Clinch River Nuclear Site

Early Site Permit Application

Part 6, Exemptions and Departures

Revision 2

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ACRONYMS AND ABBREVIATIONS

CEMP	Comprehensive Emergency Management Plan
CFR	Code of Federal Register
COLA	Combined License Application
CRN	Clinch River Nuclear
DBE	Design Basis Event
DCD	Design Control Document
EAL	Emergency Action Level
EPA	Environmental Protection Agency
EPZ	Emergency Planning Zone
ESPA	Early Site Permit Application
FEMA	Federal Emergency Management Agency
LWR	Light Water Reactor
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
PAG	Protective Action Guides
PEP	Plume Exposure Pathway
PPE	Plant Parameter Envelope
SMR	Small Modular Reactor
SRM	Staff Requirements Memorandum
SSAR	Site Safety Analysis Report
TVA	Tennessee Valley Authority

1.0 CLINCH RIVER NUCLEAR SITE EXEMPTION REQUESTS

1.1 SUMMARY DESCRIPTION

A review of regulatory requirements was undertaken as part of the Clinch River Nuclear (CRN) Site Early Site Permit Application (ESPA) to identify potential exemptions from portions of 10 CFR 50.33(g), 50.47(b) and (c)(2), and 10 CFR Part 50, Appendix E, to the extent that these regulations apply to specific provisions of onsite and offsite emergency planning. The regulations, as written, do not take into account (1) the enhanced safety expected to be inherent in the design of Small Modular Reactors (SMRs) or (2) the application of the significant body of risk information available to inform the technical basis for the Plume Exposure Pathway (PEP) Emergency Planning Zone (EPZ) size. Pursuant to 10 CFR 52.7, "Specific Exemptions," which is governed by 10 CFR 50.12, "Specific Exemptions," Tennessee Valley Authority (TVA) requests exemptions from the following for the CRN Site ESPA:

- Certain standards in 10 CFR 50.47(b) regarding onsite and offsite emergency response plans for nuclear power reactors;

- Certain requirements of 10 CFR 50.33(g) and 10 CFR 50.47(c)(2) to establish PEP EPZ for nuclear power plants; and

- Certain requirements of 10 CFR Part 50, Appendix E, which establish the elements that make up the content of emergency plans.

The requested exemptions allow for the development and implementation of emergency plans that are commensurate with the significantly reduced risk associated with SMR technology. The current 10 CFR Part 50 regulatory requirements for emergency planning provide an appropriate planning basis for the current operating plants. However, some of these requirements are not necessary to protect the health and safety of the public in the vicinity of an SMR facility due to the decreased potential consequences associated with such a facility. The requested exemptions would require the SMR design selected for the Combined License Application (COLA) to meet the established criteria at the selected EPZ boundary. The criteria are consistent with and based upon the U.S. Environmental Protection Agency (EPA) Protective Action Guides (PAG) 1 rem dose criteria for early phase protective actions in the unlikely event of a severe accident. The intermediate and late phase EPA PAGs are not relevant to sizing of the PEP EPZ, and further references to the EPA PAGs in this document and Site Safety Analysis (SSAR) Section 13.3 are to the early phase EPA PAG.

SECY-15-0077, "Options for Emergency Preparedness for Small Modular Reactors and Other New Technologies" (Reference 3-1), describes an option for SMR applicants to request exemptions from the current regulations when proposing the use of different emergency planning requirements or standards within the current NRC emergency planning regulatory framework. In this application, TVA is proposing a dose-based, consequence-oriented approach to establish an appropriate EPZ size consistent with PAG criteria. The requested exemptions, and justification for each, are based on and consistent with the Nuclear Energy Institute (NEI) White Paper, "*Proposed Emergency Preparedness Regulations and Guidance for Small Modular Reactor Facilities*" (Reference 3-2).

1.2 DETAILED DESCRIPTION

Part 5 of the CRN Site ESPA includes two Emergency Plans (Part 5A and Part 5B) for review by the NRC. The two distinct Emergency Plans are based upon a PEP EPZ border that encompasses the areas in which the plume exposure doses could exceed the EPA PAG and where there is a substantial reduction in risk of significant early health effects. Part 5A addresses a PEP EPZ established at the Site Boundary and Part 5B addresses a PEP EPZ approximately two miles from the site center point.

Based on the Site Safety Analysis Report (SSAR) Section 13.3 criteria applied to the selected SMR technology, two sets of exemptions have been developed for the CRN Site ESPA to address the Emergency Plans included in Part 5:

- Exemptions for an approximate 2-mile PEP EPZ (hereafter referred to as the "2-mile EPZ").

- Exemptions for a PEP EPZ established at the Site Boundary (hereafter referred to as the "Site Boundary EPZ").

The two distinct Emergency Plans and the two sets of exemptions are based on the distance at which the selected SMR reactor technology is able to demonstrate that it meets the criteria set forth in Site Safety Analysis Report (SSAR) Section 13.3. The applicability of any exemption would be based on the SMR design selected for the COLA falling within the parameters set forth in SSAR Section 13.3. The specific portions of 10 CFR 50.33(g), 50.47, and 10 CFR Part 50, Appendix E from which TVA is requesting exemptions for each of the Emergency Plans are identified using strikethrough text in Table 1-1, "Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the Site Boundary EPZ Emergency Plan," Table 1-2, "Exemptions Requested from 10 CFR Part 50, Appendix E," and Table 1-3, "Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the 2-Mile EPZ Emergency Plan." No exemption is sought with respect to the portions of these regulations that are not identified using strikethrough text.

As appropriate, each Emergency Plan included in Part 5 of the ESPA considers the requested exemptions presented in Tables 1-1, 1-2 and 1-3. Specifically, the Emergency Plan in Part 5A considers the requested exemptions in Tables 1-1 and 1-2, and the Emergency Plan in Part 5B considers the requested exemptions in Table 1-3. The selected EPZ size will be determined based upon the SMR design selected in the preparation of the COLA. The criteria for determining the appropriate EPZ size, the appropriate regulatory exemptions, and the Emergency Plan that TVA intends to incorporate into a future COLA, are addressed in SSAR Section 13.3.

1.3 JUSTIFICATION

The Commission, in SRM-SECY-15-0077, recognized that current emergency planning regulations are not necessarily appropriate for SMR designs and that "[f]or any small modular reactor reviews conducted prior to the establishment of a [new] rule, the staff should be prepared to adapt an approach to emergency planning zones for SMRs under existing exemption processes, in parallel with its rulemaking efforts." In order to establish an emergency planning program commensurate with the hazards associated with SMR technology, exemptions from portions of 10 CFR 50.33(g), 10 CFR 50.47(b), 50.47(c)(2), and 10 CFR 50,

Appendix E, are needed to account for the reduced risks and reduced consequences expected to be associated with new SMR technology. The criteria established in SSAR Section 13.3 employs a consequence based approach consistent with EPA PAG to determine appropriate EPZ size for the commensurate risks associated with SMR technology. During preparation of a COLA, when TVA has selected a reactor design, the appropriate EPZ will be selected based on the SMR design that conforms to the criteria established in SSAR Section 13.3.

10 CFR 50.12 states that the Commission may grant exemptions from the regulatory requirements in 10 CFR Part 50 if the exemption is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security. 10 CFR 50.12 also states that the Commission will not consider granting an exemption unless special circumstances are present. As discussed below, this exemption request satisfies the provisions of 10 CFR 50.12.

1.3.1 Exemptions Are Authorized By Law

Under 10 CFR 52.7, which is governed by 10 CFR 50.12, the NRC is authorized to grant exemptions that do not violate the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Granting these exemptions would not violate the Atomic Energy Act or any other statute or regulation and is therefore authorized by law.

1.3.2 Exemptions Will Not Present Undue Risk to Public Health And Safety

SSAR Section 13.3 sets forth criteria that the SMR design will be required to meet in order for an exemption to apply. SSAR Section 13.3 demonstrates that due to the calculated consequences of radiological events for the surrogate plant presented in this ESPA:

- For the Site Boundary EPZ, formal offsite emergency response plans will not be needed for protection of the public beyond the Site Boundary because no credible event will result in offsite consequences in excess of EPA PAG. Offsite response organizations are capable of implementing protective actions in accordance with each agency’s Comprehensive Emergency Management Plan (CEMP), commensurate with the hazard posed by the SMR designs under consideration.

For the 2-mile EPZ, offsite emergency plans will be developed consistent with the guidance presented in NUREG-0654, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (NUREG-0654/FEMA-REP-1)” considering any approved regulatory exemptions. Formal offsite emergency response plans will not be needed for protection of the public beyond two miles because no credible event will result in offsite consequences in excess of EPA PAG beyond the EPZ. The criteria have been established using a dose-based, consequence-oriented approach in accordance with the EPA PAG. Use of the criteria in the ESPA demonstrates that public health and safety are protected. The use of EPA PAG as performance criteria requires that the SMR design selected demonstrate that the hazards associated with the SMR design are not greater than those present in standard industrial activities. For the Site Boundary EPZ, this level of hazard does not require advance offsite emergency planning to protect public health and safety because any consequences are limited to the site. If the SMR design selected does not meet those criteria at the Site Boundary, the Site Boundary EPZ will not be used. Alternatively, if the selected SMR design meets the established criteria within two miles then TVA could elect to establish the EPZ

at an approximate 2-mile radius. Consideration will be given to local emergency response needs and capabilities, including considerations of demography, topography, land characteristics, access routes, and jurisdictional boundaries.

If the dose consequences can not be met at a 2-mile radius, then neither set of exemptions would be applicable. Accordingly, for either EPZ size, the scope of the onsite emergency management organization and corresponding requirements in the Emergency Plans included in Part 5 do not present an undue risk to the public health and safety. The technical basis for demonstrating that the SMR design meets the criteria in SSAR Section 13.3 will be in the COLA.

The proposed criteria for determining the appropriate EPZ size, and thus the appropriate regulatory exemptions and the Emergency Plan, take into account the enhanced safety features of the SMR designs under consideration. The proposed technical criteria for determining the EPZ size consider the utilization of the existing emergency preparedness regulatory framework and dose saving criteria established in NUREG-0396. Therefore, the underlying purpose of the regulations (protecting public health and safety) will continue to be met and as a result, the exemptions will not present an undue risk to the public health and safety**.**

The requested exemptions otherwise do not result in any other change. Because the requested exemptions will not alter the operation of any plant equipment or systems, they do not present an undue risk. The proposed exemptions do not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor would they modify or remove design or operational controls or safeguards that are intended to mitigate any on-site hazards. Furthermore, the proposed exemptions would not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in fuel cladding failures. Accordingly, these proposed exemptions do not present an undue risk from any equipment or systems.

The exemptions, if approved by the Commission, would not affect the authority that the Federal Emergency Management Agency (FEMA) has under its regulations in 44 CFR Chapter I for overall emergency management and assistance to State and local response organizations, nor would the exemptions affect the responsibilities of State and local governments to establish and maintain a CEMP.

1.3.3 Exemptions Are Consistent with the Common Defense and Security

The scope of the emergency preparedness organization and associated Emergency Plan requirements will not adversely affect the ability of TVA to physically secure the CRN Site or protect special nuclear material. Physical security measures at the CRN Site are not affected by the requested exemptions. Therefore, the proposed exemptions are consistent with the common defense and security.

1.3.4 Special Circumstances

10 CFR 50.12(a)(2) lists six “special circumstances” for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemptions meet the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection identifies a special

circumstance as when, “Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.”

The regulations under consideration in this request for exemption require that licensees develop, and maintain in effect, emergency plans that comply with specific standards. The underlying purpose of 10 CFR 50.33(g), 10 CFR 50.47(b) and (c)(2), and 10 CFR 50, Appendix E, is to establish PEP and ingestion pathway EPZs for nuclear power plants, to provide reasonable assurance that adequate protective measures will be taken in the event of a radiological emergency, and to ensure that licensees maintain effective offsite and onsite emergency plans.

Special circumstances exist at the CRN Site due to the anticipated enhanced safety features of the SMR designs under consideration. Specifically, the SMR designs are expected to have smaller radionuclide inventory and source terms; the projected rate of progression of postulated accidents is anticipated to be slower; various design features are expected to eliminate several historically considered design-basis events (DBEs); and the occurrence of severe accidents are projected to be significantly less likely. Additionally, each of the SMR designs under consideration for the CRN Site has advanced design features that minimize accident consequences. The criteria established in the ESPA require the SMR design to demonstrate in the COLA that any accident consequences are less than the EPA PAG criteria and meet specific risk reduction criteria (see SSAR Subsection 13.3.3.1.1) for the Emergency Plan and the size of the PEP EPZ in the ESPA to be used. If the SMR design selected does not meet those criteria, the smaller EPZ will not be used.

Therefore, special circumstances are present, because of the enhanced safety features inherent in the design of SMRs provide for significant additional confidence in the protection of public health and safety. Application of the current regulations as required by 10 CFR 50.33(g), 50.47(b) and (c)(2), and 10 CFR Part 50, Appendix E, in the particular circumstances discussed in this request, is not necessary to achieve the underlying purpose of the rules due to the significant enhancements in nuclear safety.

The appropriateness of the requested exemptions, including the size of the CRN Site EPZ, were established using risk-informed considerations and the understanding that the SMR designs evaluated under the CRN Site Plant Parameter Envelope (PPE) reflect enhanced safety features. The selected SMR design will conform to the criteria described in SSAR Section 13.3.

Therefore, the underlying purpose of the regulations will continue to be met. Because the underlying purpose of the rules will continue to be met, the exemptions will not present an undue risk to the public health and safety.

Each of the SMR designs under consideration for the CRN Site has advanced design features that minimize accident consequences. The criteria established in the ESPA require the SMR design to demonstrate that any accident consequences conform to EPA PAG criteria and meet specific risk reduction criteria for the use of one of the Part 5 emergency plans and the corresponding size of the EPZ. Based on the selection of a SMR design that satisfies the criteria presented in SSAR Section 13.3, TVA has concluded that the portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR 50, Appendix E, requested for exemption as identified in the Tables 1-1, 1-2, and 1-3, will not be necessary to protect the health and safety of the public, and

would be unduly burdensome. Approval of the exemptions, as requested, will not present an undue risk to the public or prevent appropriate response in the event of an emergency at the CRN Site.

1.4 TECHNICAL EVALUATION

1.4.1 Accident Analysis Overview

SSAR Chapter 15, Accident Analysis, addresses the postulated DBEs associated with the SMR technologies under consideration for the CRN Site.

The criteria for determining the appropriate EPZ size, and thus the appropriate regulatory exemptions and the Emergency Plan that TVA intends to ultimately incorporate into a future COLA, are addressed in SSAR Section 13.3. The selected design will be required to demonstrate conformance with the criteria established in SSAR Section 13.3.

1.4.2 Consequences of Design Basis Events

The criteria for a DBE are addressed in SSAR Section 13.3.

1.4.3 Consequences of Beyond Design Basis Events

The criteria for a Beyond Design Basis Event are addressed in SSAR Section 13.3.

1.5 CONCLUSION

In the COLA, the selected SMR design will be required to demonstrate conformance with the criteria established in SSAR Section 13.3. TVA has concluded that if the selected SMR technology meets the criteria established in SSAR Section 13.3, then the protection of public health and safety will be ensured and the regulatory exemptions described herein are appropriate.

If the selected SMR design is unable to conform to the criteria established, appropriate revisions to the CRN Site Emergency Plan will be described in the COLA.

Table 1-1 (Sheet 1 of 4)
Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the Site Boundary EPZ Emergency Plan

Item	Regulation in 10 CFR 50.33(g), 50.47(b) or 50.47 (c)(2)	Basis for Exemption
1	10 CFR 50.33(g): If the application is for an operating license or combined license for a nuclear power reactor, or if the application is for an early site permit and contains plans for coping with emergencies under § 52.17(b)(2)(ii) of this chapter, the applicant shall submit radiological emergency response plans of State and local governmental entities in the United States that are wholly or partially within the plume exposure pathway emergency planning zone (EPZ), as well as the plans of State governments wholly or partially within the ingestion pathway EPZ. If the application is for an early site permit that, under 10 CFR 52.17(b)(2)(i), proposes major features of the emergency plans describing the EPZs, then the descriptions of the EPZs must meet the requirements of this paragraph. Generally, ~~the plume exposure pathway EPZ for nuclear power reactors shall consist of an area about 10 miles (16 km) in radius and~~ the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to the local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. The size of the EPZs also may be determined on a case-by-case basis for gas-cooled reactors and for reactors with an authorized power level less than 250 MW thermal. The plans for the ingestion pathway shall focus on such actions as are appropriate to protect the food ingestion pathway.	The criteria established in SSAR Section 13.3, provide for adequate protection of public health and safety by providing an EPZ that encompass the areas in which the plume exposure doses could exceed the EPA PAG, and for where there is a substantial reduction in risk of significant early health effects. Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, defined EPZs and formal offsite radiological emergency response plans are not necessary.

Table 1-1 (Sheet 2 of 4)
Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the Site Boundary EPZ Emergency Plan

Item	Regulation in 10 CFR 50.33(g), 50.47(b) or 50.47 (c)(2)	Basis for Exemption
2	10 CFR 50.47(b): The onsite ~~and, except as provided in paragraph (d) of this section, offsite~~ emergency response plans for nuclear power reactors must meet the following standards:	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary.
3	10 CFR 50.47(b)(4): A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee~~, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures~~.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Although the likelihood of an accident or event resulting in offsite doses exceeding the EPA PAGs beyond the site boundary is extremely remote, TVA's Emergency Plan will describe the capabilities to determine if a radiological release is occurring and promptly communicate that information to Offsite Response Organizations (OROs) for their consideration. Each ORO is responsible for deciding what, if any, protective actions should be taken utilizing its Comprehensive Emergency Management Plan (CEMP). Also refer to basis for 10 CFR 50.47(b). Note: TVA will adopt an Emergency Action Level (EAL) scheme developed in accordance with industry standards.

Table 1-1 (Sheet 3 of 4)
Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the Site Boundary EPZ Emergency Plan

Item	Regulation in 10 CFR 50.33(g), 50.47(b) or 50.47 (c)(2)	Basis for Exemption
4	10 CFR 50.47(b)(5): Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and followup messages to response organizations ~~and the public~~ has been established~~; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established~~.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, defined EPZs and formal offsite radiological emergency response plans are not necessary. The PEP EPZ would be within the Site Boundary, so there is no populace within the plume exposure pathway that would require early notification or instructions. Refer to basis for 10 CFR 50.47(b). Notification and instructions to members of the public that may be onsite is addressed in 10 CFR 50.47(b)(10).
5	10 CFR 50.47(b)(6): Provisions exist for prompt communications among principal response organizations to emergency personnel~~ and to the public~~.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, there is no need to require prompt communications to the public beyond the Site Boundary. Refer to basis for Appendix E to 10 CFR 50, IV.D.3.
6	10 CFR 50.47(b)(9): Adequate methods, systems, and equipment for assessing and monitoring actual or potential ~~offsite~~ consequences of a radiological emergency condition are in use.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Refer to basis for 10 CFR 50.47(b). TVA will maintain the capability to assess the impact of radiological releases and communicate the results to the OROs.

Table 1-1 (Sheet 4 of 4)
Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the Site Boundary EPZ Emergency Plan

Item	Regulation in 10 CFR 50.33(g), 50.47(b) or 50.47 (c)(2)	Basis for Exemption
7	10 CFR 50.47(b)(10): A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. ~~In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis.~~ Guidelines for the choice of ~~protective actions during an emergency, consistent with Federal guidance, are developed and in place, and~~ protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, the language regarding the range of actions to be considered with respect to the public beyond the Site Boundary is not applicable. Refer to basis for 10 CFR 50.47(b).
8	10 CFR 50.47(c)(2): Generally, ~~the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and~~ the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. The size of the EPZs also may be determined on a case-by-case basis for gas cooled nuclear reactors and for reactors with an authorized power level less than 250 MW thermal. The plans for the ingestion pathway shall focus on such actions as are appropriate to protect the food ingestion pathway.	The criteria established in SSAR Section 13.3, provide for adequate protection of public health and safety by providing an EPZ that encompass the areas in which the plume exposure doses could exceed the EPA PAG, and for where there is a substantial reduction in risk of significant early health effects. Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary.

Table 1-2 (Sheet 1 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
1	10 CFR 50 App E. IV. Content of Emergency Plans The applicant's emergency plans shall contain, but not necessarily be limited to, information needed to demonstrate compliance with the elements set forth below, *i.e.*, organization for coping with radiological emergencies, assessment actions, activation of emergency organization, notification procedures, emergency facilities and equipment, training, maintaining emergency preparedness, and recovery, and onsite protective actions during hostile action. In addition, the emergency response plans submitted by an applicant for a nuclear power reactor operating license under this part, or for an early site permit (as applicable) or combined license under 10 CFR part 52, shall contain information needed to demonstrate compliance with the standards described in § 50.47(b), and they will be evaluated against those standards.	See following analysis for each paragraph.
2	IV. 2 ~~This nuclear power reactor license applicant shall also provide an analysis of the time required to evacuate various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations, using the most recent U.S. Census Bureau data as of the date the applicant submits its application to the NRC.~~	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, there is no need for evacuation time estimates. Although the likelihood of an accident or event resulting in offsite doses exceeding the EPA PAGs beyond the Site Boundary is extremely remote, TVA's Emergency Plan will describe the capabilities to determine if a radiological release is occurring and promptly communicate that information to OROs for their consideration. Each ORO is responsible for deciding what, if any, protective actions should be taken utilizing its CEMP. Also refer to basis for 10 CFR 50.47(b) in Table 1-1.

Table 1-2 (Sheet 2 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
3	IV. 3 ~~Nuclear power reactor licensees shall use NRC approved evacuation time estimates (ETEs) and updates to the ETEs in the formulation of protective action recommendations and shall provide the ETEs and ETE updates to State and local governmental authorities for use in developing offsite protective action strategies.~~	Refer to basis for 10 CFR 50, Appendix E, Section IV.2.
4	IV. 4 ~~Within 365 days of the later of the date of the availability of the most recent decennial census data from the U.S. Census Bureau or December 23, 2011, nuclear power reactor licensees shall develop an ETE analysis using this decennial data and submit it under § 50.4 to the NRC. These licensees shall submit this ETE analysis to the NRC at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.~~	Refer to basis for 10 CFR 50, Appendix E, Section IV.2.
5	IV 5 ~~During the years between decennial censuses, nuclear power reactor licensees shall estimate EPZ permanent resident population changes once a year, but no later than 365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. These licensees shall maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.~~	Refer to basis for 10 CFR 50, Appendix E, Section IV.2.
6	IV 6 ~~If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the nuclear power reactor licensee's currently NRC approved or updated ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC under § 50.4 no later than 365 days after the licensee's determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.~~	Refer to basis for 10 CFR 50, Appendix E, Section IV.2.

Table 1-2 (Sheet 3 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
7	IV 7 ~~After an applicant for a combined license under part 52 of this chapter receives its license, the licensee shall conduct at least one review of any changes in the population of its EPZ at least 365 days prior to its scheduled fuel load. The licensee shall estimate EPZ permanent resident population changes using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. If the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ, to increase by 25 percent or 30 minutes, whichever is less, from the licensee's currently approved ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC for review under § 50.4 of this chapter no later than 365 days before the licensee's scheduled fuel load.~~	Refer to basis for 10 CFR 50, Appendix E, Section IV.2
8	D. Notification Procedures D.1. Administrative and physical means for notifying local, State, and Federal officials and agencies ~~and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary,~~ shall be described. This description shall include identification ~~of the appropriate officials, by title and agency,~~ of the State and local government agencies within the EPZs.	Refer to basis for 10 CFR 50, Appendix E, Section IV.2.

Table 1-2 (Sheet 4 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
9	D.3. A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. ~~The licensee shall demonstrate that the appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed by the licensee of an emergency condition. Prior to initial operation greater than 5 percent of rated thermal power of the first reactor at a site, each nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway EPZ. The design objective of the prompt public alert and notification system shall be to have the capability to essentially complete the initial alerting and initiate notification of the public within the plume exposure pathway EPZ within about 15 minutes. The use of this alerting and notification capability will range from immediate alerting and notification of the public (within 15 minutes of the time that State and local officials are notified that a situation exists requiring urgent action) to the more likely events where there is substantial time available for the appropriate governmental authorities to make a judgment whether or not to activate the public alert and notification system. The alerting and notification capability shall additionally include administrative and physical means for a backup method of public alerting and notification capable of being used in the event the primary method of alerting and notification is unavailable during an emergency to alert or notify all or portions of the plume exposure pathway EPZ population. The backup method shall have the capability to alert and notify the public within the plume exposure pathway EPZ, but does not need to meet the 15-minute design objective for the primary prompt public alert and notification system. When there is a decision to activate the alert and notification system, the appropriate governmental authorities will determine whether to activate the entire alert and notification system simultaneously or in a graduated or staged manner. The responsibility for activating such a public alert and notification system shall remain with the appropriate governmental authorities.~~	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, there would be no members of the public within the PEP EPZ to alert and inform, and no need for action by governmental authorities beyond the Site Boundary. TVA will maintain the capability to assess, classify, and declare an emergency condition and notify offsite governmental organizations within times specified in the Emergency Plan. Offsite governmental agencies will maintain the capability to alert and notify the public utilizing a CEMP. The elimination of the regulatory required time to alert and notify the public is acceptable because there is no need for State or local response organizations to implement immediate protective actions. The 10 CFR 50.72(a)(3) requirement to complete an Emergency Notification System notification of the declaration of an Emergency Class within one hour after the time TVA declares one of the Emergency Classes is not impacted by this exemption. Also, Refer to basis for 10 CFR 50, Appendix E, Section IV.2.

Table 1-2 (Sheet 5 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
10	D.4. ~~If FEMA has approved a nuclear power reactor site's alert and notification design report, including the backup alert and notification capability, as of December 23, 2011, then the backup alert and notification capability requirements in Section IV.D.3 must be implemented by December 24, 2012. If the alert and notification design report does not include a backup alert and notification capability or needs revision to ensure adequate backup alert and notification capability, then a revision of the alert and notification design report must be submitted to FEMA for review by June 24, 2013, and the FEMA-approved backup alert and notification means must be implemented within 365 days after FEMA approval. However, the total time period to implement a FEMA-approved backup alert and notification means must not exceed June 22, 2015.~~	Refer to basis for 10 CFR Part 50, Appendix E, Section IV.D.3 regarding the alert and notification system requirements.
11	F.2. The plan shall describe provisions for the conduct of emergency preparedness exercises as follows: Exercises shall test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, ~~test the public alert and notification system,~~ and ensure that emergency organization personnel are familiar with their duties.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, a dedicated public alert and notification system would not be used and no testing is required. Refer to basis for 10 CFR 50, Appendix E, Section IV.2.
12	F.2.a. An ~~full participation~~ exercise which tests as much of the licensee~~, State, and local~~ emergency plans as is reasonably achievable ~~without mandatory public participation~~ shall be conducted for each site at which a power reactor is located. Nuclear power reactor licensees shall submit exercise scenarios under § 50.4 at least 60 days before use in a ~~full participation~~ exercise required by this paragraph 2.a.	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, a full participation exercise is not required. TVA would continue to invite State and local support organizations to participate in the periodic drills and exercises conducted to assess each participating organization's ability to perform responsibilities related to an emergency at the facility. Refer to basis for 10 CFR 50, Appendix E, Section IV.2.

Table 1-2 (Sheet 6 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
13	F.2.a(i) For an operating license issued under this part, this exercise must be conducted within two years before the issuance of the first operating license for full power (one authorizing operation above 5 percent of rated power) of the first reactor and shall include participation by ~~each State and local government within the plume exposure pathway EPZ and~~ each state within the ingestion exposure pathway EPZ. If the ~~full participation~~ exercise is conducted more than 1 year prior to issuance of an operating licensee for full power, an exercise which tests the licensee's onsite emergency plans must be conducted within one year before issuance of an operating license for full power. ~~This exercise need not have State or local government participation.~~	TVA would be exempt from those portions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.(i)-(iii) related to offsite participation in exercises because TVA would be exempt from the umbrella provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.
14	F 2.a.(ii) For a combined license issued under part 52 of this chapter, this exercise must be conducted within two years of the scheduled date for initial loading of fuel. If the first ~~full participation~~ exercise is conducted more than one year before the scheduled date for initial loading of fuel, an exercise which tests the licensee's onsite emergency plans must be conducted within one year before the scheduled date for initial loading of fuel. ~~This exercise need not have State or local government participation. If FEMA identifies one or more deficiencies in the state of offsite emergency preparedness as the result of the first full participation exercise, or i~~[I]f the Commission finds that the state of emergency preparedness does not provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency, the provisions of § 50.54(gg) apply.	TVA would be exempt from those portions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.(i)-(iii) related to offsite participation in exercises because TVA would be exempt from the umbrella provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.
15	F 2.a (iii) For a combined license issued under part 52 of this chapter, if the applicant currently has an operating reactor at the site, an exercise, ~~either full or partial participation,~~ shall be conducted for each subsequent reactor constructed on the site. This exercise may be incorporated in the exercise requirements of Sections IV.F.2.b. and c. in this appendix. ~~If FEMA identifies one or more deficiencies in the state of offsite emergency preparedness as the result of this exercise for the new reactor, or i~~[I]f the Commission finds that the state of emergency preparedness does not provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency, the provisions of § 50.54(gg) apply.	TVA would be exempt from those portions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.(i)-(iii) related to offsite participation in exercises because TVA would be exempt from the umbrella provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.

Table 1-2 (Sheet 7 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
16	F 2.b. Each licensee at each site shall conduct a subsequent exercise of its onsite emergency plan every 2 years. Nuclear power reactor licensees shall submit exercise scenarios under § 50.4 at least 60 days before use in an exercise required by this paragraph 2.b. ~~The exercise may be included in the full participation biennial exercise required by paragraph 2.c. of this section.~~ In addition, the licensee shall take actions necessary to ensure that adequate emergency response capabilities are maintained during the interval between biennial exercises by conducting drills, including at least one drill involving a combination of some of the principal functional areas of the licensee's onsite emergency response capabilities. The principal functional areas of emergency response include activities such as management and coordination of emergency response, accident assessment, event classification, notification of offsite authorities, assessment of the onsite ~~and offsite~~ impact of radiological releases, ~~protective action recommendation development, protective action decision making,~~ plant system repair and mitigative action implementation. During these drills, activation of all of the licensee's emergency response facilities (Technical Support Center (TSC), Operations Support Center (OSC), and the Emergency Operations Facility (EOF)) would not be necessary, licensees would have the opportunity to consider accident management strategies, supervised instruction would be permitted, operating staff in all participating facilities would have the opportunity to resolve problems (success paths) rather than have controllers intervene, and the drills may focus on the onsite exercise training objectives.	TVA would be exempt from those portions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.(i)-(iii) related to offsite participation in exercises because TVA would be exempt from the umbrella provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.a.

Table 1-2 (Sheet 8 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
17	F 2.c. ~~Offsite plans for each site shall be exercised biennially with full participation by each offsite authority having a role under the radiological response plan. Where the offsite authority has a role under a radiological response plan for more than one site, it shall fully participate in one exercise every two years and shall, at least, partially participate in other offsite plan exercises in this period. If two different licensees each have licensed facilities located either on the same site or on adjacent, contiguous sites, and share most of the elements defining co-located licensees, then each licensee shall:~~ ~~(1) Conduct an exercise biennially of its onsite emergency plan;~~ ~~(2) Participate quadrennially in an offsite biennial full or partial participation exercise;~~ ~~(3) Conduct emergency preparedness activities and interactions in the years between its participation in the offsite full or partial participation exercise with offsite authorities, to test and maintain interface among the affected State and local authorities and the licensee. Co-located licensees shall also participate in emergency preparedness activities and interaction with offsite authorities for the period between exercises;~~ ~~(4) Conduct a hostile action exercise of its onsite emergency plan in each exercise cycle; and~~ ~~(5) Participate in an offsite biennial full or partial participation hostile action exercise in alternating exercise cycles.~~	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR Section 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, there is no need for OROs to participate in biennial exercises. Although the likelihood of an accident or event resulting in offsite doses exceeding the EPA PAG beyond the Site Boundary is extremely remote, TVA's Emergency Plan will describe the capabilities to determine if a radiological release is occurring and promptly communicate that information to OROs for their consideration. OROs are responsible for deciding what, if any, protective actions should be taken utilizing its CEMP. Formal offsite radiological emergency response plans would not be required. Therefore, a full participation exercise is not required. Also refer to basis for 10 CFR 50.47(b) and 10 CFR 50.47(b)(4) in Table 1-1 and 10 CFR Part 50, Appendix E, Section IV.F.2.a. TVA would continue to invite State and local support organizations to participate in the periodic drills and exercises conducted to assess its ability to perform responsibilities related to an emergency at the facility. Those portions of F.2.c relating to co-located facilities are not applicable to the CRN Site ESPA. However, if in the future, the CRN Site became a co-located facility, those portions of F.2.c applicable to the CRN Site are addressed elsewhere in F.2.

Table 1-2 (Sheet 9 of 9)
Exemptions Requested from 10 CFR 50, Appendix E for the Site Boundary EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
18	F 2.d. Each State with responsibility for nuclear power reactor emergency preparedness should fully participate in the ingestion pathway portion of exercises at least once every exercise cycle. In States with more than one nuclear power reactor plume exposure pathway EPZ, the State should rotate this participation from site to site. ~~Each State with responsibility for nuclear power reactor emergency preparedness should fully participate in a hostile action exercise at least once every cycle and should fully participate in one hostile action exercise by December 31, 2015. States with more than one nuclear power reactor plume exposure pathway EPZ should rotate this participation from site to site.~~	Because there are no offsite consequences from any credible event in excess of the criteria provided in SSAR 13.3, formal offsite radiological emergency response plans are not necessary. Therefore, there is no need for OROs to participate in hostile action exercises. Although the likelihood of an accident or event resulting in offsite doses exceeding the EPA PAG beyond the Site Boundary is extremely remote, TVA's Emergency Plan will describe the capabilities to determine if a radiological release is occurring and promptly communicate that information to OROs for their consideration. OROs are responsible for deciding what, if any, protective actions should be taken utilizing its CEMP. Formal offsite radiological emergency response plans would not be required. Therefore, offsite participation in a hostile action exercise is not required. TVA would continue to invite State and local support organizations to participate in the periodic drills and exercises conducted to assess its ability to perform responsibilities related to an emergency at the facility.

Table 1-3 (Sheet 1 of 2)
Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the 2-Mile EPZ Emergency Plan

Item	Regulation in 10 CFR 50.33(g), 50.47(b) or 50.47 (c)(2)	Basis for Exemption
1	10 CFR 50.33(g): If the application is for an operating license or combined license for a nuclear power reactor, or if the application is for an early site permit and contains plans for coping with emergencies under § 52.17(b)(2)(ii) of this chapter, the applicant shall submit radiological emergency response plans of State and local governmental entities in the United States that are wholly or partially within the plume exposure pathway emergency planning zone (EPZ), as well as the plans of State governments wholly or partially within the ingestion pathway EPZ. If the application is for an early site permit that, under 10 CFR 52.17(b)(2)(i), proposes major features of the emergency plans describing the EPZs, then the descriptions of the EPZs must meet the requirements of this paragraph. Generally, ~~the plume exposure pathway EPZ for nuclear power reactors shall consist of an area about 10 miles (16 km) in radius and~~ the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to the local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. The size of the EPZs also may be determined on a case-by-case basis for gas-cooled reactors and for reactors with an authorized power level less than 250 MW thermal. The plans for the ingestion pathway shall focus on such actions as are appropriate to protect the food ingestion pathway.	The criteria established in SSAR Section 13.3, provide for adequate protection of public health and safety in accordance with the EPA PAG.

Table 1-3 (Sheet 2 of 2)
Exemptions Requested from 10 CFR 50.33(g), 50.47(b), and (c)(2) for the 2-Mile EPZ Emergency Plan

Item	Regulation in Appendix E to 10 CFR Part 50	Basis for Exemption
2	10 CFR 50.47(c)(2): Generally, ~~the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and~~ the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. The size of the EPZs also may be determined on a case-by-case basis for gas cooled nuclear reactors and for reactors with an authorized power level less than 250 MW thermal. The plans for the ingestion pathway shall focus on such actions as are appropriate to protect the food ingestion pathway.	Refer to basis for 10 CFR 50.33(g).

2.0 CLINCH RIVER NUCLEAR SITE DEPARTURES

A departure is a plant-specific deviation from design information in a standard design certification rule. Because TVA has not selected a reactor design, departures from the reference Design Control Document (DCD) have not been identified.

3.0 REFERENCES

3-1 SECY-15-0077, “Options for Emergency Preparedness for Small Modular Reactors and Other New Technologies,” dated May 29, 2015.

3-2 Nuclear Energy Institute, White Paper, “Proposed Emergency Preparedness Regulations and Guidance for Small Modular Reactor Facilities,” July 2015.