmP) to manage development of portions of the ESPA.

1.4.2.3 Bechtel Power Corporation

Bechtel Power Corporation assisted in developing portions of the Site Safety Analysis Report (SSAR) and conducted various analyses and investigations, including:

- Geotechnical field investigations, with contracted support from Amec Foster Wheeler
- Identification and characterization of seismic source zones, with contracted support from Lettis Consultants International
- Determination of site-specific distribution coefficients, with contracted support from Argonne National Laboratory

1.4.2.4 Other Contractors and Participants

Contractual relationships were established between TVA and specialized consulting firms to assist in preparation of the ESPA for the CRN Site, as discussed in the following subsections.

1.4.2.4.1 Barge Waggoner Sumner & Cannon, Inc.

TVA contracted Barge Waggoner Sumner & Cannon, Inc., to perform evaluations and studies in the area of hydrology.

1.4.2.4.2 Enercon Services, Inc.

TVA contracted Enercon Services, Inc., to prepare portions of the SSAR related to demography and meteorology and to develop the Emergency Plans.

1.4.2.4.3 AECOM Technical Services Inc.

TVA contracted AECOM Technical Services, Inc., to perform a portion of the seismic analyses.

1.5 REQUIREMENTS FOR ADDITIONAL TECHNICAL INFORMATION

No technical development programs remain to be performed to support this application.

1.6 MATERIAL REFERENCED

No material has been incorporated by reference in this application.

1.7 DRAWINGS AND OTHER DETAILED INFORMATION

No such information has been submitted separately as part of this application.

1.8 INTERFACES WITH STANDARD DESIGN

This topic is not applicable to an Early Site Permit Application using the plant parameter envelope approach and is addressed at the combined license application stage.

1.9 CONFORMANCE WITH REGULATORY CRITERIA

This section addresses the conformance of the Site Safety Analysis Report (SSAR) with applicable NRC guidance contained in NRC Regulatory Guides (RGs) and NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition* (SRP).

NRC RGs evaluated for conformance were identified through a review of the applicable SRP sections. Table 1.9-1 provides a listing of applicable RGs by number and title with the associated SSAR section number statements of conformance. Exceptions to conformance with a RG are noted with an explanation. RGs included are those identified in the applicable SRP sections.

Table 1.9-2 provides a listing of the SRP sections, applicable to an Early Site Permit Application (ESPA), with statements of conformance. An exception to conformance is noted when the SSAR does not meet regulatory guidance as stated but the intent or objective is met using an acceptable alternative. Exceptions to conformance with the SRP are noted with an explanation.

Exemptions to NRC regulations required to support this ESPA are identified and described in ESPA Part 6.

Table 1.9-1 (Sheet 1 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[a]	Comments
1.23	1	Meteorological Monitoring Programs for Nuclear Power Plants	2.3.1	Conforms	
			2.3.2	Conforms	
			2.3.3	Conforms	
			2.3.4	Conforms	
			2.3.5	Conforms	
1.26	4	Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants	17.5	NA	Quality group classifications are addressed in the Combined License Application (COLA), when a reactor technology has been selected.
1.27	3	Ultimate Heat Sink for Nuclear Power Plants	2.3.1	NA	The small modular reactor (SMR) designs being considered for use at the Clinch River Nuclear (CRN) Site use passive containment cooling for the ultimate heat sink (UHS). As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.1	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.2	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.3	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.4	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.

Table 1.9-1 (Sheet 2 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[(a)]	Comments
			2.4.5	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.6	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.7	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.8	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.9	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.11	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.4.12	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.
			2.5.4	NA	The SMR designs being considered for use at the CRN Site use passive containment cooling for the UHS. As indicated in RG 1.27, Rev. 3, the guidance provided therein does not apply for those designs.

Table 1.9-1 (Sheet 3 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[(a)]	Comments
1.28	4	Quality Assurance Program Criteria (Design and Construction)	2.5.4	NA	The activities related to an ESPA do not involve design or construction of a nuclear power plant. This is addressed in the COLA.
			2.5.5	NA	The activities related to an ESPA do not involve design or construction of a nuclear power plant. This is addressed in the COLA.
			17.5	NA	The activities related to an ESPA do not involve design or construction of a nuclear power plant. This is addressed in the COLA.
1.29	4	Seismic Design Classification	2.4.1	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.2	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.3	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.4	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.5	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.6	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.7	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.8	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.9	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.10	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
			2.4.11	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.

Table 1.9-1 (Sheet 4 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[a]	Comments
			2.4.14	NA	The site grade is above the maximum flood height (the site is considered to be “dry”). Thus, no flooding protection for structures, systems, and components (SSCs) important to safety is required.
			17.5	NA	Seismic design is addressed in the COLA when a reactor technology has been selected.
1.59	2	Design Basis Floods for Nuclear Power Plant	2.4.1	Conforms	
			2.4.2	Conforms	
			2.4.3	Conforms	
			2.4.4	Conforms	
			2.4.5	Conforms	
			2.4.6	Conforms	No tsunami-induced flooding hazards are expected at the site. Operating procedures are addressed in the COLA.
			2.4.7	Conforms	
			2.4.8	NA	The CRN Site does not include cooling water canals or reservoirs.
			2.4.9	Conforms	Channel diversions as a result of changes to the river basin, associated with the CRN Site, are not expected to cause flooding hazards at the CRN Site.
			2.4.10	Conforms	The CRN Site is a “dry” site.
			2.4.14	Conforms	The CRN Site is a “dry” site.
1.60	2	Design Response Spectra for Seismic Design of Nuclear Power Plants	2.5.2	NA	Site-specific vertical Ground Motion Response Spectra (GMRS) was developed using the guidance in RG 1.208.
1.76	1	Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants	2.3.1	Conforms	
1.78	1	Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release	2.2.1–2.2.2	Conforms	
			2.2.3	Conforms	

Table 1.9-1 (Sheet 5 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[a]	Comments
1.91	2	Evaluations of Explosions Postulated to Occur at Nearby Facilities and on Transportation Routes Near Nuclear Power Plants	2.2.1–2.2.2	Conforms	
			2.2.3	Conforms	
1.101	5	Emergency Response Planning and Preparedness for Nuclear Power Reactors	13.3	NA	An emergency action-level scheme will be adopted consistent with industry standards developed to address SMR technology.
1.102	1	Flood Protection for Nuclear Power Plants	2.4.1	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.2	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.3	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.4	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.5	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.6	Conforms	There are no tsunami-induced flood hazards at the CRN Site. Design and operational considerations are addressed in the COLA.
			2.4.7	Conforms	There are no ice-induced flooding hazards at the CRN Site. Design and operational considerations are addressed in the COLA.
			2.4.8	Conforms	The CRN Site layout does not include cooling water canals or reservoirs. The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.9	Conforms	Channel diversions are not expected to cause flooding at the CRN Site. Design and operational considerations are addressed in the COLA.
			2.4.10	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.
			2.4.14	Conforms	The CRN Site is a “dry” site. Design and operational considerations are addressed in the COLA.

Table 1.9-1 (Sheet 6 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[a]	Comments
1.109	1	Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50, Appendix I	2.4.13	Conforms	
			11.2.3	Conforms	
			11.3.3	Conforms	
1.111	1	Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors	2.3.4	Conforms	
			2.3.5	Conforms	
			11.3.3	Conforms	
1.112	1	Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Nuclear Power Reactors	11.2.3	NA	Information related to the effluent source term is based upon vendor-provided information in the plant parameter (PPE) approach. In-plant controls are addressed in the COLA.
			11.3.3	NA	Information related to the effluent source term is based upon vendor-provided information in the PPE approach. In-plant controls are addressed in the COLA.
1.113	1	Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I	2.4.13	NA	Information is applicable only when calculating re-concentration in surface waters.
			11.2.3	Conforms	
1.125	2	Physical Models for Design and Operation of Hydraulic Structures and Systems for Nuclear Power Plants	2.4.8	NA	The site does not include cooling water canals or reservoirs.
1.132	2	Site Investigations for Foundations of Nuclear Power Plants	2.5.2	Conforms	Investigation of borrow materials and materials suitable for foundations is addressed in COLA.
			2.5.3	NA	Regulatory Guide 1.132 is no longer referenced in SRP Section 2.5.3.
			2.5.4	Conforms	Construction mapping is addressed in COLA.
			2.5.5	Conforms	

Table 1.9-1 (Sheet 7 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[a]	Comments
1.138	2[b]	Laboratory Investigations of Soils and Rocks for Engineering Analysis and Design of Nuclear Power Plants	2.5.2	Conforms	ASTM D7012-10 was used for testing related to unconfined compression, as ASTM D2938 was withdrawn and replaced by ASTM D7012.
			2.5.4	Conforms	ASTM D7012-10 was used for testing related to unconfined compression, as ASTM D2938 was withdrawn and replaced by ASTM D7012.
			2.5.5	Conforms	ASTM D7012-10 was used for testing related to unconfined compression, as ASTM D2938 was withdrawn and replaced by ASTM D7012.
1.138	3[b]	Laboratory Investigations of Soils and Rocks for Engineering Analysis and Design of Nuclear Power Plants	2.5.2	Exception	This revision was issued after the completion of the subsurface investigation. The following standards were used that reflect revisions later than those identified in RG 1.138, Rev. 3: ASTM D3080/3080M-11, ASTM D2435/2435M-11, and ASTM D1557-12.
			2.5.4	Exception	This revision was issued after the completion of the subsurface investigation. The following standards were used that reflect revisions later than those identified in RG 1.138, Rev. 3: ASTM D3080/3080M-11, ASTM D2435/2435M-11, and ASTM D1557-12.
			2.5.5	Exception	This revision was issued after the completion of the subsurface investigation. The following standards were used that reflect revisions later than those identified in RG 1.138, Rev. 3: ASTM D3080/3080M-11, ASTM D2435/2435M-11, and ASTM D1557-12.
1.145	1	Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants	2.3.4	Conforms	
			2.3.5	Conforms	
1.183	0	Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors	15	NA	Accident source term is defined in the PPE. Vendor-specific source terms are addressed in the COLA.

Table 1.9-1 (Sheet 8 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[(a)]	Comments
1.198	0	Procedures and Criteria for Assessing Seismic Soil Liquefaction At Nuclear Power Plant Sites	2.5.2	Conforms	
			2.5.3	NA	Regulatory Guide 1.198 is no longer referenced in SRP Section 2.5.3.
			2.5.4	Conforms	
			2.5.5	Conforms	
1.208	0	A Performance-Based Approach to Define the Site-Specific Earthquake Ground Motion	2.5.1	Conforms	
			2.5.2	Conforms	
			2.5.3	Conforms	
1.221	0	Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants	2.3.1	Conforms	

Table 1.9-1 (Sheet 9 of 9)
Conformance with Regulatory Guides

Regulatory Guide	Rev.	Title	Applicable SSAR Section	Conformance[a]	Comments
4.7	3	General Site Suitability Criteria for Nuclear Power Stations	2.1.2	Conforms	
			2.1.3	Conforms	
			2.2.1–2.2.2	Conforms	
			2.2.3	Conforms	
			2.3.4	Conforms	
			2.3.5	Conforms	
			2.5.1	Conforms	
			2.5.2	Conforms	
			2.5.3	Conforms	
			13.3	Exception	Part 5A: TVA is requesting an exemption from certain elements of 10 CFR 50.33(g) and 10 CFR 50.47(c)(2) as they relate to the size of the Plume Exposure Pathway Emergency Planning Zone (EPZ) and the Ingestion Pathway EPZ. The Plume Exposure Pathway EPZ for the CRN Site described in Part 5A is at the site boundary. Part 5B: TVA is requesting an exemption from certain elements of 10 CFR 50.33(g) and 10 CFR 50.47(c)(2) as they relate to the size of the Plume Exposure Pathway EPZ and the Ingestion Pathway EPZ. The Plume Exposure Pathway EPZ for the CRN Site described in Part 5B is about 2 miles.
5.62	1	Reporting of Safeguards Events	13.3	Conforms	

(a) NA = Not applicable
(b) Revision 3 of Regulatory Guide 1.138 was issued in December of 2014; however, the subsurface investigation for the CRN Site was conducted between June 2013 and March 2014, using the information in Regulatory Guide 1.138 in effect at that time (Revision 2).

Table 1.9-2 (Sheet 1 of 6)
Conformance with Standard Review Plan

Section of NUREG-0800	Rev.	Title	Applicable SSAR Section(s)	Conformance[a]	Comments
1.0	2	Introduction and Interfaces	1.1–1.11	Conforms	Supplementary information related to reactor design and construction is addressed in the COLA, when a vendor has been selected.
2.0	0	Site Characteristics and Site Parameters	2.0	Conforms	
2.1.1	3	Site Location and Description	2.1.1	Conforms	
2.1.2	3	Exclusion Area Authority and Control	2.1.2	Conforms	
2.1.3	3	Population Distribution	2.1.3	Conforms	
2.2.1–2.2.2	3	Identification of Potential Hazards in Site Vicinity	2.2.1–2.2.2	Conforms	
2.2.3	3	Evaluation of Potential Accidents	2.2.3	Conforms	The locations, quantities, and effects of chemicals to be stored onsite are addressed in the COLA. Evaluations of the impacts of toxic gases on main control room habitability are addressed in the COLA.
2.3.1	3	Regional Climatology	2.3.1	Conforms	
2.3.2	3	Local Meteorology	2.3.2	Conforms	
2.3.3	3	Onsite Meteorological Measurements Programs	2.3.3	Conforms	
2.3.4	3	Short Term Dispersion Estimates for Accident Releases	2.3.4	Conforms	Control room dispersion estimates are addressed in the COLA.
2.3.5	3	Long-Term Atmospheric Dispersion Estimates for Routine Releases	2.3.5	Conforms	
2.4.1	3	Hydrologic Description	2.4.1	Conforms	The Tennessee River System, including the Clinch River arm of the Watts Bar Reservoir, is a regulated and fully developed system. Surges, seiches, tsunami, flooding caused by landslides and effects of ice formation are not credible for the CRN Site.
2.4.2	4	Floods	2.4.2	Conforms	The Tennessee River System, including the Clinch River arm of the Watts Bar Reservoir, is a regulated and fully developed system. Surges, seiches, tsunami, flooding caused by landslides and effects of ice formation are not credible for the CRN Site.
2.4.3	4	Probable Maximum Flood (PMF) on Streams and Rivers	2.4.3	Conforms	

Table 1.9-2 (Sheet 2 of 6)
Conformance with Standard Review Plan

Section of NUREG-0800	Rev.	Title	Applicable SSAR Section(s)	Conformance[(a)]	Comments
2.4.4	3	Potential Dam Failures	2.4.4	Conforms	Design of structures is addressed in the COLA.
2.4.5	3	Probable Maximum Surge and Seiche Flooding	2.4.5	Conforms	These events are not credible for the site because of its location, reservoir characteristics, and site history.
2.4.6	3	Probable Maximum Tsunami Hazards	2.4.6	Conforms	There are no tsunami-induced flooding hazards expected at the CRN Site. Because the conditions at the site are not conducive to the creation of a tsunami, no propagation model has been developed and wave runup, inundation, and drawdown are not separately addressed.
2.4.7	3	Ice Effects	2.4.7	Conforms	No safety-related SSCs are subject to ice-induced forces or blockages from sheet or frazil ice.
2.4.8	3	Cooling Water Canals and Reservoirs	2.4.8	Conforms	The CRN Site does not include cooling water canals or reservoirs.
2.4.9	3	Channel Diversions	2.4.9	Conforms	Requirements for alternative water sources are addressed in the COLA, when a reactor technology has been selected.
2.4.10	3	Flooding Protection Requirements	2.4.10	Conforms	Based upon grade elevation and maximum flooding height, the site is considered to be “dry”; however, the need for flood protections is addressed in the COLA when detailed grading and reactor design are available. Local PMP is addressed in the COLA, when detailed grading and reactor design are available.
2.4.11	3	Low Water Considerations	2.4.11	Conforms	
2.4.12	3	Groundwater	2.4.12	Conforms	Groundwater is not used for safety-related purposes. The need for dewatering systems is addressed in the COLA.
2.4.13	3	Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters	2.4.13	Conforms	
2.4.14	3	Technical Specifications and Emergency Operation Requirements	2.4.14	Conforms	The site is considered to be “dry” and does not require a safety-related source of water. By design, no emergency actions or Technical Specifications are required. Conformance with the general design criteria is not applicable to ESPAs.
2.5.1	5	Basic Geologic and Seismic Information	2.5.1	Conforms	

Table 1.9-2 (Sheet 3 of 6)
Conformance with Standard Review Plan

Section of NUREG-0800	Rev.	Title	Applicable SSAR Section(s)	Conformance[(a)]	Comments
2.5.2	5	Vibratory Ground Motion	2.5.2	Conforms	A sensitivity analysis was performed to evaluate the impact of the consideration of overburden on GMRS.
2.5.3	5	Surface Faulting	2.5.3	Conforms	
2.5.4	5	Stability of Subsurface Materials and Foundations	2.5.4	Conforms	Profiles illustrating the detailed relationship between the foundation and subsurface materials is provided in the COLA. While the foundation depth is provided, remaining information (e.g., information related to backfill and borrow) are provided in the COLA.
2.5.5	5	Stability of Slopes	2.5.5	Conforms	Site grading are developed and stability of any safety-related slopes are addressed in the COLA.
3.5.1.6	4	Aircraft Hazards	3.5.1.6	Conforms	
11.2	4	Liquid Waste Management System	11.2.3	Conforms	Information related to design is addressed in the COLA.
11.3	3	Gaseous Waste Management System	11.3.3	Conforms	Information related to design is addressed in the COLA.
13.3	3	Emergency Planning	13.3	Exception	SRP Criterion 1: Part 5A: TVA is requesting exemptions from certain elements of 10 CFR 50.47(b)(4)–(6), (9) and (10) and 10 CFR 50, Appendix E F.2, F.2.a, F.2.a(i)–(iii), F.2.b-d, and F.2.f as they relate to offsite emergency planning. SRP Criterion 2: Part 5A: TVA is requesting exemptions from certain elements of 10 CFR 50.47(b)(4)–(6), (9) and (10) and 10 CFR 50, Appendix E F.2, F.2.a, F.2.a(i)–(iii), F.2.b–d, and F.2.f as they relate to offsite emergency planning. SRP Criterion 3: Certain aspects of the technology-specific Emergency Action Levels (EALs) required by 10 CFR 50.47(b)(4) and 10 CFR 50 Appendix E Section IV.B are addressed in the COLA. An EAL scheme consistent with industry standards developed to address SMR technology will be adopted.

Table 1.9-2 (Sheet 4 of 6)
Conformance with Standard Review Plan

Section of NUREG-0800	Rev.	Title	Applicable SSAR Section(s)	Conformance[(a)]	Comments
					SRP Criteria 4–6: Not applicable SRP Criterion 7: Due to the Site Boundary EPZ, onsite and offsite protective measures are being implemented in an ad hoc manner. Protective Action Recommendation (PAR) logic and PAR logic diagrams for the CRN Site are addressed and added to the Emergency Plan in the COLA. SRP Criterion 9: FEMA evaluations are beyond the scope of the Emergency Plan. SRP Criterion 10: TVA is requesting exemptions from certain elements of 10 CFR 50.33(g) and 10 CFR 50.47(c)(2) as they relate to EPZ and IPZ sizing. The EPZ for the CRN Site described in Part 5A is at the site boundary. The EPZ for the CRN Site described in Part 5B is about 2 miles. SRP Criterion 11: Part A: TVA is requesting exemptions from certain elements of 10 CFR 50, Appendix E, IV.2–IV.7 as they relate to Evacuation Time Estimates (ETEs). Due to the Site Boundary EPZ, an ETE is not being performed. Part B: In Part 6 of the ESPA, TVA is requesting exemptions from certain elements of 10 CFR 50.33(g) and 10 CFR 50.47(c)(2) as they relate to EPZ sizing. The EPZ for the CRN Site described in Part 5B is 2 miles. An ETE has been performed for the 2-mile EPZ.

Table 1.9-2 (Sheet 5 of 6)
Conformance with Standard Review Plan

Section of NUREG-0800	Rev.	Title	Applicable SSAR Section(s)	Conformance[(a)]	Comments
					SRP Criterion 12: Not applicable SRP Criterion 13: TVA is submitting an ESPA. The requirements of 10 CFR 50.47(b) and 10 CFR 50.47(d) are satisfied in the COLA. SRP Criterion 14: Not applicable SRP Criterion 16: Part A: TVA is requesting exemptions from certain elements of 10 CFR 50, Appendix E, IV.2–IV.7 as they relate to ETEs. Due to the Site Boundary EPZ, an ETE is not being performed. Part B: In Part 6 of the ESPA, TVA is requesting exemptions from certain elements of 10 CFR 50.33(g) and 10 CFR 50.47(c)(2) as they relate to EPZ sizing. The EPZ for the CRN Site described in Part 5B is 2 miles. An ETE has been performed for the 2-mile EPZ. SRP Criterion 19: Part A: TVA is requesting exemptions from certain elements of 10 CFR 50.47(b)(5) and 10 CFR 50, Appendix E, D, D.3, and D.4 as they relate to notification measures and procedures regarding notifications to the public. Part B: The CRN Site Alert and Notification System is being developed and implemented consistent with a Federal Emergency Management Agency (FEMA) approved design.

Table 1.9-2 (Sheet 6 of 6)
Conformance with Standard Review Plan

Section of NUREG-0800	Rev.	Title	Applicable SSAR Section(s)	Conformance[(a)]	Comments
					SRP Criterion 20: For the ESPA, Parts 5A and 5B are being submitted as major features Emergency Plans in accordance with 10 CFR 52.17(b)(2)(i). SRP Criteria 21–24: Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) are developed and submitted in the COLA. SRP Criteria 25–29: Not applicable SRP Criterion 31: Emergency Plans Parts 5A and 5B are being submitted as part of an ESPA.
13.6.3	1	Physical Security - Early Site Permit	13.6	Conforms	
15.0.3	0	Design Basis Accident Radiological Consequences of Analyses for Advanced Light Water Reactors	15	Conforms	
17.5	0	Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants	17.5	Exception	The TVA Nuclear Quality Assurance Plan governing the safety-related aspects of the ESPA (TVA-NQA-PLN89-A) is the same plan currently used for TVA's operating fleet. It is based upon the guidance of ANSI N45.2 - 1971 and meets the requirements of 10 CFR 50, Appendix B. The current program is adequate to meet Quality Assurance requirements for this stage of the project.

(a) NA = Not applicable

1.10 IMPACT OF CONSTRUCTION OF NEW NUCLEAR POWER PLANT UNITS ON OPERATING UNITS AT MULTI-UNIT SITES

This topic is not applicable to this Early Site Permit Application and is addressed at the combined license application stage.

1.11 OVERVIEW OF REACTOR TYPES

Four conceptual, light-water cooled, small modular reactor (SMR) designs were used to create a "surrogate plant" as defined in NEI 10-01, *Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit* (Reference 1.11-1) and to develop the site-related design parameter values listed in Table 2.0-2 of Chapter 2. A basis summary for each plant parameter is typically provided in the SSAR section indicated in Table 2.0-2 for that plant parameter. The reactor designs are:

- BWXT mPower™ (Generation mPower LLC design)
- NuScale (NuScale Power, LLC, design)
- SMR-160 (Holtec SMR, LLC, design)
- Westinghouse SMR (Westinghouse Electric Company, LLC, design)

All four designs are described as passively safe with minimal or no reliance on offsite power, offsite water, or operator action for safety. Based on design features, these designs eliminate various conventional design basis events (e.g., large-break LOCAs precluded by elimination of large bore piping). All four designs are integral pressurized water reactors (iPWRs); that is, pressurized water reactor (PWR) designs in which the primary coolant system and all (or most) of its components (i.e., pressurizer, steam generators, and reactor coolant pumps, where applicable) are enclosed in one pressure vessel.

1.11.1 BWXT mPower™

The BWXT mPower™ SMR is an advanced iPWR that generates 530 MWt, with an estimated power output of 180 MWe. The mPower reactor uses standard PWR fuel with a shorter fuel assembly length. The iPWR is located in a below-grade containment.

The mPower SMR is designed to be built in multiples of two reactors per plant, and up to two plants (four reactors) would be placed on the CRN Site.

1.11.2 NuScale

The NuScale SMR is an advanced iPWR that generates 160 MWt, with an estimated power output of 50 MWe. The NuScale SMR uses standard light water reactor fuel with a shorter fuel assembly length. The reactor sits within a containment vessel, and up to 12 reactors can be housed in one below-grade shared pool.

The NuScale SMR is a multi-unit configuration that is designed to include up to 12 reactors per plant, and up to 12 reactors would be placed on the CRN Site.

1.11.3 SMR-160

The Holtec Inherently-Safe Modular Underground Reactor (HI-SMUR™) SMR-160 is an iPWR that generates 525 MWt, with an estimated power output of 160 MWe. This reactor design does not use standard fuel. Instead, it uses a unitary cartridge containing all fuel that is replaced entirely each refueling. The reactor, steam generator, and spent fuel pool are located inside the containment structure. The reactor core is located below grade.

Each unit is built as a stand alone plant, and up to four SMR-160 reactors would be placed on the CRN Site.

1.11.4 Westinghouse SMR

The Westinghouse SMR is an advanced iPWR that generates 800 MWt, with an estimated power output of 225 MWe. The Westinghouse SMR uses standard PWR fuel, with a shorter fuel assembly length. The iPWR vessel is housed in a containment located below grade.

Each unit is built as a stand-alone plant, and up to three Westinghouse SMRs would be placed on the CRN Site.

1.11.5 Reference

1.11-1. NEI 10-01, “Industry Guidance for Developing a Plant Parameter Envelope in Support of an Early Site Permit,” Rev. 1, May 2012.