UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 15, 2023

Mr. Brian McDermott, Director
Licensing and Planning
New Nuclear Program
Tennessee Valley Authority
1101 Market Street
LP 1G-C
Chattanooga, TN 37402

SUBJECT: INTERIM AUDIT SUMMARY REPORT WITH INITIAL FROM THE NUCLEAR REGULATORY COMMISSION STAFF OBSERVATIONS ON TENNESSEE VALLEY AUTHORITY'S ANNOTATED OUTLINE FOR CLINCH RIVER NUCLEAR SITE CONSTRUCTION PERMIT APPLICATION

Dear Mr. McDermott:

On October 27, 2022, the U.S. Nuclear Commission (NRC) issued a pre-application audit plan (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22285A027) to review documents associated with the Tennessee Valley Authority's (TVA's) development of a Title 10 of the *Code of Federal Regulation* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," construction permit (CP) application for the Clinch River Nuclear (CRN) Site. To support this audit, TVA set up an electronic reading room (eRR) for NRC staff to view TVA's annotated outline (AO) for a CP application based on the proposed GE Hitachi Nuclear Energy (GEH) BWRX-300 reactor design. The scope and content of the AO was developed using information from both Regulatory Guide (RG) 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," and NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Standard Review Plan (SRP). For each Chapter, the AO included the regulatory basis, whether the information will be provided in the CP application preliminary safety analysis report (PSAR) or the operating license (OL) application final safety analysis report (FSAR), a description of the regulatory action, whether or not the CRN CPA would comply with the regulatory action, and, if not, TVA's proposed compliance pathway(s). This letter serves as an interim audit report to transmit the NRC staff's initial observations on the AO. The NRC may provide additional observations at a later date.

The following observations are important for TVA to consider during preparation of a CP application. The NRC staff recommends additional preapplication engagement to help ensure alignment on CP application scope and content:

- The CRN Site Early Site Permit (ESP) (ESP-006), ML19352D868, contains permit conditions and combined license (COL) action items that need to be addressed in either the PSAR or FSAR, as appropriate.

- For any referenced topical reports (TR), information needs to be provided in the CP application that demonstrates how the limitations and/or conditions in the TR are met.

- Any references to approved Economic Simplified Boiling-Water Reactor (ESBWR) TRs should be justified for the BWRX-300 design by considering the differences in the designs and progression and mitigation approach of transients/accidents. Specifically, applicability of code models and correlations and experimental data or validation basis to the BWRX-300 design should be addressed.

- Identification of all design features that would be in the Regulatory Treatment of Non-Safety Systems program in the CP application is recommended.

- In the PSAR, TVA should discuss the plans to demonstrate the capability of design features (such as new valve designs) that have not been demonstrated as part of current licensed nuclear power plants. Although the requirements of 10 CFR 50.43(e) do not need to be met for a CP application, understanding how an applicant plans to demonstrate the capability of design features can optimize resource planning and testing demonstration activities associated with obtaining an OL.

- Chapter 7 of the AO references the Design Review Guide (DRG): Instrumentation and Controls for non-light-water reactor reviews, rather than Chapter 7 of the SRP. The DRG in intended for evaluating I&C designs that follow the technology-inclusive, risk-informed, and performance-based approach prescribed in RG 1.233, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors," which endorses Nuclear Energy Institute 18-04,"Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors". TVA will need to demonstrate it's appropriate to use this DRG without using the associated RG 1.233 licensing framework. Additionally, per 50.34(h)(3), TVA will need to identify differences from the SRP acceptance criteria and how the proposed alternatives provide an acceptable method of complying with the regulations.

- Aspects of Chapter 7 related to Human Factors Engineering (HFE) have a nexus to SRP Chapter 18, HFE, which was not addressed in the AO. Although Chapter 18 is not required for a PSAR, staff notes that it would be appropriate to address the intent to meet certain HFE and human-system interface related requirements in the PSAR, as detailed in the enclosure. Full compliance with the related requirements need to be demonstrated by the FSAR.

- Chapter 15 of the AO references two GEH TRs that have not yet been submitted (TR NEDC-33934P, "Safety Strategy" and TR NEDC-33913P, "Severe Accident Management and Source Term Methodology"). These TRs should be under NRC staff review prior to submission of the CP application as approval of the CP is predicated on approval of these TRs. Alternately, the content from these TRs necessary for the CPA could be moved to the PSAR.

- The annotated outline does not include Chapter 19, "Probabilistic Risk Assessment and Severe Accident Evaluation." Although Chapter 19 is not currently required by regulations to be part of a CP application, the Commission is considering changes the regulations to require it.[1] The staff are currently working to develop guidance on the level of PRA information needed, commensurate with design readiness, for a CP application, and a draft white paper containing that guidance is expected to be available for comment by late fall of 2023. While that guidance is being developed, TVA is encouraged to continue preapplication engagement with NRC staff to ensure alignment on the level of detail of PRA-related information needed to support acceptance and review of a construction permit application.

- The staff recommends considering DNRL-ISG-2022-01, "Safety Review of Light-Water Power Reactor Construction Permit Applications" (ML22189A099) for additional guidance on the content of a CP application.

Enclosure 1 is the audit observations and Enclosure 2 is the list of participants that attend the meeting.

If you have any questions please contact me, Allen Fetter, the Senior Project Manager at Allen.Fetter@nrc.gov.

Sincerely,

/RA/

Allen Fetter, Senior Project Manager
New Reactor Licensing and Infrastructure Branch
Division of New and Renewed Licenses
Office of Nuclear Reactor Regulation

Docket No.: 99902056

Enclosures:
1. Detailed Staff Interim Audit Observation on Tennessee Valley Authority's Annotated Outline
2. Audit Team Members

[1] SECY-22-0052, "Proposed Rule: Alignment of Licensing Processes and Lessons Learned from New Reactor Licensing (RIN 3150 AI66)," ML21159A055

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ADAMS Accession No.: ML23236A476 ***via email** **NRR-106**

OFFICE	NRR/DNRL/NLIB/PM	NRR/DNRL/NLIB/LA	NRR/DNRL/NLIB/BC	NRR/DNRL/NLIB/PM
NAME	AFetter*	SGreen*	MHayes	AFetter
DATE	08/22/2023	08/28/2023	08/29/2023	9/15/2023

Table 1 - Detailed Staff Interim Audit Observations on Tennessee Valley Authority's Annotated Outline

Chapter/ Section	Observations
2.1.2 Exclusion Area Authority and Control	10 CFR Part 100.3(a) is referenced in the text, but there is no 10 CFR 100.3(a) in the regulations.
2.1.2.2 Control of Activities Unrelated to Plant Operations	Include discussion of number and kind of persons to be engaged in the activity, and the frequency and length of time the activities to be permitted. Include determination of the potential radiation exposures to persons engaged in these activities resulting from the design-basis accidents postulated and evaluated in Chapter 15 of the preliminary PSAR.
2.2.2.3 Pipelines	The minimum time necessary to isolate the affected pipeline after a rupture of the pipeline is not indicated. It is unclear if the pipeline identified is used for transporting natural gas.
2.2.2.4 Waterways	Include the materials transported using the waterways if they are hazardous in nature
2.2.2.5 Airports	Include commercial and general aviation, and military aircraft, including local and itinerant helicopter flights.
SRP 2.2.1-2.2.2 III-3 PSAR	For each nearby facility where bulk storage of hazardous chemicals may be stored, identify the specific chemical and the quantity in storage.
2.2.3.1 Determination of Design Basis Events	Immediate ignition of released liquids or vapors result in a jet fire and develop thermal radiation that may be damaging to the safety-related structures, systems and components (SSCs), will need to be evaluated.
2.2.3.1.6 Liquid Spills	Potential fire and/or explosion hazards from potential spill(s) of flammable chemicals will need to be evaluated.
ESP Permit Condition CRN ESP PC 3.F(1)	The new Oak Ridge Airport will be located in East Tennessee Technology Park Heritage Center. Construction is planned to start in 2024.
2.3.2 Local Meteorology	If meteorological data, other than that which was used to support ESP-006, will be provided in the CP application, then hourly data should be provided in text file format as described in Appendix A of RG 1.23. Data should not be provided via magnetic tape as mentioned in the AO. Data should also not be provided in a Microsoft Excel file.
2.3.4 Short-Term Diffusion Estimates	There is no RG 4.98. The assumption is that this section intended to reference RG 4.28, which was renumbered to RG 1.249 and is expected to be published in 2023.

2.4.10 Flooding Protection Requirements	TVA must also address the regulatory requirements of 10 CFR 50.34a, "Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors," as it applies to this Site Safety Analysis Report (SSAR) section as well as Chapter 11, "Radioactive Waste Management," of a CP (refer to DNRL-ISG-2022-01, ML22189A099).
2.4.12 Dispersion, Dilution and Travel Times of Accidental Releases of Liquid Effluents in Surface Waters	TVA will address, as proposed in the work plan table in the eRR, (1) substantiation of assumed design bases using information gathered during dewatering for construction excavation and (2) all other details of the dewatering system design that implement design bases established during the CP review.
2.5.2 Vibratory Ground Motion (Section 2.5.2.4)	Section 2.5.2.4 of the outline appears to be stating that the Electric Power Research Institute (EPRI) 2004,2006 ground motion model will be used in the probabilistic seismic hazard analysis. However, a new updated CEUS ground motion model (NGA-East) has been developed under the Senior Seismic Hazard Analysis Committee process and has been accepted by the staff. The NGA-East ground motion models report 23 significant frequencies compared to the 7 significant frequencies reported in the EPRI ground motion model.
2.5.2 Vibratory Ground Motion (Section 2.5.2.5)	Section 2.5.4.5 discusses approaches to capturing the uncertainties associated with site response analysis. A good resource for the use of logic trees in capturing epistemic uncertainties in site response acceptable to the staff is published in the research information letter (RIL) RIL2021-15.
2.5.3 Surface Faulting	Section 2.5.3 of the annotated outline includes the content of both the SRP and RG 1.70. SRP Section 2.5.3 was updated in 2019 and is applicable to both Part 50 and 52 applicants. Although the outline includes the guidance in RG 1.70, Section 2.5.3, this guidance is outdated and addresses surface faulting only. When reviewing Section 2.5.3 of the CP application, the staff will be specifically looking for information related to surface deformation as reflected in the 2019 update to SRP Section 2.5.3, not just information on surface faulting as outlined in RG 1.70. The overall section title should also reflect the most recent guidance in SRP Section 2.5.3.
2.5.4 Stability of Subsurface Materials and Foundations	In support of a CP application, TVA will need to describe the excavation process for the reactor building and structure and the nature of any excavation support systems (i.e., temporary or permanent). If excavation supports are to be left in place, an analysis would need to show that those supports would not adversely affect the safety of the facility.

3.1 Conformance with NRC General Design Criteria	GDC 19 (Control Room) is within the scope of the HFE area review of the CP; it is not called out in the discussion column, so my assumption is that the CP will contain design criteria that corresponds to GDC 19. If there will be differences in the content of this design criteria due to BWRX-300 design-specific considerations, then the basis should be provided.
3.9.3 ASME Code Class 1, 2, and 3 Components, Component Supports and Core Support Structures	Section 3.9.3.2, “Pump and Valve Operability Assurance,” refers to active American Society of Mechanical Engineers (ASME) Class 1, 2, and 3 pumps and valves. In the PSAR, the applicant should address all valves with safety functions (active and passive) in accordance with the scope of the ASME OM Code as incorporated by reference in 10 CFR 50.55a. The applicant should address dynamic restraints as part of the response to Section 3.9.3.4, "Component Supports."
3.9.6 In Service Testing of Pumps and Valves	The applicant should discuss the plans to meet the most recent edition of the ASME Standard QME-1 as accepted in RG 1.100 for the qualification of active mechanical equipment, including pumps, valves, and dynamic restraints, to be used in the BWRX-300 plant. The applicant should discuss its plans to meet the inservice testing (IST) requirements in the ASME OM Code as incorporated by reference in 10 CFR 50.55a, which extends beyond the scope of ASME Boiler and Pressure Vessel Code Class 1, 2 and 3 components. As a clarification of the discussion in the TVA annotated outline, NUREG-1482 provides guidance (rather than requirements) for implementing the IST requirements in the ASME OM Code. Regarding Section 3.9.6.3, the applicant should discuss any plans to submit relief or alternative requests for the IST Program. Regarding Section 3.9.6.4, the applicant should discuss its plans to meet the IST requirements for dynamic restraints in the ASME OM Code as incorporated by reference in 10 CFR 50.55a.
3.9.7 Risk Informed In Service Testing	The TVA annotated outline indicates that a risk-IST Program will not be applied at the outset of plant operation. The applicant may apply risk insights when implementing the IST Program as allowed by specific requirements in the ASME OM Code as incorporated by reference in 10 CFR 50.55a.
3.11 Environmental Qualification of Mechanical and Electrical Equipment:	The applicant should discuss its plans to meet the latest edition of the ASME Standard QME-1 as accepted in RG 1.100 for the environmental qualification of mechanical equipment, including nonmetallic material.
3.11.2 Qualification Tests and Analyses	Note that RG 1.156, Revision 2, “Qualification of Connection Assemblies,” was published in February 2023. Section 3.11.2 references Revision1 of RG 1.156, which is not the latest version.
4.2.4 Testing and Inspection Plan	Include discussion of Surveillance Plans
7.1.1 Relationship to Plant-Level Lines of Defense	Recommend inclusion of discussion of the functional requirements for I&C systems in the CP application. Specifically, safety significant functions, including safety-related, non-safety-related with regulatory treatments, and defense-in-depth requirements.

Additional Chapter 7 Observations related to Human Factors Engineering	Aspects of Chapter 7 interface with the HFE review area and have with a nexus to Chapter 18. At the PSAR stage, it would be reasonable to address the intent to meet certain HFE and human-system interface related requirements via the design process. This could, for example, include a commitment to meeting 50.34(f)(2)(iii) in the design of the control room (i.e., provide a control design reflecting state-of-the-art human factors principles) and the guidance (e.g., NUREG-0711) and standards (e.g., NUREG-0700) that are planned to be utilized in accomplishing that. It would also be appropriate to discuss, at least at a high-level, the overall HFE program to be used (e.g., the major programmatic elements and processes). It would also be appropriate to discuss the intent for the finished design to also comply with the other HFE-related post-TMI requirements of 50.34(f), as may be technologically relevant to the design. Additionally, it would be very helpful to supplement the CP with a Concept of Operations description, as well as a Functional Requirements Analysis and Function Allocation of a sufficient scope to describe the plant safety functions and to provide a preliminary description of how those safety functions will be allocated to active safety features, passive safety features, inherent safety characteristics, or human actions. Including this additional information can potentially enhance the staff's understanding of the design, minimize subsequent information requests, and aid in informing a graded review on the part of the staff.
8.1.3 Communication Systems	Section 8.1.3 states the communication systems (both voice & data) between the nuclear power plant and its offsite transmission system operating authorities will be discussed. This actual communication system discussion is more appropriate for Chapter 7. However, Chapter 8 should discuss the other items listed for Section 8.1.3 (i.e., agreements/protocols, as noted). Recommend retitling Section 8.1.3 as "Agreements and Protocols with TSO/ISO/RC."
8.1.4 Design Criteria, Regulatory Guides and Standards	RG 1.129, Revision 3 is referenced. Please note RG 1.129, Revision 4, "Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries," was issued March 2023.
8.2 Offsite Power System	The design has a generator circuit breaker and capability to back feed thru the generator step-up transformers, as stated for SRP Section 8.2, "Offsite Power System". Suggest including if the generator circuit breaker will follow the guidelines in SRP Section 8.2, Appendix A, "Guidelines for Generator Circuit Breakers/Load Break Switches" or why it is not applicable.
11.1 Source Terms	Appears to provide context that the CP will provide the necessary information for the staff to determine source term information. 11.1 does not specifically mention GALE86 or another version, but reference is made in 11.2 and 11.3. If a computer code outside of GALE is used the staff will ensure it has the information available to understand how the realistic and design-basis source terms are determined.

11.5.2 Process and Effluent Radiological Monitoring and Sampling – System Description	The expectation for the CP is that it will address location of monitors and sample points and that the monitoring and sampling types and parameters will be appropriate for the radionuclides measured and the intended purpose. The FSAR would be expected to provide the type of information indicated in the outline, as well as any changes or updated information from the CP. Specific setpoint values may not be necessary in the application if appropriate testing is provided and an acceptable setpoint control program is in place.
12.1.3 Ensuring that Occupational Radiation Exposures Are as Low As Is Reasonably Achievable – Operational Considerations	In Column 4, the text in red for the FSAR stage appears to be incomplete and appears to contain errors (e.g., parentheses without an end, incomplete sentences/items, etc.). This item should be re-written and should be consistent with the text from RG 1.70. In addition, in the FSAR stage, information related to meeting 10 CFR 19.12, such as keeping workers informed as to the storage, transfer, or use of radioactive materials, or radiation in such areas, and instructed as to the risk associated with occupational radiation exposure, precautions and procedures to reduce exposures, and the purpose and function of protective devices employed, should be included.
12.2.1 Radiation Sources – Contained Sources	ANSI 237 is referenced in RG 1.70 and in the applicant's annotated outline, as guidance for developing source terms. ANSI 18.1 is more current than ANSI 237 and provides more up-to-date source term guidance and is referenced in the SRP.
12.2 – Radiation Sources (additional observations)	The description of radiation sources, during normal operations and accident conditions in the plant, is used as the basis for the radiation protection program and for shield design calculations. The description should include isotopic composition, location in the plant, source strength and source geometry, and the basis for the values. The description should include any required radiation sources containing byproduct, source, and special nuclear material exceeding 100 millicuries. Potential airborne radiation sources also should be described.
12.3.4 Radiation Protection Design Features – Area Radiation and Airborne Radioactivity Monitoring Instrumentation	This section should include the following, "Indicate whether, and if so how, the guidance provided by RGs 1.21, 8.2, 8.8, 8.12, and 1.97, and ANSI N13.1-1969 has been followed; if not followed, describe the specific alternative methods used."
SRP 12.3 III-1 (additional observations)	The annotated outline indicates that "a description of the scaled layout drawing of the facility, concentrating on the sources, shielding, etc.," should be provided. Consistent with the SRP and RG 1.70. Scaled layout drawings and text should be provided to provide adequate information on sources, shielding, radiation dose rates, etc.

13.2 Conduct of Operations - Training	It should be noted that RG 1.70 (published pre-TMI) predates many current Part 55 requirements for training and operator licensing, as well as portions of 50.54 and the 50.120 training rule in its entirety. The applicant will need to analyze those differences and ensure that the CP aligns with current Part 50 and 55 requirements as they relate initial and continuing licensed operator training, as well as for the training of plant staff under a Systems Approach to Training-based program. The CP needs to be clear in committing to the current regulatory requirements and should provide a preliminary description of how those requirements will be met.
13.6.1 Industrial Security – Preliminary Planning	1) Page 5 of 120, continuation of "Discussion" states "These [discussion] notes apply for the requirements below." It is unclear as to what requirements this statement is referencing. Identify the specific sections referred to. 2) Page 6 of 120, clarity is needed as to why "[a]fter confirming that the generic text is appropriate, the reviewer must focus the review on site-specific information." is struck out. 3) Pages 8 and 106 of 120, last row: The staff recommends additional engagement on the specific regulations being considered by TVA under the 10 CFR Part 73, "Physical Protection of Plants and Material," Security requirements for proposed alternative measures.
13.6.4 Access Authorization – Operational Program	Observation 1) Page 3 of 9 "Discussion" states, 'TVA will provide a description of the intent to use the operating reactor plant AA program for personnel listed in SRP Section 13.6.4, Table 1 at appropriate milestones.' a. Is it the intent that TVA will provide a detailed description to use the operating reactor plant AA program at the construction site(s) or provide a description of implementation milestones for meeting the intent of the access authorization rule under 10 CFR 73.56 for TVA's Operational Program prior to receipt of fuel assemblies on site? b. How will TVA describe the operational program in phases for the implementation milestones? c. Will TVA delineate in procedures and plans the AA measures for the protection of security- and safety-related SSCs, as well as measures for transitioning to the physical protection program required by 10 CFR 73.55(b)(1) and AA program required by 10 CFR 73.56 as applicable to an operating reactor? d. How will TVA describe the general performance objective of providing reasonable assurance that malicious acts during nuclear power plant construction cannot later reasonably result, directly or indirectly, in radiological sabotage? i. Will this be described in site-specific measures?

	ii. How will TVA achieve the general performance objectives, as construction activities near completion? The construction security program should provide for the deterrence and detection of malicious acts to security- and safety-related SSCs before and after final placement of each SSC. This includes the implementation of the lockdown procedures to ensure that the capability to deter and detect malicious acts directed against security- and safety-related SSCs is maintained until all construction activities have ended and the transition to the requirements of 10 CFR 73.55 is complete prior to nuclear fuel on site (in the protected area) or after the plant becomes operational. Observation 2) Page 5-6 of 9, "Discussion" states, 'TVA will provide a description of the intent to use the operating reactor plant AA program for personnel listed in SRP 13.6.4, Table 1 at appropriate milestones.' a. How will TVA describe or address the staff's comment above in the FSAR, typically Chapter 13, Section 13.6.4 to ensure that the Access Authorization Operational Program and associated milestones are included?
13.7.1 Fitness for Duty – Operation Program	Observation 1) The FFD programs for those applicants at sites whose licensees already have an existing NRC-approved FFD program will be considered acceptable if the full operational program is applied to the applicable personnel as described in 10 CFR 26.4(f) (see Table 1 for more information). These applicants will need to provide a description of their intent to use the operating reactor plant licensee's FFD program at the construction site(s) and any site-specific program considerations, such as deviations from the operating reactor plant FFD program. To be acceptable, this description should meet the requirements of 10 CFR 52.79(a)(44) and as discussed in Section I of this guidance. The NRC observes that the NRC does not "approve" a licensee's or other entity's FFD program whether implemented for construction or operation. During the licensing phase, pursuant to the note above, the FFD program description is reviewed by the staff to ensure that the intended FFD program conforms with regulatory requirements. During facility construction and operation, FFD programs are subject to inspection. Observation 2) Fitness for Duty – Operation Program. The applicant described its intent to use its "fleet operating reactor plant FFD program at CRN" and apply this program to those individuals in TVA-provided Table 1, "FFD Program Applicability and Milestones." This FFD program would therefore implement the requirements in 10 CFR Part 26, "Fitness for Duty Programs," Subparts A through I, N, and O, as listed below.

	• Subpart A—Administrative Provisions • Subpart B—Program Elements • Subpart C—Granting and Maintaining Authorization • Subpart D—Management Actions and Sanctions To Be Imposed • Subpart E—Collecting Specimens for Testing • Subpart F—Licensee Testing Facilities • Subpart G—Laboratories Certified by the Department of Health and Human Services • Subpart H—Determining Fitness-for-Duty Policy Violations and Determining Fitness • Subpart I—Managing Fatigue • Subpart N—Recordkeeping and Reporting Requirements • Subpart O—Inspections, Violations, and Penalties The NRC staff observes that based on the TVA statement, all Part 26 requirements, except those in Subpart K, "FFD programs for construction," would apply to the applicable individuals described in 10 CFR 26.4, "FFD program applicability to categories of individuals," during facility construction and operation. If TVA intends to use its "fleet operating reactor plant FFD program at CRN," then certain milestones and applicable 10 CFR Part 26, Subparts" provided in TVA-provided Table 1 would not be applicable. For example, the Table 1, Item 1, reference to 10 CFR Part 26, Subpart K, "FFD programs for construction," would not be applicable. A second example could be implementation of the fatigue management program and use of FFD program personnel (e.g., the Medical Review Officer and collectors) from another nuclear site like Watts Bar Nuclear Plant. The TVA-provided table is equivalent to "Table 1 - FFD Program Applicability and Milestones," provided in SRP Section 13.7.1, which is "a matrix describing the applicability of FFD program requirements to certain individuals as an applicant or licensee transitions from construction to reactor operation." A "fleet operating reactor plant FFD program" describes an FFD program that meets all Part 26 requirements, except those in Subpart K, "FFD programs for construction," and this fleet FFD program would apply to applicable individuals as described in 10 CFR 26.4, "FFD program applicability to categories of individuals," during facility construction and operation. In this case, there would be no change in FFD program requirements for individuals described in 10 CFR 26.4(f) as the Clinch River facility transitions from construction to operation. If TVA elects not to apply its fleet FFD program to all individuals at the Clinch River facility during construction, then TVA would be required to implement an FFD program that meets the requirements of Subpart K for those described in 10 CFR 26.4(f) and an FFD program that meets all Part 26 requirements, except those requirements in Subpart K, for those individuals described in 10 CFR 26.4(e). Then, as the Clinch River facility transitions from construction to operation, TVA may

	implement the graded applicability of FFD programs to those individuals as detailed in TVA-provided Table 1. Note that for the purposes of Part 26 implementation, 10 CFR 26.5, defines that "[c]onstructing or construction activities mean, for the purposes of [Part 26], the tasks involved in building a nuclear power plant that are performed at the location where the nuclear power plant will be constructed and operated. These tasks include fabricating, erecting, integrating, and testing safety- and security-related SSCs, and the installation of their foundations, including the placement of concrete." See related Observation 4 below. Observation 3) Fitness for Duty – Operation Program. The applicant stated that "any deviations from the operating program will also be provided." The NRC staff observes that the applicant did not provide any information as to what "deviations from the operating program" they may implement. Deviations from the requirements in Subparts A through I, K, N and O would require an exemption under 10 CFR 26.9, "Specific exemptions." Observation 4) Fitness for Duty – Operation Program. Observation 4. The applicant referred to "SRP Section 13.6.4 – Table 1" in Section 13.6, "Physical Security," within its proposed Section 13.6.4 Access Authorization – Operational Program." In Table 1 (see pages 8 and 9 of the applicant's Section 13.6, Physical Security, submission) information is provided regarding the applicability of the proposed access authorization program to "construction personnel." The NRC observes that TVA did not define "construction personnel" in their use of the phrase "construction personnel" in this security-related Table 1. Furthermore, as noted in NRC staff Observation 2 above, Part 26 defines "Constructing or construction activities;" this Part 26 definition is similar to but not equivalent to the definition of construction in 10 CFR Part 50 which would apply to the AA program. The Part 50 definition is "[c]onstruction or constructing means, for the purposes of § 50.55(e), the analysis, design, manufacture, fabrication, quality assurance, placement, erection, installation, modification, inspection, or testing of a facility or activity which is subject to the regulations in this part and consulting services related to the facility or activity that are safety related." Consequently, the applicability of the FFD and AA programs could apply to different populations of individuals at the CRN Site, because the definitions for construction are different. These populations of individuals could also be subject to different FFD programs as described in NRC staff Observation 2. The NRC staff also observes that the applicability of the AA program to "construction personnel" could be applied to a smaller population of individuals than that required by an operating AA program (which TVA stated that they intend to implement). For example, security personnel

	are not "construction personnel" because security personnel would not be performing those duties and responsibilities associated with those activities described in the 10 CFR 50.2 definition of construction.
14.1.1 Scope of Test Program	Commensurate with the maturity of the reactor design at the CP stage, the scope of the Initial Test Program (ITP) should include a list of safety-related systems and components, and any systems or components not classified as safety-related but within the scope of special treatment requirements of 10 CFR Part 50 (such as no safety-related systems or components applicable to the NRC regulations related to station blackout or anticipated transients without a scram).
14.1.2 Plant Design Features That Are Special, Unique, or First of a Kind	In preparation for meeting 50.43(e) for the OL stage, TVA might find it useful to review other recent examples of demonstration of first of a kind design features.
14.1.3 Regulatory Guides	Several RGs also provide useful information for testing of components and systems, such as RGs 1.68.1, 1.68.2, 1.68.3 and 1.79.1 for preoperational testing of plant systems, RG 1.100 for qualification of active mechanical equipment for nuclear facilities, RG 1.118 for periodic testing of electric power and protection systems, and RG 1.140 for atmospheric cleanup systems testing.
14.1.4 Utilization of Plant Operating and Testing Experiences at Other Reactor Facilities	Note that significant operating and test experience has been obtained for the qualification and testing of power-operated valves since the issuance of RG 1.70. The PSAR should include plans to address the safety issues described in NRC generic communications. The PSAR should also address other operating and testing experience applicable to the ITP.
14.1.5 Test Program Schedule	The information requested in Section 14.1.5 in RG 1.70 is important for the NRC staff to prepare for the review of ITP plans and plans for their implementation.
14.1.6 Trial Use of Plant Operating and Emergency Procedures	Include plans to perform trial use of complex plant procedures, such as diagnostic testing of components at training or similar facilities.
14.1.7 Augmenting Applicant's Staff During Test Program	Include if component vendors or consultants might be needed to assist plant staff in the evaluation of the test results for certain systems or components.
15.4.2 Uncontrolled Control Rod Assembly Withdrawal at Power	Does not include how SRP 15.4.2, Section III.2 is addressed.
15.7.4 Radiological Consequences of a	Applicable guidance is also found in SRP 15.0.3.

Fuel Handling Accident	
15.7.5 Spent Fuel Cask Drop Accidents	Applicable guidance is also found in SRP 15.0.3.
15.9 Boiling Water Reactor Stability	No licensing technical report identified for the methodology so the methodology for stability will need to be included in the PSAR.
16.0 Technical Specifications	Acknowledging that the BWRX-300 is a new design, because it is derived from ESBWR, TVA might want to consider the generic TS and Bases in the ESBWR design certification as guidance for selecting limiting condition for operations and NUREG-1433, Revision 5 5 for current requirements in standard TS Sections 1.2, 1.3, 1.4, 2.0, 3.0, and 5.5. Similarly, while SRP 16.0, Section III.2, "Additional Review Considerations," is not directly applicable to the BWRX-300, it may offer some guidance for drafting the CPA preliminary technical specifications.
17.4. Reliability Assurance Program (RAP)	SRP 17.4 II A.5: TVA's draft CP application content does not include probabilistic risk assessment (PRA)-related information that is one of the inputs needed to determine the list of RAP SSCs. While the methodology and process may be delineated prior to the availability of PRA information, PRA information is needed to identify the comprehensive list of RAP SSCs. Pre-application discussions with TVA and GEH to identify the necessary information for Chapter 19 in the CP application will support the information necessary for Chapter 17.4.
Other Chapter 17 Notes	At the OL application stage, TVA will need to address compliance with 50.155 - Mitigating Beyond Design Basis Events

Table 2 - Audit Team Members

NRC Technical Reviewers	Office
Amitava "Amit" Ghosh	Office of Nuclear Reactor Regulation
Kevin Quinlan	Office of Nuclear Reactor Regulation
Hosung Ahn	Office of Nuclear Reactor Regulation
Scott Stovall	Office of Nuclear Reactor Regulation
Jenise Thompson	Office of Nuclear Reactor Regulation
Zuhan Xi	Office of Nuclear Reactor Regulation
Jesse Seymour	Office of Nuclear Reactor Regulation
Thomas Scarbrough	Office of Nuclear Reactor Regulation
Sheila Ray	Office of Nuclear Reactor Regulation
Shanlai Lu	Office of Nuclear Reactor Regulation
Hanry Wagage	Office of Nuclear Reactor Regulation
Joe Ashcraft	Office of Nuclear Reactor Regulation
Dinesh Taneja	Office of Nuclear Reactor Regulation
Zach Gran	Office of Nuclear Reactor Regulation
Ed Stutzcage	Office of Nuclear Reactor Regulation
Judy Petrucelli	Office of Nuclear Security and Incident Response
Paul Harris	Office of Nuclear Security and Incident Response
Shanlai Lu	Office of Nuclear Reactor Regulation
Elijah Dickson	Office of Nuclear Reactor Regulation
Ryan Nolan	Office of Nuclear Reactor Regulation
Craig Harbuck	Office of Nuclear Reactor Regulation
Alissa Neuhausen	Office of Nuclear Reactor Regulation
John Hughey	Office of Nuclear Reactor Regulation
Shilp Vasavada	Office of Nuclear Reactor Regulation