1.0 INTRODUCTION AND INTERFACES

This chapter of the Safety Evaluation Report (SER) is organized as follows:

- Section 1.1 provides an overview of the entire combined license (COL) application;
- Section 1.2 provides the regulatory basis for the COL licensing process;
- Section 1.3 provides an overview of the COL application principal review matters and where the staff's review of the 10 parts of the COL application is documented.
- Section 1.4 documents the staff's review of Chapter 1 of the Final Safety Analysis Report (FSAR); and
- Section 1.5 documents regulatory findings that are in addition to those directly related to the staff's review of the FSAR.

1.1 Summary of Application

In a letter dated October 30, 2007, (Agencywide Documents Access and Management System (ADAMS) Accession Number ML073110527), as supplemented by several letters, the Tennessee Valley Authority (TVA or the applicant) submitted its application to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for a COL for two Westinghouse AP1000 advanced passive pressurized water reactors (PWRs) pursuant to the requirements of Sections 103 and 185(b) of the Atomic Energy Act, Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, "Licenses, Certifications and Approvals for Nuclear Power Plants," and the associated material licenses under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 40, "Domestic Licensing of Source Material," and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." These reactors would be identified as Bellefonte Nuclear Plant, Units 3 and 4 (BLN 3 and 4), and would be located on a site previously utilized for construction of BLN, Units 1 and 2 (BLN 1 and 2) near the cities of Hollywood and Scottsboro in Jackson County in northeast Alabama. Unless otherwise noted this SER with open items is based on Revision 1 of TVA's COL application, which was submitted via letter (ADAMS Accession Number ML090290406) dated January 21, 2009.

In its January 21, 2009, Revision 1 submission, the applicant referenced the Westinghouse AP1000 standard design with certain standard and/or plant specific departures, exemptions, and supplements. Specifically, the applicant incorporated by reference the Westinghouse AP1000 Design Control Document (DCD), Revision 17. Revision 17 of the DCD of the AP1000 referenced in this application is the Design Certification Amendment request to revise Appendix D to 10 CFR Part 52.

The AP1000 nuclear reactor design is a pressurized water reactor (PWR) with a power rating of 3415 megawatts thermal (MWt) and an electrical output of at least 1000 megawatts electric (MWe). The AP1000 design uses safety systems that rely on passive means, such as gravity, natural circulation, condensation and evaporation, and stored energy, for accident prevention and mitigation.

The BLN 3 and 4 COL application is organized as follows:

- **Part 1 General and Administrative Information**

Part 1 provides an introduction to the application and includes certain corporate information regarding TVA pursuant to 10 CFR 50.33(a) – (d).

- **Part 2 Final Safety Analysis Report**

Part 2 contains information pursuant to the requirements of 10 CFR 52.79 and, in general, adheres to the content and format guidance provided in Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."

- **Part 3 Environmental Report**

Part 3 contains environmental information pursuant to the requirements of 10 CFR 52.80 and 10 CFR 51.50(c).

- **Part 4 Technical Specifications**

Part 4 addresses how the AP1000 Generic Technical Specifications and Bases are incorporated by reference into the BLN 3 and 4 Plant-Specific Technical Specifications and Bases. Specifically, Section A addresses completion of bracketed information. Section B provides a complete copy of the BLN 3 and 4 Plant-Specific Technical Specifications and Bases.

- **Part 5 Emergency Plan**

Part 5 contains the BLN Nuclear Station Combined License Emergency Plan, supporting information (e.g., evacuation time estimates), and applicable offsite State and local emergency plans.

- **Part 6 [Not Used - reserved for Limited Work Authorization/site redress information]**

- **Part 7 Departures Report**

Part 7 contains information regarding "departures" and "exemptions." TVA identified four departures related to: (1) Administrative departure for organization and numbering for the FSAR sections; (2) Unit 3 transformer area arrangement; (3) the service water system (SWS) blowdown flow path; and (4) the Emergency Response Facility locations. TVA also identified two exemptions: (1) from 10 CFR 52.79(a)(44) to provide a "description of the fitness-for-duty program"; and (2) from Appendix D, Section IV.A.2.a to 10 CFR Part 52, related to Combined License Application Organization and Numbering.

Subsequent to submitting Revision 1 to the application, TVA provided one additional departure and two additional exemption requests in a response to a request for additional information (RAI) 15.00.03-1. The departure relates to an exclusionary boundary (EAB) atmospheric dispersion value in DCD Tier 2 material. The two exemption requests relate to: (1) containment leak rate technical specifications; and (2) AP1000 DCD Tier 1 EAB atmospheric dispersion site

parameter. The staff intends to discuss these two additional exemption requests in this SER with open items; therefore, these exemption requests are mentioned here.

In addition, in a letter (ADAMS Accession Number ML090840147) dated March 23, 2009, TVA provided its description of the fitness for duty program and withdrew the exemption from 10 CFR 52.79(a)(44). The original exemption request was based on the timing of the pending 10 CFR Part 26 (fitness for duty) rulemaking. TVA's original submittal was provided October 30, 2007, and the fitness for duty rulemaking was issued (73 FR 17176) March 31, 2008. The letter of March 23, 2009, aligns the BLN COL application with 10 CFR Part 26, rendering the fitness for duty exemption request unnecessary. Although the fitness for duty exemption request is addressed in Revision 1 of the BLN COL application, it will not be discussed in this SER because the March 23, 2009, information supersedes Revision 1.

- **Part 8 Security Plan**

Part 8 addresses the BLN 3 and 4 Safeguards and Security Plans. This part contains safeguards information that is to be withheld from public disclosure. Part 8 was submitted to the NRC by separate transmittal (ADAMS Accession Number for cover letter only is ML073110400) dated October 30, 2007.

- **Part 9 Withheld Information**

Part 9 identifies sensitive information that is withheld from public disclosure under 10 CFR 2.390.

- **Part 10 Proposed Combined License Conditions (Including ITAAC)**

Part 10 contains BLN 3 and 4 proposed license conditions including inspections, tests, analyses, and acceptance criteria (ITAAC) information in accordance with 10 CFR 52.80. TVA proposes eight license conditions addressing:

- specific ITAAC that are the subject of a Section 103(a) hearing
- COL information items that cannot be resolved prior to issuance of a combined license
- operational programs implementation
- security program revisions
- detailed operational program schedule that is updated every 6 months until 12 months before fuel loading to allow NRC resource planning
- vendor, architect engineer qualification information
- startup testing
- environmental protection plan

The environmental protection plan license conditions are not evaluated in this SER. Part 10 of the application incorporated by reference (IBR) the AP1000 Tier 1 information including ITAAC. In addition, the application contains emergency planning ITAAC.

- **Part 11 Information Incorporated by Reference**

Part 11 contains the TVA Nuclear Generation Development and Construction Quality Assurance Program Description (QAPD). The QAPD is the top-level policy document that establishes the quality assurance (QA) policy and assigns major functional responsibilities for construction/pre-operation and/or operations activities conducted by or for TVA.

1.2 Regulatory Basis

1.2.1 Applicable Regulations

10 CFR Part 52, Subpart C, "Combined Licenses," sets out the requirements and procedures applicable to Commission issuance of a COL for nuclear power facilities. The following are of particular significance:

- 10 CFR 52.79 identifies the technical information for the FSAR.
  - 10 CFR 52.79 (d) provides additional requirements for a COL referencing a standard certified design.
- 10 CFR 52.80 provides additional technical information outside of the FSAR (ITAAC and the environmental report).
- 10 CFR 52.81 provides standards for reviewing the application.
- 10 CFR 52.83 provides for the finality of referenced NRC approvals (i.e., standard design certification (DC)).
- 10 CFR 52.85 provides requirements for administrative reviews and hearing.
- 10 CFR 52.87 provides for referral to the Advisory Committee on Reactor Safeguards.

The NRC staff reviewed this application according to the standards set out in 10 CFR Parts 20, 30, 40, 50, 51, 52, 54, 55, 70, 73, 100, and 140. The staff evaluated the application against the acceptance criteria provided in the following standard review plans (SRPs).

- NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants"
- NUREG-1555, Supplement 1: "Standard Review Plans for Environmental Reviews for Nuclear Power Plants"
- NUREG-1577, "Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance"

In addition, the staff considered the format and content guidance in RG 1.206[1] for the COL application.

1.2.2 Finality of Referenced NRC Approvals

In accordance with 10 CFR 52.83, "Finality of referenced NRC approvals; partial initial decision on site suitability," if the application for a COL references a DC rule, the scope and nature of matters resolved in the DC for the application and any combined license issued are governed by 10 CFR 52.63, "Finality of standard design certifications."

Based on the finality afforded to referenced certified designs, the scope of this COL application review as it relates to the referenced certified design[2] is limited to items that fall outside the scope of the certified design (e.g., COL information items, design information replacing conceptual design information, and programmatic elements that are the responsibility of the COL). TVA may need to supplement this application, based on the outcome of the AP1000 DC amendment rulemaking. This activity is being tracked as Open Item 1-1. The staff will supplement this SER as necessary to reflect the final disposition of the DC application.

The contents of the COL application are specified by 10 CFR 52.79(a), which requires the submission of information within the final safety analysis report that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components of the facility as a whole. For a COL application that references a DC, Section 52.79(d) requires the DCD to be included or incorporated by reference into the FSAR. A COL application that references a certified design must also contain the information and analysis required to be submitted within the scope of the COL application, but which is outside the scope of the DCD. This set of information addresses plant- and site-specific information and includes all COL action or information items; design information replacing conceptual design information; and programmatic information that was not reviewed and approved in connection with the design certification rulemaking.

The initial step in the staff evaluation of the COL application is to confirm that the complete set of information required to be addressed within the COL application was addressed within the DC, the DC as supplemented by the COL application, or completely within the COL application. Following this confirmation, the staff review of the COL application is limited to the COL review items.

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[1] Appendix D, Section IV.A.2.a to 10 CFR Part 52 requires the COL application to include a plant-specific DCD that contains the same type of information and uses the same organization and numbering as the generic DCD. The generic DCD used RG 1.70, Revision 3 as a guide for the format and content. RG 1.206 was issued after the initial certification of the AP1000; thus, there are anticipated differences between the BLN 3 and 4 COL application and the guidance of RG 1.206.

[2] Note: While the referenced version of the AP1000 design is not yet certified, 10 CFR 52.55(c) allows an applicant, at its own risk, to incorporate by reference a design that is not certified. The AP1000 DC amendment application (Docket Number 52-006) is currently undergoing review by the NRC staff. The results of the NRC staff's technical evaluation will be documented in a supplement to NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design."

1.2.3 Overview of the Design-Centered Review Approach

The design-centered review approach (DCRA) is described in Regulatory Issue Summary (RIS) 2006-06, "New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach." The DCRA is endorsed by the Commission's Staff Requirements Memorandum (SECY-06-0187 – Semiannual Update of The Status of New Reactor Licensing Activities and Future Planning for New Reactors, dated November 16, 2006). The DCRA is Commission policy intended to promote standardization of COL applications beyond the scope of information included in the DC. Specifically, this policy allows the staff to perform one technical review for each standard issue outside the scope of the DC and use this decision to support decisions on multiple COL applications. In this context, "standard" refers to identical information.

The first COL application submitted for NRC staff review is designated in a design center as the reference COL (R-COL) application, and the subsequent applications in the design center are designated as subsequent COL (S-COL) applications. The BLN 3 and 4 COL application has been designated as the RCOL application for the AP1000 design center[3].

TVA, as the RCOL applicant for the AP1000 design center, organized and annotated its FSAR, Part 2 of the COL application, to clearly identify: a) sections that incorporate by reference (IBR) the AP1000 DCD; b) sections that are standard for COL applicants in the AP1000 design center; and c) sections that are site-specific and thus only apply to TVA/BLN 3 and 4. The following notations have been used by the applicant for the departures from and/or supplements to the referenced DCD included in this COL application:

- STD – standard (STD) information that is identical in each COL referencing the AP1000.
- BLN – plant-specific information that is specific to this application.
- DEP – represents a departure (DEP) from the DCD.
- COL – represents a COL information item identified in the DCD.
- SUP – represents information that supplements (SUP) information in the DCD.
- CDI – represents design information replacing conceptual design information (CDI) included in the DCD but not addressed within the scope of the DCD review.

[3] In a letter dated April 28, 2009 (ADAMS accession number ML091210083) the NuStart Energy Development, LLC, consortium informed the NRC that it had changed the RCOL designation for the AP1000 design center from BLN Units 3 and 4 to the Vogtle Electric Generating Plant (VEGP) Units 3 and 4. The staff does not intend to issue an SER with open items for VEGP Units 3 and 4 and intends to transition the RCOL from BLN Units 3 and 4 to VEGP Units 3 and 4 after the issuance of the BLN Units 3 and 4 SER with open items. Therefore, for purposes of this SER with open items the BLN Units 3 and 4 COL application is considered the RCOL application.

1.3 Principal Review Matters

The staff's evaluations related to the COL application review are addressed as follows:

- **Part 1 General and Administrative Information**

The staff's evaluation of the corporate information regarding TVA pursuant to 10 CFR 50.33 is provided in Section 1.5.1 of this SER.

- **Part 2 Final Safety Analysis Report**

The staff's evaluation of information in the BLN COL FSAR is provided in the corresponding sections of this SER.

- **Part 3 Environmental Report**

The staff's evaluation of environmental information pursuant to the requirements of 10 CFR 51.50(c) addressed in the Environmental Report is provided in the Environmental Impact Statement.

- **Part 4 Technical Specifications**

Chapter 16 of this SER contains the staff's evaluation of the BLN 3 and 4 Plant-Specific Technical Specifications and Bases (specifically completion of bracketed text).

- **Part 5 Emergency Plan**

Chapter 13 of this SER includes the staff's evaluation of the BLN Emergency Plan, supporting information such as evacuation time estimates, and the applicable offsite State and local emergency plans.

- **Part 7 Departures Report**

The staff's evaluation of the departures and exemptions in Part 7 is provided in the applicable chapter of this SER. The table below provides a description of the departure or exemption and where the evaluation is addressed in this SER.

Description of Departure or Exemption	Location of Evaluation in this Report
Departure for organization and numbering for the FSAR sections	1.5.4
Departure associated with Unit 3 transformer area arrangement	8
Departure associated with the SWS blowdown flow path	9
Departure associated with Emergency Response Facility locations	18

Description of Departure or Exemption	Location of Evaluation in this Report
Exemption from 10 CFR 52.79(a)(44) to provide a "description of the fitness-for-duty program"	Exemption request withdrawn by March 23, 2009, TVA submission as discussed above
Exemption from Appendix D, Section IV.A.2.a to 10 CFR Part 52 related to COL application Organization and Numbering	1.5.4
RAI 15.00.03-1 departure relating to an EAB atmospheric dispersion value in DCD Tier 2 material	6
RAI 15.00.03-1 exemption related to containment leak rate technical specifications	6
RAI 15.00.03-1 exemption related to AP1000 DCD Tier 1 EAB site parameter	6

- **Part 8 Security Plan**

The staff's evaluation of the Safeguards and Security Plans is documented separately from this SER and is withheld from the public in accordance with 10 CFR 2.390. A summary will be provided in Chapter 13.

- **Part 9 Withheld Information**

The staff's evaluation of the withheld information occurs in the context of the specific subject being reviewed and is documented accordingly.

- **Part 10 Proposed Combined License Conditions (Including ITAAC)**

The staff's evaluation of the proposed combined license conditions (including ITAAC) is provided in the applicable chapter of this SER. The table below provides a description of the proposed license condition and where the evaluation is addressed in this SER.

Description of Proposed Combined License Condition	Location of Evaluation in this Report
ITAAC	14.3
COL information items that cannot be resolved prior to issuance of a combined license	The proposed license conditions are evaluated throughout this SER. The staff has not yet determined which BLN COL FSAR commitments require a license condition. The decision on which BLN COL FSAR commitments, if any, should become license conditions is Open Item 1-2.
operational programs implementation	13
security program revisions	13

Description of Proposed Combined License Condition	Location of Evaluation in this Report
detailed operational program schedule that is updated every 6 months until 12 months before fuel loading to allow NRC resource planning	13
vendor, architect engineer qualification information	1.4
startup testing	14.2

- **Part 11 Information Incorporated by Reference**

Chapter 17 of this SER contains the staff's evaluation of the TVA QAPD. The QAPD is the only IBR item that is discussed in Part 11.

The staff's SER is structured as follows:

- The SER adheres to the "finality" afforded to COL applications that incorporate by reference a standard certified design. As such, this SER does not repeat any technical evaluation of material incorporated by reference; rather, it points to the corresponding review findings of NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," (FSER) and its supplements. However, the referenced DCD and the BLN COL FSAR are considered in the staff's safety evaluation to the extent necessary to ensure that the expected scope of information to be included in a COL application is addressed adequately in either the DCD and COL FSAR or in both.

- For sections that were completely IBR without any supplements or departures, the SER simply points to the DCD and related FSER and confirms that all the relevant review items were addressed in the DCD and the staff's evaluation was documented in NUREG-1793.

- For subject matter within the scope of the COL application, this SER generally follows a six-subsection organization as follows:

  - "Introduction" section provides a brief overview of the specific subject matter

  - "Summary of Application" section identifies whether portions of the review have received finality and clearly identifies the scope of review for the COL

  - "Regulatory Basis" section identifies only the relevant criteria for the information addressed by the COL application

  - "Technical Evaluation" section focuses on the information addressed by the COL application

  - "Post Combined License Activities" section identifies issues that are COL holder responsibilities

  - "Conclusion" section summarizes how the technical evaluation resulted in a reasonable assurance determination by the staff that the relevant acceptance criteria have been met

1.4 Staff Review of BLN COL FSAR Chapter 1

1.4.1 Introduction

There are two types of information provided in Chapter 1 of the FSAR:

- General information that enables the reviewer or reader to obtain a basic understanding of the overall facility without having to refer to the subsequent chapters. A review of the remainder of the application can then be completed with a better perspective and recognition of the relative safety significance of each individual item in the overall plant description.

- Specific information relating to qualifications of the applicant, construction impacts and regulatory considerations that apply throughout the balance of the application (e.g., conformance with the acceptance criteria in NUREG-0800).

This section of the SER will identify the information incorporated by reference, summarize all of the new information provided, and document the staff's evaluation of the sections addressing regulatory considerations.

1.4.2 Summary of Application

Section 1.1 Introduction

Section 1.1 of the BLN COL FSAR incorporates by reference Section 1.1, "Introduction," of the AP1000 DCD, Revision 17 with the following supplements:

- STD SUP 1.1-1

The applicant specified the incorporation of Revision 17 of the Westinghouse AP1000 DCD in all sections of the BLN COL FSAR. Additionally, the applicant incorporated by reference Nuclear Energy Institute (NEI) technical reports as identified in Table 1.6-201 of the BLN COL FSAR.

- BLN SUP 1.1-2

The applicant clarified that the FSAR was being submitted to NRC by TVA under Section 103 of the Atomic Energy Act to construct and operate two nuclear power plants under the provisions of 10 CFR Part 52, Subpart C.

- BLN COL 2.1-1

The applicant provided additional information in BLN COL 2.1-1 to address COL Information Item 2.1-1 (COL Action Item 2.1.1-1). Specifically BLN 3 and 4 are to be located in Jackson County, in northeast Alabama on a site previously used for construction of BLN 1 and 2. This is a brief introductory summary of the plant location. An expanded discussion of BLN COL 2.1-1 is included in BLN COL FSAR Section 2.1.

- BLN COL 1.1-1

The applicant provided the anticipated schedule for construction and operation of BLN 3 and 4 in BLN COL FSAR Table 1.1-203. The applicant committed to provide a site-specific construction plan and startup schedule after issuance of the COL and after a positive decision had been made to construct the plant.

- STD SUP 1.1-6

The applicant identified that, while the BLN COL FSAR generally follows the AP1000 DCD organization and numbering, there were some organization and numbering differences that were adopted, where necessary, to include additional material, such as additional content identified in RG 1.206.

Related to this is STD DEP 1.1-1, "Administrative departure for organization and numbering of the FSAR sections," discussed in FSAR Section 1.8 and Part 7 of the COL application. Staff evaluation of this departure is included in Section 1.5.4 of this SER.

- STD SUP 1.1-3

The applicant provided additional information to describe annotations used in the left hand column of the BLN COL FSAR to identify departures, supplementary information, COL items, and CDI.

- STD SUP 1.1-4

The applicant provided additional information to indicate how proprietary, personal or sensitive information withheld from public disclosure pursuant to 10 CFR 2.390 and RIS 2005-026, "Control of Sensitive Unclassified Nonsafeguards Information Related to Nuclear Power Reactors," is identified in the BLN COL FSAR. Proprietary material was provided in Part 9 of the COL application.

- BLN SUP 1.1-5

The applicant provided additional information to identify acronyms and system designations used in the BLN COL FSAR that are in addition to those identified in the DCD.

<u>Section 1.2 General Plant Description</u>

Section 1.2 of the BLN COL FSAR incorporates by reference Section 1.2, "General Plant Description" of the AP1000 DCD, Revision 17 with the following supplements:

- BLN COL 2.1-1; BLN COL 3.3-1; and BLN COL 3.5-1

The applicant provided additional information on the site plan for BLN 3 and 4 summarizing the principal structures and facilities, parking areas, roads, and transmission lines. The location and

orientation of the power block complex are also described. These COL information items are expanded in other sections of the BLN COL FSAR.[4]

Section 1.3 Comparisons with Similar Facility Designs

Section 1.3 of the BLN COL FSAR incorporates by reference Section 1.3, "Comparisons with Similar Facility Designs" of the AP1000 DCD, Revision 17 with no supplements.

Section 1.4 Identification Of Agents And Contractors

Section 1.4 of the BLN COL FSAR incorporates by reference Section 1.4, "Identification of Agents and Contractors" of the AP1000 DCD, Revision 17 with the following supplements:

- BLN SUP 1.4-1

The applicant provided additional information to identify TVA as owner and operator of BLN 3 and 4. TVA is wholly owned by the United States Government, and currently owns and operates six nuclear units.

- BLN SUP 1.4-2

The applicant provided additional information to clarify the identification of additional participants. The primary agents or contractors for the design, construction, and operation of the nuclear power plant have not been identified at this time. In particular, TVA has not yet contracted with the AP1000 provider, architect-engineer, or constructor. In Part 10 of the COL application, the applicant proposed License Condition 7 stating "Prior to commencement of construction, the licensee shall submit a license amendment request that: 1) identifies the NSSS vendor, architect-engineer, and constructor; 2) describes their technical qualifications; and 3) describes the division of responsibility among them."

- BLN SUP 1.4-3

The applicant provided additional information related to specialized consulting firms that assisted in preparing the COL application for BLN.

TVA received support from the following contractors in preparing the COL:

- MACTEC Engineering and Consulting, Inc.
- William Lettis & Associates, Inc.
- Enercon Services, Inc.
- Burns & Roe Enterprises, Inc.

Section 1.5 Requirements for Further Technical Information

Section 1.5 of the BLN COL FSAR incorporates by reference Section 1.5, "Requirements for Further Technical Information" of the AP1000 DCD, Revision 17 with no supplements. This section of the DCD provides information related to testing conducted during the AP600 conceptual design program to provide input into the plant design and to demonstrate the

[4] Table 1.8-202 of the BLN COL FSAR provides a COL information item index of occurrences in the BLN COL FSAR.

feasibility of unique design features. The DCD also describes the analyses performed to show that the AP600 and AP1000 exhibit a similar range of conditions such that the AP600 tests are sufficient to support the AP1000 safety analysis.

Section 1.6 Material Referenced

Section 1.6 of the BLN COL FSAR incorporates by reference Section 1.6, "Material Referenced" of the AP1000 DCD, Revision 17 with the following supplements:

- BLN SUP 1.6-1

The applicant provided additional information to identify the technical documents incorporated by reference in the BLN COL FSAR in addition to those technical documents incorporated by reference in the AP1000 DCD.

Section 1.7 Drawings and Other Detailed Information

Section 1.7 of the BLN COL FSAR incorporates by reference Section 1.7, "Drawings and Other Detailed Information" of the AP1000 DCD, Revision 17, with the following supplements:

- BLN SUP 1.7-1

The applicant identified the site-specific system drawings. These are circulating water system, raw water system, SWS, and offsite power system one line diagram.

Section 1.8 Interfaces for Standard Design

Section 1.8 of the BLN COL FSAR incorporates by reference Section 1.8, "Interfaces for Standard Design" of the AP1000 DCD, Revision 17 with the following supplements:

- BLN SUP 1.8-1

The applicant identified four departures in BLN COL FSAR Table 1.8-201, "Summary of FSAR Departures from the DCD." The departures are:

- STD DEP 1.1-1 related to numbering and organization of the BLN COL FSAR sections to be consistent with RG 1.206 and NUREG-0800.

- BLN DEP 8.2-1 related to rearranging the transformer area for BLN Unit 3.

- BLN DEP 9.2-1 related to the service water cooling tower blowdown flow.

- BLN DEP 18.8-1 related to the location of the Technical Support Center and Operations Support Center.

Subsequent to submitting Revision 1 to the application, TVA provided one additional departure in a response to an RAI (ADAMS Accession Number ML090350443) dated February 2, 2009. The departure will eventually be identified in BLN COL Table 1.8-201. A summary of the departure is as follows:

- BLN DEP 2.3-1 relates to the EAB atmospheric dispersion values addressed in various portions of the AP1000 DCD Tier 2 material.

- BLN SUP 1.8-2

The applicant provided a list of the COL information items in the AP1000 DCD. In BLN COL FSAR Table 1.8-202, TVA provides the sections of the application addressing these issues. The table further identifies the AP1000 COL items as an "applicant" item, a "holder" item or both. An applicant item is completely addressed in the application. TVA's definition of a COL holder item is an item that cannot be resolved prior to issuance of the COL. These items are regulatory commitments of the COL holder and will be completed as specified in the appropriate section of the referenced DCD and their completion is the subject of a COL condition presented in Part 10 of this COL application.

Section 1.9 Compliance With Regulatory Criteria

Section 1.9 of the BLN COL FSAR incorporates by reference Section 1.9, "Compliance With Regulatory Criteria" of the AP1000 DCD, Revision 17 with the following supplements:

- STD COL 1.9-1

The applicant provided additional information related to NRC RGs cited in the BLN COL FSAR. Table 1.9-201 identifies the RG revision and provides BLN COL FSAR cross-references. In addition, Appendix 1AA, "Conformance with Regulatory Guides," was developed by the applicant to supplement the detailed discussion presented in Appendix 1A, "Conformance with Regulatory Guides," of the referenced DCD. Specifically, Appendix 1AA delineates conformance of design aspects as stated in the DCD and conformance with programmatic and/or operational issues as presented in the BLN COL FSAR. In certain RGs design aspects were beyond the scope of the DCD and are also presented in the BLN COL FSAR.

- STD SUP 1.9-1

The applicant provided additional information related to conformance with NUREG-0800. Specifically BLN COL FSAR Table 1.9-202 delineates conformance with NUREG-0800 for design aspects as stated in the DCD and conformance for subjects beyond the scope of the DCD as presented in the BLN COL FSAR.

- STD COL 1.9-3 (related to the second un-numbered COL information item identified at the end of DCD Table 1.8-2)

The applicant provided additional information related to review of unresolved safety issues and generic safety issues. Specifically, Table 1.9-203 lists Three Mile Island (TMI) Action Plan items, Task Action Plan items, New Generic Issues, Human Factors issues, and Chernobyl Issues and states how they were considered in the DCD and COL application. In addition, the applicant provided discussion on four new generic issues: Issue 186 related to heavy load drops; Issue 189 related to susceptibility of certain containments to early failure from hydrogen combustion; Issue 191 related to PWR sump performance; and Issue 196 related to the use of Boral in long-term dry storage casks for spent reactor fuel.

- STD SUP 1.9-2

The applicant clarified that the severe accident mitigation design alternatives evaluation for the AP1000 in Appendix 1B to the DCD is not incorporated into the BLN COL FSAR; but is addressed in the COL application Environmental Report.

- STD COL 1.9-2 (related to the first un-numbered COL information item identified at the end of DCD Table 1.8-2):

The applicant provided additional information related to operational experience.
BLN COL FSAR Table 1.9-204 provides a list of Bulletins and Generic Letters (GLs), the appropriate BLN COL FSAR cross-references and whether the subject matter was addressed in the DCD.

Section 1.10 Nuclear Power Plants to Be Operated On Multi-Unit Sites

The applicant provided an assessment of the potential impacts of construction of one unit on structures, systems and components (SSCs) important to safety for an operating unit, in accordance with 10 CFR 52.79(a)(31). This section of the BLN COL FSAR provides an assessment of potential construction activity hazards, SSCs important to safety for the operating unit and related limiting conditions for operation (LCOs) for the operating unit, potentially impacted SSCs and LCOs and applicable managerial and administrative controls to be used to provide assurance that the LCOs for operating units are not exceeded as a result of construction activities at the multi-unit sites.

- STD SUP 1.10-1

The applicant identified this as a new section in the BLN COL application that was not part of the referenced DCD.

- BLN SUP 1.10-1

The applicant identified that the power blocks for BLN 3 and 4 have a minimum separation of at least 800 feet between plant centerlines. In the standard portion of the application there is a discussion that the primary consideration in setting this separation distance is the space needed to support plant construction via the use of a heavy-lift crane.

1.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in the NRC staff's FSER related to the DCD (NUREG-1793). In addition, the relevant requirements of the Commission regulations for the introductory information in BLN COL FSAR Chapter 1, and the associated acceptance criteria, are given in Section 1.0 of NUREG-0800.

The applicable regulatory requirements for the introductory information are as follows:

- 10 CFR 50.43(e) as it relates to requirements for approval of applications for a DC, COL, manufacturing license, or operating license that propose nuclear reactor designs that differ significantly from light-water reactor designs that were licensed before 1997, or use

simplified, inherent, passive, or other innovative means to accomplish their safety functions.

- 10 CFR 52.77 and 10 CFR 52.79 as they relate to general introductory matters.

- 10 CFR 52.79(a)(17) as it relates to compliance with technically relevant positions of the TMI requirements.

- 10 CFR 52.79(a)(20) as it relates to proposed technical resolutions of those Unresolved Safety Issues and medium- and high-priority generic safety issues that are identified in the version of NUREG-0933 current on the date up to 6 months before the docket date of the application and, which are technically relevant to the design.

- 10 CFR 52.79(a)(31) regarding nuclear power plants to be operated on multi-unit sites, as it relates to an evaluation of the potential hazards to the SSCs important to safety of operating units resulting from construction activities, as well as a description of the managerial and administrative controls to be used to provide assurance that the LCOs are not exceeded as a result of construction activities at the multi-unit sites.

- 10 CFR 52.79(a)(37) as it relates to the information necessary to demonstrate how operating experience insights have been incorporated into the plant design.

- 10 CFR 52.79(a)(41) as it relates to an evaluation of the application against the applicable NRC review guidance in effect 6 months before the docket date of the application.

- 10 CFR 52.79(d)(2) requiring that, for a COL referencing a standard DC, the FSAR demonstrate that the interface requirements established for the design under 10 CFR 52.47 have been met.

- 10 CFR 52.97(a)(1)(iv) regarding technical and financial qualifications.

The related acceptance criteria from NUREG-0800, Chapter 1 are as follows:

- For regulatory considerations, acceptance is based on addressing the regulatory requirements as discussed in FSAR Chapter 1 or in the referenced FSAR section. The SRP acceptance criteria associated with the referenced section will be reviewed in the context of that review.

- For performance of new safety features, the information is sufficient to provide reasonable assurance that: (1) these new safety features will perform as predicted in the applicant's FSAR; (2) the effects of system interactions are acceptable; and (3) the applicant provides sufficient data to validate analytical codes. The design qualification testing requirements may be met with either separate effects or integral system tests; prototype tests; or a combination of tests, analyses, and operating experience.

For conformance with regulatory criteria, RG 1.206 states an applicant should perform a similar evaluation for conformance with RGs that were in effect six months prior to the submittal of the COL application.

1.4.4 Technical Evaluation

The NRC staff reviewed Section 1 of the BLN COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the information in the COL represents the complete scope of information relating to this review topic.[5] The NRC staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to this introduction. The DC amendment request is being reviewed by the staff under Docket Number 52-006. The NRC staff's technical evaluation of the information incorporated by reference related to the introductory matter will be documented in the staff's SER on the DC application for the AP1000 design.

The staff reviewed the information contained in the BLN COL FSAR:

<u>BLN COL FSAR Sections 1.1, 1.2, 1.3, 1.6, and 1.7</u>

There are no specific NUREG-0800 acceptance criteria related to the General Information presented in Sections 1.1, 1.2, 1.3, 1.6, and 1.7, and no specific regulatory findings. The information provides the reader with a basic overview of the nuclear power plant and the construct of the BLN COL FSAR, itself. In BLN COL FSAR Section 1.1, the applicant did commit to providing a site-specific construction plan and startup schedule after issuance of the COL and after a positive decision had been made to construct the plant. This is identified as Commitment Number 1.4-1.

<u>FSAR Section 1.4</u>

This evaluation is limited to TVA's technical qualification to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.97(a)(1)(iv). The financial qualifications that are also a requirement of 10 CFR 52.97(a)(1)(iv) are evaluated in Section 1.5.1 of this SER.

The applicant identified TVA as the owner and operator of BLN 3 and 4. TVA is wholly owned by the United States Government, and currently owns and operates six nuclear units. TVA also identified the contractors who assisted in the preparation of the COL. However, TVA proposed a license condition related to the primary agents and contractors who will support the design, construction, and operation of the nuclear power plant and who have not been identified at this time. This is proposed License Condition 7, "Vendor AE Construction Qualifications," addressed in Part 10 of the COL application.

In RAI 1-13, the staff stated that TVA should revise the commitment in the application related to the nuclear steam system supply (NSSS) vendor, architect-engineer and constructor.

The staff is currently in the process of developing guidance on what post-COL commitments require license conditions and which commitments can remain in the BLN COL FSAR and be controlled using the 10 CFR 50.59 process. Although the staff's development of guidance in this area is not complete, the staff has determined that a license condition requiring an amendment to the COL that identifies the NSSS vendor, architect-engineer, and constructor is not needed. The staff has determined that a BLN COL FSAR commitment to provide this information when it is available is sufficient.

[5] See Section 1.2.2, "Finality of Referenced NRC Approvals" for a discussion of the staff's review related to verification of the scope of information to be included within a COL application that references a DC.

In Section 1.4 of the application, TVA provides justification for why it believes it is qualified to hold a 10 CFR Part 52 license. Because TVA holds 10 CFR Part 50 licenses for nuclear power plants and has demonstrated its ability to build and operate these plants, the staff finds that TVA is qualified to hold a 10 CFR Part 52 license. This includes TVA's demonstrated ability to choose and manage oversight of NSSS vendors, architect-engineers and constructors of nuclear-related work. The staff notes that Section 17.5 of the BLN COL FSAR discusses the QA program to be implemented at the receipt of the COL. This QA program includes requirements that will be implemented by TVA's NSSS vendor, architect-engineer, and constructor. The staff's evaluation of Section 17.5 of the BLN COL FSAR is in Section 17.5 of this SER. Based on TVA's experience with nuclear power plants and the staff's evaluation of TVA's QA program, the staff finds that TVA is technically qualified to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.79(a)(1)(iv) and a license condition to provide the NSSS vendor, architect-engineer, and constructor is not needed.

In its response to RAI 1-13, TVA committed to removing the proposed license condition for providing the NSSS vendor, architect-engineer and constructor at a later date from its COL application and replacing it with a BLN COL FSAR commitment. The staff finds this level of commitment appropriate. The commitment to update the FSAR when the NSSS vendor, architect-engineer and constructor are available is Commitment 1.4-2. The commitment to remove the proposed license condition from the FSAR associated with this item in accordance with RAI 1-13 is Confirmatory Item 1.4-1.

FSAR Section 1.5

10 CFR 50.43(e) requires additional testing or analysis for applications for a DC or COL that propose nuclear reactor designs that differ significantly from light-water reactor designs that were licensed before 1997, or use simplified, inherent, passive, or other innovative means to accomplish their safety functions. This requirement was addressed in the DCD. The COL application does not include any additional design features that require additional testing.

FSAR Section 1.8

The applicant incorporated by reference Section 1.8 of the DCD. This section of the DCD identifies certain interfaces with the standard design that have to be addressed in accordance with 10 CFR 52.47(a)(1)(vii).[6] As required by 10 CFR 52.79(d)(2), the COL application must demonstrate how these interface items have been met. The BLN 3 and 4 application does not explicitly identify how these interface items have been met. This is being tracked as Open Item 1.4-1.

As discussed above, the applicant introduced four departures from the DCD in Revision 1 of the BLN COL FSAR and an additional departure in an RAI response dated February 2, 2009. A cross reference to where these departures are discussed in this SER is provided in Section 1.3 of this SER. In addition, the departure associated with the DCD numbering scheme is evaluated in Section 1.5.4 of this SER.

The applicant identified that certain COL information items cannot be resolved prior to the issuance of a COL. The applicant has identified combined License Condition 2 in Part 10 of the COL application to ensure these COL Holder items will be completed by the identified

[6] Following the update to 10 CFR Part 52 (72 FR 49517), this provision has changed to 10 CFR 52.47(a)(25).

implementation milestones through completion of the action identified. The determination that these COL information items cannot be resolved prior to issuance of a COL is discussed in the relevant SER section related to the topic. As noted in Section 1.3 of this SER, the staff has not yet determined which BLN COL FSAR commitments, including the proposed COL holder items addressed in the FSAR and Part 10 of the BLN COL FSAR, requires a license condition. As discussed in Section 1.3 of this SER, the decision on which BLN COL FSAR commitments, if any, should become a license condition is Open Item 1-2.

FSAR Section 1.9

In this section of the application, the applicant demonstrates conformance with RGs and the SRP and addresses unresolved and generic safety issues, TMI action items, and operating experience.

- STD COL 1.9-1

Regarding RGs, the applicant provides in BLN COL FSAR Table 1.9-201 a cross-reference between the RG and where it is discussed in the application, and Appendix 1AA, "Conformance with Regulatory Guides," to supplement the detailed discussion presented in Appendix 1A, "Conformance with Regulatory Guides," of the referenced DCD. The technical discussions related to this appendix are addressed in the related technical sections of the BLN COL FSAR. In addition, BLN COL FSAR Table 1.9-201 provides a listing of all RGs, the specific revision, and provides BLN COL FSAR and DCD cross-references.

The staff issued three RAIs associated with how the RG information in Table 1.9-201 and Appendix 1AA of the BLN COL FSAR is presented. In addition, there were two specific RAIs associated with how an individual RG is discussed in Table 1.9-201 and Appendix 1AA. A description of the RAIs and their responses follows.

RAI 1-5

In RAI 1-5, the staff noted that BLN COL FSAR Appendix 1AA lists the later version of the RG when compared with DCD Table 1.9-1 but in some cases does not discuss compliance with the later version. In other cases, exceptions to the RG were identified but not justified.

RAI 1-7

In RAI 1-7, the staff noted that not all RGs listed in Appendix 1AA provided a cross-reference to where they were discussed in accordance with the guidance in Section 1 of NUREG-0800.

RAI 1-11

In RAI 1-11, the staff noted that the information that TVA provided in response to RAIs 1-5 and 1-7 conflicted with information that TVA provided in response to another RAI. TVA was requested to reconcile these differences.

RAIs 1-1 and 1-10

These RAIs are associated with specific RGs and RAI 1-1 and RAI 1-10 are evaluated in Chapters 13 and 12, of this SER, respectively.

In TVA's response to RAIs 1-5 and 1-7, TVA committed to make changes to BLN COL FSAR Table 1.9-201 and Appendix 1AA to:

- Add an additional statement to Appendix 1AA that specifically addresses the later version of the RG.

- Revise BLN COL FSAR Sections 1.9.1.1, 1.9.1.2, 1.9.1.3, and 1.9.1.4, to reflect that one method of identifying and justifying an alternative to an RG is the use of previous revisions of the RG for design aspects as stated in the DCD in order to preserve the finality of the certified design.

- Revise BLN COL FSAR Table 1.9-201 to address the RG listed in Appendix 1AA, thereby providing a more complete cross reference of where each RG is discussed in the COL application.

In response to RAI 1-11, TVA committed to revising BLN COL FSAR Table 1.9-201 and Appendix 1AA to ensure that they are consistent with commitments made in other RAI responses.

The staff's evaluation of the RGs is addressed in Chapters 2 through 19 of this SER as needed. At a minimum the NRC staff's FSER sections will discuss any RG that involves an exception.

The staff finds TVA's responses to RAIs 1-5 and 1-7 acceptable. However, the staff notes that BLN COL FSAR Table 1.9-201 and Appendix 1AA will most likely need additional changes based on the staff's evaluation of the RGs in this SER and TVA's response to RAI 1-11. The NRC staff is still evaluating TVA's response to RAI 1-11 and has not yet made a determination of whether the response is acceptable. This is Open Item 1.4-2. The updating of BLN COL FSAR Table 1.9-201 to reflect changes committed to by TVA in response to RAI 1-11 and the updating of this information to reflect TVA's commitments in other RAI responses is Confirmatory Item 1.4-2.

- STD SUP 1.9-1

Regarding conformance with regulatory review criteria as required by 10 CFR 52.79(a)(41), BLN COL FSAR Table 1.9-202 provides the applicant's review of conformance with the acceptance criteria of NUREG-0800. The technical discussions related to the specific acceptance criteria of NUREG-0800 are addressed in the related sections of the BLN COL FSAR and addressed in Chapters 2 through 19 of this SER as needed.

- STD COL 1.9-3

Regarding consideration of new and generic safety issues as required by 10 CFR 52.79(a)(17) and 10 CFR 52.79(a)(20), BLN COL FSAR Table 1.9-203, provides a listing of the TMI Action Plan items, Task Action Plan items, New Generic Issues, Human Factors issues, and Chernobyl Issues and states how they were considered in the DCD and COL application. The technical discussions related to the specific safety issues are addressed in the related sections of the BLN COL FSAR.

In addition, the applicant provided discussion of four new generic issues: Issue 186 related to heavy load drops; Issue 189 related to susceptibility of certain containments to early failure from

hydrogen combustion; Issue 191 related to PWR sump performance; and Issue 196 related to the use of Boral in long-term dry storage casks for spent reactor fuel.

The applicant identified that neither Issue 189 nor Issue 196 is applicable to the design or application and that therefore neither is addressed in the BLN COL FSAR. Issue 186 states that there are not any planned heavy load lifts outside those described in the DCD; nonetheless, special procedures to address heavy loads are discussed in Subsection 9.1.5.3. Related to Issue 191, the applicant provided a reference to the protective coatings program and containment cleanliness program in Subsections 6.1.2.1.6 and 6.3.8.1 of the BLN COL FSAR, respectively.

Issue 186 and Issue 196 are evaluated in Chapter 9 of this SER. Issues 189 and 191 are evaluated in Chapter 6 of this SER.

- STD COL 1.9-2 (related to the first un-numbered COL information item identified at the end of DCD Table 1.8-2)

Regarding demonstration of operating experience from Bulletins and GLs, as required by 10 CFR 52.79(a)(37), BLN COL FSAR Table 1.9-204 provides a list of Bulletins and GLs, the appropriate BLN COL FSAR cross-references, and whether the subject matter was addressed in the DCD. The technical discussions related to the specific safety issues are addressed in the related sections of the BLN COL FSAR and are addressed in Chapters 2 through 19 of this SER as needed.

FSAR Section 1.10

In this section of the application, the applicant provides an assessment of the potential hazards due to construction of one unit on SSCs important to safety for an operating unit, in accordance with 10 CFR 52.79(a)(31).

- STD SUP 1.10-1

The NRC staff reviewed the information in BLN COL FSAR Table 1.10-201, identifying the potential hazards from construction activities, BLN COL FSAR Table 1.10-202 that cross-references the construction hazard with the impacted SSCs, and BLN COL FSAR Table 1.10-203, identifying the specific managerial and administrative controls to preclude or mitigate the construction hazard. There is the potential that review of other areas of the application could impact the hazards and management programs identified in the Bellefonte application. For example, site runoff from construction of Unit 4, if not properly controlled, could impact the operation of Unit 3. Site runoff is evaluated in Section 2.4 of this report. The staff has not yet completed its review of this application against the requirements of 10 CFR 52.79(a)(31). This is part of Open Item 1.4-3.

In the application, TVA stated that controls within Section 1.10 of the FSAR are not required unless there is an operating unit on the site. To clarify this FSAR commitment, the staff requests TVA to revise the application to positively state these programs will be in place when there is an operating unit on the site. This is Open Item 1.4-4.

- BLN SUP 1.10-1

The supplemental information states that the power blocks for BLN 3 and 4 have a minimum separation of at least 800 feet between plant centerlines and notes that new units SSCs important to safety are described in BLN COL FSAR Chapter 3 and the LCOs for BLN 3 and 4 are identified in Part 4 of the COL application. In the standard portion of FSAR Section 1.10, there is a discussion that the primary consideration in setting the 800 foot separation distance is the space needed to support plant construction via the use of a heavy-lift crane.

The site-specific supplemental information is provided to supplement the standard information above and provides with specificity the location of the SSCs and LCOs required by 10 CFR 52.79(a)(31). The staff has not yet completed its review of this application against the requirements of 10 CFR 52.79(a)(31). This is Open Item 1.4-3.

1.4.5 Post Combined License Activities

There are two post-COL activities associated with FSAR Chapter 1:

- A site-specific construction plan and startup schedule will be provided after issuance of the COL and after a decision has been made to construct the plants. This is Commitment 1.4-1.

- The commitment to update the FSAR when the NSSS vendor, architect-engineer and constructor are available is Commitment 1.4-2.

1.4.6 Conclusion

The NRC staff reviewed the application and checked the referenced DCD. The NRC staff's review confirmed that the applicant addressed the required information relating to principal review matters, and there is no outstanding information expected to be addressed in the BLN COL FSAR related to this subsection.

The Westinghouse application to amend Appendix D to 10 CFR Part 52 includes changes to Chapter 1 of the AP1000 DCD, as stated in Revision 17 of the AP1000 DCD. The staff is reviewing this information on Docket Number 52-006. The results of the NRC staff's technical evaluation of the information incorporated by reference in the BLN COL FSAR will be documented in a supplement to the NRC staff's FSER (NUREG-1793). The supplement to NUREG-1793 is not yet complete, and this is being tracked as part of Open Item 1-1. The staff will update Section 1 of this SER to reflect the final disposition of the DC application.

1.5 Additional Regulatory Considerations

1.5.1 10 CFR 52.97(a)(1)(iv) Applicant Financial Qualifications and Evaluation of Financial Qualification in accordance with 10 CFR 50.33

BACKGROUND:

According to the COL application, TVA is a wholly owned corporate agency and instrumentality of the United States. TVA was created by the United States Congress in 1933 by virtue of the

Tennessee Valley Authority Act of 1933, as amended, 16 U.S.C. §§ 831-831ee (2000 and Supplement IV 2004) (as amended, the "TVA Act"). TVA manages the Tennessee River and its tributaries for multiple river-system purposes, such as: navigation; flood damage reduction; power generation; environmental stewardship; shoreline use; as well as water supply for power plant operations, consumer use, recreation, and industry.

TVA's electrical generation power systems constitute the majority of its activities and virtually all of its revenue. BLN will be used to produce electricity for sale. TVA supplies electricity to approximately 8.7 million customers in its service area, through 158 public power utilities.

TVA has a history of using nuclear power and began building nuclear power plants in the 1960's. It began operating nuclear power plants in 1974. TVA currently owns and operates six nuclear plants on three sites.

REGULATORY EVALUATION:

The applicant's request for the NRC to issue two COLs under Section 103 of the Atomic Energy Act of 1954, as amended, for construction and operation is subject to, among other things, the requirements of the Atomic Energy Act of 1954, as amended; 10 CFR Part 52, Subpart C, Combined Licenses; 10 CFR Part 50; and 10 CFR Part 140. This safety evaluation reviews the following issues: financial qualifications, decommissioning funding assurance, antitrust, foreign ownership, and nuclear insurance and indemnity.

FINANCIAL QUALIFICATIONS:

Pursuant to 10 CFR 52.77, the application must contain all of the information required by 10 CFR 50.33.

Construction:

Pursuant to 10 CFR 50.33(f)(1), "the applicant shall submit information that demonstrates that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. The applicant shall submit estimates of the total construction costs of the facility and related fuel cycle costs, and shall indicate the source(s) of funds to cover these costs."

Construction Cost Estimate:

Under 10 CFR Part 50, Appendix C, I.A.1:

> Each applicant's estimate of the total cost of the proposed facility should be broken down as follows and be accompanied by a statement describing the bases from which the estimate is derived:
>
> (a) Total nuclear production plant costs; and
>
> (b) Transmission, distribution, and general plant costs; and
>
> (c) Nuclear fuel inventory cost for first core.

> If the fuel is to be acquired by lease or other arrangement than purchase, the application should so state. The items to be included in these categories should be the same as those defined in the applicable electric plant and nuclear fuel inventory accounts prescribed by the Federal Energy Regulatory Commission or an explanation given as to any departure therefrom.

In Revision 0 of the COL application dated October 30, 2007, the applicant outlined the projected overnight costs[7] for the construction of two AP1000 nuclear units at the BLN site in Part 1 of the COL application. Specifically, the information required by 10 CFR Part 50, Appendix C, 1.A.1 for BLN Units 3 and 4 is contained in Part 1 of BLN FSAR COL Table 1.3-1, "Projected Project Cost Bellefonte Nuclear Plant, Unit 3 – AP1000 (constant 2007 dollars, $ millions)," and Table 1.3-2, "Projected Project Cost Bellefonte Nuclear Plant, Unit 4 – AP1000 (constant 2007 dollars, $ millions)," respectively. The format and content of these tables meet the requirements of 10 CFR Part 50, Appendix C.

According to the COL application, the assumed construction period is 2010-2018 for BLN Unit 3 and 2011-2019 for BLN Unit 4.

The applicant described the bases for the cost estimate in the COL application. According to the application, most of the estimated construction cost estimates in the COL application are derived from Westinghouse.

In Revision 1 to the BLN COL application, dated January 21, 2009, TVA provided an updated estimate of overnight construction costs for the proposed BLN 3 and 4, pursuant to 10 CFR Part 50, Appendix C. The Revision 1 material updates construction cost data that was previously forecast in the original BLN COL application of October 30, 2007.

Construction Cost Estimate - Update

As provided in Revision 1 of the BLN COL FSAR the revised and updated projected overnight costs[7] for the construction of two AP1000 nuclear units at the BLN site found in Part 1, Tables 1.3-1 and 1.3-2 were updated for BLN Units 3 and 4, respectively.

According to TVA, most of the estimated construction cost estimates in Revision 1 of the COL application are derived from Westinghouse.

The two BLN units are expected to operate at an estimated gross electrical power output of approximately 2,000 MWe. Therefore, the total overnight cost provided in BLN COL application, Part 1, Tables 1.3-1 and 1.3-2 can be converted to $/kWe installed. In addition, the total estimated overnight costs with interest and escalation provided in Tables 1.3-1 and 1.3-2 for both BLN units can be converted to $/kWe installed.

[7] Overnight cost is the cost of a construction project if no interest was incurred during construction, as if the project was completed "overnight." An alternate definition is: the present value cost that would have to be paid as a lump sum up front to completely pay for a construction project. The overnight cost is frequently used when describing power plants.

The NRC staff reviews studies from independent sources[8] and collects projected construction cost estimates from all COL applications, as they are submitted, for comparison and reasonableness.[9] According to the NRC staff's independent sources, the cost of constructing a plant comparable to BLN 3 and 4 is approximately $2,000/kWe to $2,950/kWe installed. As stated earlier, the applicant's overnight cost estimate can be calculated based on information contained in Part 1 of the BLN COL application.

The applicant's overnight cost estimate is greater than those derived from the studies developed by independent sources, and is therefore more conservative. The staff concludes that there is no basis to find the overnight cost estimate provided by TVA in Revision 1 of the BLN COL FSAR to be unreasonable.[9] Accordingly, the staff finds the applicant's overnight cost estimate to be reasonable.

Sources of Construction Funds:

Pursuant to 10 CFR Part 50, Appendix C, I.A.2:

> The application should include a brief statement of the applicant's general financial plan for financing the cost of the facility, identifying the source or sources upon which the applicant relies for the necessary construction funds, e.g., internal sources such as undistributed earnings and depreciation accruals, or external sources such as borrowings.

According to the application, TVA will be able to recover the costs of construction of the proposed units through rates established by TVA. TVA, which is authorized to issue bonds pursuant to the TVA Act of 1933, indicated that it will rely in part on the issuance of bonds to finance the construction of the plants. TVA also stated that it intends to utilize financing arrangements with the U.S. Treasury, and short-term funding available in the form of revolving credits with a national bank. Further, TVA will rely in part on operating cash flow.

The applicant submitted, pursuant to 10 CFR Part 50, Appendix C, I.A.3, annual financial statements. In addition, the capital costs of TVA's other announced major projects were taken into account when projecting the available source of funds for the BLN COL FSAR. The staff did not identify anything to indicate that the general financial plan of the applicant's is unreasonable.

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[8] See, e.g., the 2003 the Massachusetts Institute of Technology (MIT) interdisciplinary study entitled The Future of Nuclear Power; the U.S. Department of Energy's Energy Information Agency (EIA) 2004 Annual Energy Outlook (AEO); the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development 2005 update on Projected Costs of Generating Electricity; and the Keystone Center 2007 report entitled Nuclear Power Joint Fact-Finding.

[9] The staff's consideration of the cost information submitted by the applicant focuses on the estimated production plant cost and on the estimated cost of fuel, since the NRC clearly has oversight of the plant and fuel, and unreasonably low plant construction and fuel cost estimates may have a nexus to a possible reduction in safety. The NRC does not have regulatory authority over transmission and distribution assets, which do not raise radiological safety issues. Thus, any such cost estimate provided is deemed to be true and accurate under 10 CFR 50.9 and no further assessment of that estimate is performed.

Based on the foregoing, and in consideration of the new overnight construction cost estimate provided in Revision 1 of the BLN COL application, the NRC staff finds that TVA has fulfilled the requirements of 10 CFR Part 50, Appendix C, I.A.1, and that TVA has demonstrated it possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. Therefore, the NRC staff finds TVA is financially qualified to construct the facilities.

Operations:

Pursuant to 10 CFR 50.33(f)(3), "If the application is for a combined license under Subpart C of Part 52 of this chapter, the applicant shall submit the information described in paragraphs (f)(1) and (f)(2) of this section."

10 CFR 50.33(f) provides that each application shall state "except for an electric utility applicant for a license to operate a utilization facility of the type described in 10 CFR 50.21(b) or 50.22, information sufficient to demonstrate to the Commission the financial qualification[s] of the applicant to carry out, in accordance with the regulations in this chapter, the activities for which the permit or license is sought."

10 CFR 50.2 states, in part, that an electric utility is "any entity that generates or distributes electricity and which recovers the cost of this electricity, either directly or indirectly, through rates established by the entity itself or by a separate regulatory authority."

TVA is self-regulated and the Tennessee Valley Authority Act of 1933, as amended, gives the TVA Board of Directors (Board) sole responsibility for establishing the rates TVA charges for electric power. These rates are not subject to review or approval by any State or Federal regulatory body. Based on the foregoing, the staff finds that TVA is an electric utility, and is not subject to further financial qualifications review.

DECOMMISSIONING FUNDING ASSURANCE:

Regulatory Requirements:

Pursuant to the requirements of 10 CFR 50.33(k)(1), an applicant for a COL for a production or utilization facility will state information in the form of a report, as described in 10 CFR 50.75, indicating how reasonable assurance will be provided that sufficient funds will be available to decommission the facility.

Under 10 CFR 50.75, the report must contain a certification that the applicant will provide financial assurance for decommissioning no later than 30 days after the Commission publishes notice in the Federal Register under 10 CFR 52.103(a), using one or more of the methods allowed under the regulation at 10 CFR 50.75(e). In addition, the amount of the financial assurance may be more, but not less, than the amount stated in the table in 10 CFR 50.75(c)(1), as adjusted under 10 CFR 50.75(c)(2). Under 10 CFR 50.75(b)(4), "a combined license applicant need not obtain a financial instrument appropriate to the method to be used or submit a copy of the instrument to the Commission." Once the combined license is granted, the holder of a combined license must submit an instrument as provided in 10 CFR 50.75(e)(3).

Decommissioning Funding Estimate:

The BLN plant is a two-unit PWR (Units 3 and 4) that incorporates by reference the AP1000 certified design, as documented in Appendix D of 10 CFR Part 52. This design has a thermal power rating greater than 3400 MWt. The type of reactor and the thermal rating of the reactor are necessary for the calculation of the decommissioning funding estimate.

The applicant acknowledged the requirements of 10 CFR 50.75 regarding the certification requirements, and stated that it will provide decommissioning funding assurance in an amount of $366.2 million (2006 dollars) per unit. The staff calculated the minimum funding amount required under 10 CFR 50.75(c), and found the applicant's amounts to be acceptable.

Decommissioning Funding Mechanism:

The applicant has stated in its certification that it will use an external sinking fund as the method to provide decommissioning funding assurance. Under 10 CFR 50.75(e)(1)(ii), an external sinking fund may be used as an exclusive method by a "licensee that recovers, either directly or indirectly, the estimated total cost of decommissioning through rates established by 'cost of service' or similar ratemaking regulation. Public utility districts, municipalities, rural electric cooperatives, and State and Federal agencies, including associations of any of the foregoing, which establish their own rates and are able to recover their cost of service allocable to decommissioning, are assumed to meet this condition." The staff will make findings on the acceptability of the decommissioning funding mechanism and prospective financial instrument in the future consistent with the schedule set forth in 10 CFR 50.75(e)(3) for the submission of reports by a holder of a COL.

ANTITRUST REVIEW:

The Energy Policy Act of 2005 (EPAct) removed the antitrust review authority in Section 105.c of the Atomic Energy Act of 1954, as amended (AEA), regarding license applications for production or utilization facilities submitted under Sections 103 or 104.b of the AEA after the date of enactment of the EPAct. Accordingly, the NRC is not authorized to conduct an antitrust review in connection with this COL application.

FOREIGN OWNERSHIP, CONTROL, or DOMINATION:

Section 103 of the AEA prohibits the Commission from issuing a license for a nuclear power plant under Section 103 to:

> an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation or a foreign government.

TVA is organized as a Federal corporation, and its principal place of business is Knoxville, Tennessee. The application provided the names and addresses of the current eight members of the board of directors, and stated that all are United States citizens. The application also provided the names, titles, and business addresses of the principal executives and officers of TVA, and stated all are United States citizens. According to the application, TVA is not owned, controlled, or dominated by foreign interests.

The staff does not know or have reason to believe otherwise.

NUCLEAR INSURANCE & INDEMNITY:

The provisions of the Price-Anderson Act (Section 170 of the AEA) and the Commission's regulations at 10 CFR Part 140 require that the current indemnity agreement with respect to TVA's current facilities reflect that TVA will be the licensee for BLN 3 and 4, after the proposed licenses are issued.

TVA will be required to maintain the financial protection required by 10 CFR Part 140 and the property insurance required by 10 CFR 50.54(w). The NRC staff will issue to TVA an amended indemnity agreement to include BLN 3 and 4, prior to fuel being brought on site. This is SER Commitment 1.5-1.

CONCLUSION:

Based on the foregoing, the staff finds that TVA is financially qualified to engage in the proposed activities regarding BLN 3 and 4. No antitrust review is authorized. The staff has resolved issues regarding decommissioning funding assurance, foreign ownership, nuclear insurance, and indemnity that need to be addressed at this stage. Decommissioning funding methods will be reviewed post COL issuance as provided in 10 CFR 50.75(e)(3).

1.5.2 Nuclear Waste Policy Act

Section 302(b) of the Nuclear Waste Policy Act of 1982, as amended, states, "The Commission, as it deems necessary or appropriate, may require as a precondition to the issuance or renewal of a license under section 103 or 104 of the Atomic Energy Act of 1954 [42 U.S.C. 2133, 2134] that the applicant for such license shall have entered into an agreement with the Secretary for the disposal of high-level radioactive waste and spent nuclear fuel that may result from the use of such license." In RAI 1-12, the staff requested that TVA provide the Department of Energy (DOE) contract numbers for BLN 3 and 4 for disposal of high-level radioactive waste and spent nuclear fuel or for TVA to provide its plans, including the time frame, for entering into such a contract.

In the response to RAI 1-12, TVA stated that on May 14, 2009, TVA signed contracts with DOE establishing the terms and conditions applicable to the DOE's responsibility for disposal of spent nuclear fuel and high-level radioactive waste generated at the proposed BLN 3 and 4. The DOE contract numbers that are referenced in TVA's RAI response are DE-CR01-09RW09024 for BLN 3 and DE-CR01-09RW09025 for BLN 4. Because TVA has entered into contracts with DOE for the disposal of high-level radioactive waste and spent nuclear fuel for BLN 3 and 4, the staff considers that the applicable requirements of Section 302(b) of the Nuclear Waste Policy Act of 1982 to be met. Therefore, the staff considers RAI 1-12 resolved.

1.5.3 Consultation with Department of Homeland Security

In accordance with Section 657 of the Energy Policy Act of 2005, the NRC consulted with the Department of Homeland Security.

1.5.4 Evaluation of Departures and Exemption Associated with Numbering of the Application

The applicant renumbered the FSAR sections to include content consistent with RG 1.206 and NUREG-0800. The applicant identified the affected FSAR sections in Part 7 of the COL application. The departure and the exemption associated with the numbering scheme of the FSAR are closely related. The departure provided in Part 7 of the COL application provides the specific sections of the BLN COL FSAR that deviate from the DCD numbering scheme.

Pursuant to 10 CFR 52.7, "Specific Exemptions," and 10 CFR 52.93, "Exemptions and Variances," the applicant requested an exemption from 10 CFR Part 52, Appendix D, Section IV.A.2.a, to include "a plant-specific DCD containing the same type of information and using the same organization and numbering as the generic DCD for the AP1000 design…." In Part 7, "Departures and Exemptions," of the BLN COL application, the applicant states that the exemption will not result in any significant departures from the expected organization and numbering of a typical FSAR, and the information is readily identifiable to facilitate NRC review. The applicant states that the subject deviations are considered to be purely administrative to support a logical construction of the document. Further, the revised organization and numbering generally follows the guidance provided in RG 1.206 and the applicable NUREG-0800.

Pursuant to 10 CFR 52.7, "Specific Exemption," the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. 10 CFR 52.7 further states that the Commission's consideration will be governed by 10 CFR 50.12, which states that an exemption may be granted when: (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "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 NRC staff reviewed the subject exemption, which will allow the applicant to provide a detailed description of the topics, and determined that this administrative change of minor renumbering will not present an undue risk to the public health and safety. Granting this exemption will not adversely affect the common defense and security. Further, the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule. The NRC staff will verify that all applicable requirements and regulations are fully met before fuel load. Therefore, the staff finds that the exemption to 10 CFR Part 52, Appendix D, Section IV.A.2.a is justified. Because the departure from the numbering scheme in the BLN COL FSAR is related to the exemption request, the staff also finds the departure acceptable.

1.5.5 Effects of Reinstatement of the Bellefonte 1 and 2 Construction Permits on Bellefonte 3 and 4 Application

In a letter (ADAMS Accession Number ML082410087) dated August 26, 2008, TVA requested that the construction permits for BLN 1 and 2 be reinstated. In a Commission Order (ADAMS Accession Number ML090610237) dated March 9, 2009, the construction permits for BLN 1 and 2 were reinstated in a terminated status. In a letter (ML082810401) dated October 3, 2008, TVA provided additional information regarding consideration of BLN 1 and 2

as a potential power generation alternative in the BLN 3 and 4 Environmental Report. The staff notes that the COL application for BLN 3 and 4 is based on BLN 1 and 2's not being built. TVA indicates in its August 26, 2008, and October 3, 2008, letters that, because reinstatement does not represent a decision to actually proceed with the continued construction of BLN 1 and 2, the licensing information previously submitted to the NRC for the purpose of supporting the COL application for BLN 3 and 4 remains valid.

If BLN 1 and 2 were to proceed to construction completion, the staff notes that many parts of the BLN 3 and 4 application would need to be changed. These changes could include, but are not limited to the following:

- Changes to the parts of the application that rely on the use of BLN 1 and 2 structures to support operation of BLN 3 and 4 such as the river intake, cooling tower and switchyard
- Changes to the security and emergency plans
- Changes to the proposed construction schedule timeframe
- Changes necessary to meet the requirements of 10 CFR 52.79(a)(31)
- Location of BLN 3 and 4 on the site
- Site hazards associated with the operation of BLN 1 and 2
- Effects that BLN 1 and 2 operation could have on BLN 3 and 4
- Update to financial information
- Construction worker dose

This SER is based on BLN 1 and 2's not being built. In a May 1, 2009, response to RIS 2009-03 TVA states that if the TVA Board decides to pursue completion of BLN 1 and 2, TVA will submit a reactivation letter to the NRC in accordance with Generic Letter 87-15. This reactivation letter provides the NRC notice that TVA intends to restart construction 120 days from the date of the letter. Such a decision to restart construction of BLN 1 and 2 would require a re-evaluation of the design basis for BLN 3 and 4 addressed in the BLN 3 and 4 FSAR.

1.5.6 Receipt, Possession, and Use of Source, Byproduct and Special Nuclear Material Authorized by 10 CFR Part 52 Combined Licenses

In TVA's letter transmitting Revision 1 of the COL application, dated October 30, 2007, and in Part 1, "General and Financial Information," of the application TVA requested material licenses for receipt, possession and use of source, byproduct and special nuclear material in accordance with Commission regulations in 10 CFR Parts 30, 40, and 70. The reviews conducted to support the issuance of the COL encompass those necessary to support granting 10 CFR Parts 30, 40, and 70 licenses. The standard license that the staff intends to issue is based on operating licenses for nuclear power plants licensed in accordance with 10 CFR Part 50. The staff is considering the following standard license provisions for the Bellefonte combined license as it relates to authorization pursuant to regulations in Parts 30, 40, and 70:

"Subject to the conditions and requirements incorporated herein, the Commission hereby licenses TVA:

(1) (i) pursuant to the Act and 10 CFR Part 70, to receive and possess at any time, special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, described in the final safety analysis report (FSAR), as supplemented and amended;

(ii) pursuant to the Act and 10 CFR Part 70, to use special nuclear material as reactor fuel, after the finding in Section 2.D(1) of this license has been made ((note: 2D(1) is a reference to the 10 CFR 52.103(g) finding), in accordance with the limitations for storage and amounts required for reactor operation, and described in the FSAR, as supplemented and amended;

(2) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(3) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required, any byproduct, source, or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(4) pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility."

The staff notes that FSAR Table 13.4-201 of the BLN 3 and 4 COL application provides milestones for various operational programs to be implemented. Important milestone dates for various operational programs that support issuance of the license and requirements relative to 10 CFR Parts 30, 40, and 70 include the following:

- Radiation Protection Program (including ALARA principles) – prior to initial receipt of byproduct, source, or special nuclear materials (excluding exempt quantities as described in 10 CFR 30.18)

- Fire Protection Program – prior to receipt of fuel onsite

- Security Program including physical security, safeguards contingency programs, training and qualification program – prior to receipt of fuel onsite

These implementation milestones are discussed in Section 13.4 of this SER.

In addition to the evaluation of the implementation milestones noted above, the staff's evaluation of the radiation protection program that supports the issuance of the 10 CFR Parts 30, 40, and 70 licenses is addressed in Chapter 12 of this SER. Additional staff evaluations that support the issuance of the 10 CFR Part 70 license are addressed in Chapter 9 of this SER (i.e., new fuel storage, spent fuel storage, and fire protection programs) and in the staff's evaluation of TVA's security program. The staff finds that the information in the Bellefonte COL application to support granting of the 10 CFR Part 70 license mentioned as part

of the license above is sufficient, pending resolution of the open items in this report related to new and spent fuel, fire protection program, security program, and the implementation of the fire protection and security programs. However, TVA needs to provide a discussion of which parts of its COL application other than the reference to the radiation protection program provide sufficient information to support compliance with the applicable portions of 10 CFR Part 30 and 40, prior to the 10 CFR 52.103(g) finding. This is Open Item 1.5-1.

Until satisfactory evaluations of the information relative to 10 CFR Parts 30, 40, and 70, are performed and documented in this report, and Open Item 1.5-1 is closed, the staff cannot find that the requirements of 10 CFR Parts 30, 40, and 70 as they pertain to TVA's application have been met.

of the license above is sufficient, pending resolution of the open items in this report related to new and spent fuel, fire protection program, security program, and the implementation of the fire protection and security programs. However, TVA needs to provide a discussion of which parts of its COL application other than the reference to the radiation protection program provide sufficient information to support compliance with the applicable portions of 10 CFR Part 30 and 40, prior to the 10 CFR 52.103(g) finding. This is Open Item 1.5-1.

Until satisfactory evaluations of the information relative to 10 CFR Parts 30, 40, and 70, are performed and documented in this report, and Open Item 1.5-1 is closed, the staff cannot find that the requirements of 10 CFR Parts 30, 40, and 70 as they pertain to TVA's application have been met.

PKG: ML091610397
Accession No.: ML090900401 *see previous concurrence

NAME	**DNRL/NWE1:LA**	**DNRL/NWE1:PM**	**NRR/PFPB**	**DCIP/COLP BC**	DNRL/NWE1:BC
OFFICE	KGoldstein	JSebrosky	RCarlson*	MJunge*	SCoffin
DATE	04/24/09	06/18/09	06/12/09	05/20/09	06/23/09
NAME	OGC				
OFFICE	AHodgdon (NLO)				
DATE	6/18/09				

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