

## 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 COLA principal review matters and where the staff's review of the 10 parts of the COLA 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

By a letter dated November 26, 2007 (Agencywide Documents Access and Management System [ADAMS] Accession No. [ML073320913](#)), pursuant to Sections 103 and 185b. of the Atomic Energy Act and 10 CFR 52, Subpart C, Virginia Electric and Power Company (doing business as Dominion Virginia Power [DVP or Dominion] and Old Dominion Electric Cooperative (ODEC) submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for a COL to construct and operate an Economic Simplified Boiling-Water Reactor (ESBWR) plant at the North Anna Power Station (NAPS) site. Dominion and ODEC also applied for other licenses that would be required to possess and use source, special nuclear and byproduct materials related to the operation of the plant. Dominion has control of the NAPS site and existing facilities and has authority to act as ODEC's agent. The proposed plant is to be located on the existing NAPS site, in Louisa County, Virginia, adjacent to existing Units 1 and 2, and is designated as North Anna 3.

The North Anna 3 COL application incorporates by reference the ESBWR design certification (DC) application (Docket No. 05200010), which the NRC staff is currently reviewing. The ESBWR is a 4,500 MWt reactor that uses natural circulation for normal operations and has passive safety features. The COL application referenced Revision 4 of the ESBWR Design Control Document (DCD). In a letter dated December 12, 2008, Dominion submitted Revision 1 to the COL application, which referenced Revision 5 of the ESBWR DCD.

In addition to the ESBWR DCD, the COL application references the early site permit (ESP) for the North Anna ESP Site (ESP-003) —issued pursuant to 10 CFR 52.24—and incorporates by reference the North Anna Early Site Permit Application Site Safety Analysis Report, Revision 9.

The North Anna 3 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 Dominion and ODEC 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.

- **Part 3 Environmental Report**

Part 3 contains environmental-related information pursuant to the requirements of 10 CFR 51.50(c). The environmental impacts of constructing and operating new nuclear units at NAPS were previously addressed by Dominion in the North Anna ESP Application.

- **Part 4 Technical Specifications**

Part 4 contains ESBWR Generic Technical Specifications and Bases and the North Anna Plant-Specific Technical Specifications and Bases.

- **Part 5 Emergency Plan**

Part 5 contains the North Anna Emergency Plan, supporting information such as 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,” “variances,” “exemptions,” and “supplements’ or “supplemental information.” Dominion’s application contains no departures from the ESBWR standard design described in the DCD. The application contains 15 requests for variances related to the ESP. The application also includes supplemental information provided throughout the FSAR to conform with RG 1.206 guidance.

- **Part 8 Security Plan**

Part 8 contains the North Anna Unit 3 Security Plan and Safeguards Information that is withheld from public disclosure. Part 8 was submitted to the NRC in a separate transmission dated November 26, 2007 (Dominion Serial No. NA3-07-002).

- **Part 9 [Not Used]**

- **Part 10 Tier 1/ITAAC**

Part 10 contains ESBWR DCD Tier 1 information and the North Anna Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). The North Anna ITAAC are addressed in four parts: (1) Design Certification ITAAC, (2) Emergency Planning ITAAC, (3) Physical Security ITAAC, and (4) Site-Specific ITAAC.

## **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 (b) provides additional requirements for a COL referencing an ESP.
  - 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 DC and ESPs).
- 10 CFR 52.85 provides requirements for administrative reviews and hearings.
- 10 CFR 52.87 provides for referrals to the Advisory Committee on Reactor Safeguards (ACRS).

The NRC staff reviewed the North Anna COL application according to the standards in 10 CFR Parts 20, 50, 51, 52, 55, 73, and 140. The staff evaluated the application against the acceptance criteria provided in the following standard review plans:

- NUREG-0800
- NUREG-1555

In addition, the staff considered the format and content guidance contained in RG 1.206.

### **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 design certification rule (DCR) or an ESP, the scope and nature of matters resolved for the application and any combined license issued are governed by the relevant provisions addressing finality. For a DCR, finality is addressed 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<sup>1</sup> is primarily limited to ensuring that the

---

<sup>1</sup> Note: While the ESBWR design is not yet certified, 10 CFR 52.55 (c) allows an applicant to assume the risk of incorporating by reference a design that is not certified. The NRC staff is currently reviewing the ESBWR design certification application (Docket No. 052-010), and the results of the NRC staff’s technical evaluation will be documented in the staff safety evaluation report on the design certification application.

COL applicant adequately addresses the identified COL review items. Dominion may need to supplement this application, based on the outcome of the ESBWR DC rulemaking. This is being tracked as Open Item 1-1. The staff will supplement this SER as necessary to reflect the final disposition of the design certification application.

For an ESP, finality is governed by 10 CFR 52.39, "Finality of early site permit determinations." Similar to finality of a DC, the Commission may not change or impose new site characteristics, design parameters, or terms and conditions, including emergency planning requirements, on the ESP unless specified conditions are met.

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.

There are similar provisions in 10 CFR 52.79(b) pertaining to a COL application that references an ESP.

### **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 in "Staff Requirements 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 for staff to perform one technical review for each standard reactor design 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 application (R-COLA) and subsequent applications as subsequent COL applications (S-COLAs). North Anna Unit 3 has been designated as the R-COLA for the ESBWR design center.

### 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 DVP and ODEC pursuant to 10 CFR 50.33(a)–(d) is provided in Appendix A to this SER.

- **Part 2 Final Safety Analysis Report**

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

- **Part 3 Environmental Report**

The staff's evaluation of environmental-related information pursuant to the requirements of 10 CFR 51.92(e) is provided in the Supplemental Environmental Impact Statement. It should be noted that the environmental impacts from constructing and operating new nuclear units at NAPS were previously evaluated by the NRC staff in NUREG-1811, Final Environmental Impact Statement for an ESP at the North Anna Site. In accordance with 10 CFR 51.50(c)(1), Part 3 of the COL application incorporates by reference the assessment of environmental issues that were resolved in the ESP proceeding and provides supplemental information, where appropriate.

- **Part 4 Technical Specifications**

Chapter 16 of this SER contains the staff's evaluation of the Technical Specifications includes both the ESBWR Generic Technical Specifications and Bases and the North Anna Plant Specific Technical Specifications and Bases.

- **Part 5 Emergency Plan**

Chapter 13 of this SER includes the staff's evaluation of the North Anna 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, variances, exemptions, and supplemental information contained in Part 7 is provided in the applicable chapter (i.e., Chapters 2 through 19) of this SER. In addition, any associated exemptions are granted separately from this SER.

- **Part 8 Security Plan**

The staff's evaluation of the Security Plan is documented separately from evaluations of other parts of the COL application and is identified as Safeguards Information.

- **Part 10 Tier 1/ITAAC**

Chapter 14 of this SER contains the staff's evaluation of ITAAC, with the exception of Physical Security ITAAC.

The staff's SER is structured as follows:

- The SER follows the basic premise of "finality" afforded to COL applicants that incorporates by reference a standard DC as well as an ESP. As such, this SER does not repeat any technical evaluation of material incorporated by reference; rather, it points to the corresponding review findings of the subject licensing action. However, the referenced DCD, the ESP, and the COL application FSAR are considered as part of the safety evaluation to ensure that the expected scope of information to be included within a COL application is adequate within the DCD, ESP, and COL FSAR.
- For sections that were complete incorporated by reference without any supplements or departures, the SER simply points to the DCD and related FSER and confirms that all relevant review items were addressed within the DCD and the staff's evaluation.
- For subject matter within the scope of the COL application, this SER utilized 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 in the COL application.
  - "Post-Combined License Activities" section identifies license conditions or other commitments.
  - "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 FSAR Chapter 1**

##### **1.4.1 Introduction**

There are two types of information provided within 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 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 item in the overall plant description.

- Specific information related to qualifications of the applicant, construction impacts, and regulatory considerations that apply throughout the balance of the application (e.g., conformance with the standard review plan (SRP) acceptance criteria).

The SER identifies the information incorporated by reference that summarizes new information and documents 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 FSAR incorporates by reference Section 1.1 of the ESBWR DCD, Revision 5, and includes supplemental information to address the format and content of the COL application. The formatting of information in the FSAR and other parts of the COL application is summarized as follows:

- **Proprietary and Security-Related Sensitive and Classified Non-Safeguard Information (SUNSI).** Such information is to be withheld from public disclosure and therefore is not included in the public version of the COL application. SUNSI is included in the non-public version of the COL application and is appropriately indicated.
- **Numbering of Pages.** Text pages are numbered sequentially within each chapter (e.g., Page 1-4 is the fourth page of Chapter 1).
- **Tables and Figures.** Each table is identified by the section number followed by a number (for example, Table 1.9-204 would be an FSAR table in Section 1.9.) The use of the "200" series for FSAR table numbers distinguishes FSAR tables from DCD tables. If a table from the DCD is referenced in the FSAR text, it is denoted as such (e.g., DCD Table 4.1-1). Revising a table from the DCD or Early Site Permit for use in the FSAR, the original DCD or ESP table number would be appended with an "R." For example revising "DCD Table 4.2-1" would change it to "Table 4.2-1R." Drawings, pictures, sketches, curves, graphs, and engineering diagrams identified as figures are numbered using the section number followed by a number (Figure 2.1-201 would be an FSAR figure in Section 2.1). The use of the "200" series for FSAR figure numbers distinguishes FSAR figures from DCD or ESP figures. A figure from the DCD or ESP referenced in the FSAR text is denoted as such (DCD Figure 4.1-1). Revising a figure from the DCD or ESP for use in the FSAR would append the original DCD or ESP figure number with an "R; DCD Figure 4.2-1 would become Figure 4.2-1R.
- **Incorporation by Reference.** Consistent with provisions of 10 CFR 52.79, the COL application references the ESBWR DC application and the FSAR incorporates by reference the ESBWR DCD with departures and/or supplemental information as deemed appropriate by the applicant. In addition, the FSAR incorporates by reference the North Anna ESP Site Safety Analysis Report (SSAR), Revision 9, with variances and/or supplements. Analogous to a departure, a variance is a plant-specific deviation from one or more of the site characteristics, design parameters, or terms and conditions of an ESP or from the SSAR.
- **Supplements.** The following types of supplemental information are contained in the FSAR or other parts of the COL application:

- COL Items, consisting of both “applicant” (“A”) items, for which sufficient information is provided in the COL application to fully address and resolve the items, and “holder” (“H”) items, which are addressed in the COL application but require further action following issuance of the COL;
  - Conceptual Design Information;
  - ESP COL Action Items;
  - ESP Permit Conditions;
  - ESP SSAR Corrections; and
  - other supplemental information deemed appropriate by the applicant to demonstrate compliance with regulatory requirements, demonstrate conformance with staff guidance, and/or clarify the COL application content.
- **Left Margin Annotations.** FSAR sections are annotated in the left margin with information that identifies 1) the reason the information is being provided and, as applicable, 2) whether the information is standard (identical) for any ESBWR application or specific to the COL application for a particular plant. Table 1.1-201 identifies and defines the annotations.

### Section 1.2 General Plant Description

Section 1.2 of the FSAR incorporates by reference Section 1.2 of the ESBWR DCD, Revision 5, and contains supplemental information to address the following systems and equipment outside the scope of the certified design: (1) main turbine; (2) main condenser; (3) hydrogen water chemistry system; (4) zinc injection system; (5) freeze protection; (6) other building structures; and (7) modular construction techniques and plans.

The ESBWR is a 4,500 MWt reactor that uses natural circulation for normal operation and has passive safety features. North Anna Unit 3, in addition to the buildings and structures within the scope of the ESBWR standard plant, includes an intake structure for plant makeup water, normal power heat sink and auxiliary heat sink cooling towers, a sewage treatment plant, water treatment facilities, storage tanks for water and fuel oil, a switchyard and other site support systems and structures necessary to support the operation and maintenance of the facility. Detailed descriptions of the plant-specific structures, systems, and components (SSCs) are contained in FSAR Chapters 3 through 19. Consistent with the guidance of RG 1.206, Chapter 2 of the FSAR contains information concerning the geological, seismological, hydrological, and meteorological characteristics of the site and vicinity, in conjunction with present and projected population distribution and land use and site activities and controls.

North Anna Unit 3 is intended to operate at an estimated gross electrical power output at rated power of approximately 1594 MWe. The estimated net electrical power output, which is dependent on site ambient conditions, the normal plant heat sink operation controls, and station electrical loads, is between approximately 1425 MWe and 1510 MWe.

Key milestones associated with the Unit 3 estimated schedule for completion of construction and the beginning of commercial operation are: (1) Potential Safety-Related Construction Start – 2012; and (2) Commercial Operation – 2017.

### Section 1.3 Comparison with Other Facilities

Section 1.3 of the FSAR incorporates by reference Section 1.3 of the ESBWR DCD, Revision 5, and identifies that there are no updates to DCD Table 1.3-1 for North Anna Unit 3.

### Section 1.4 Identification of Agents and Contractors

Section 1.4 of the FSAR incorporates by reference Section 1.4 of the ESBWR DCD, Revision 5, and contains supplemental information to identify the applicants, licensee, and contractors. Dominion and ODEC are the applicants for the COL, and Dominion will be the licensee authorized to construct and operate Unit 3. Dominion is responsible for making each of the key project decisions, including the ultimate decision on whether to build a new nuclear power plant and who would be the plant operator. Dominion selected GE-Hitachi Nuclear Energy Americas, (GEH) as primary contractor for the design of the unit and Bechtel Power Corporation (Bechtel) as the primary contractor for site engineering.

Contractor responsibilities and the relationship with Dominion are summarized as follows:

- GEH. GEH is responsible for developing the complete standard plant for the ESBWR necessary to obtain a DC from the NRC, supporting preparation of the COL application and activities to support deployment of the ESBWR on the North Anna site.
- Turbine Island and Nuclear Island. The contractors for the construction of the turbine island and the nuclear island have not yet been selected. The turbine island and the nuclear island together represent the power block. The contractor for the construction of the turbine island will be responsible for the erection and delivery of the turbine building, the electric building, and the contents of each building. The contractor for the construction of the nuclear island will be responsible for the erection and delivery of the reactor and fuel building, the control building, the hot machine shop, the radwaste building, and the contents of each building. Each contractor will be selected based on their historical work in the nuclear industry, ongoing nuclear business, ability to deliver integrated engineering and construction services, and available resources.
- Bechtel. Bechtel is responsible for the engineering and licensing support of the COL application, and for site engineering of facilities and utilities outside of the plant power block.
- Other contractors. Contractual relationships were established with several specialized consultants to assist in developing the COL application. Other subcontractors may be added as the need arises.

### Section 1.5 Requirements for Further Technical Information

Section 1.5 of the FSAR incorporates by reference Section 1.5 of the ESBWR DCD, Revision 5, with no supplements or departures. The DCD section presents the background for the evolution of the ESBWR design, the methodology used to assess the need for further technical information, the computer code used for analysis and design, and the major Simplified Boiling-Water Reactor/ESBWR Test Programs.

### Section 1.6 Material Referenced

Section 1.6 of the FSAR incorporates by reference Section 1.6 of the ESBWR DCD, Revision 5, and supplements the DCD by FSAR Table 1.6-201. The FSAR table lists topical reports not included in DCD Section 1.6 that are incorporated in whole or in part by reference in the FSAR.

### Section 1.7 Drawings and Other Detailed Information

Section 1.7 of the FSAR incorporates by reference Section 1.7 of the ESBWR DCD, Revision 5, and supplements the DCD as follows: (1) FSAR Table 1.7-201 supplements DCD Table 1.7-2 for those portions of the electrical system configuration drawings outside the scope of the DCD; (2) FSAR Table 1.7-202 supplements DCD Table 1.7-3 for those portions of the mechanical system configuration drawings outside the scope of the DCD.

In STD COL 1.7-1-H the applicant commits to making available to the staff the final piping and instrumentation diagrams (P&IDs) used for construction upon completion of the final design configuration. In addition, design changes that result in revisions to the simplified diagrams will be incorporated in subsequent updates to the FSAR.

### Section 1.8 Interfaces with Standard Design

Section 1.8 of the FSAR incorporates by reference Section 1.8 of the ESBWR DCD, Revision 5, and contains supplemental information as follows:

- **Balance of Plant Interfaces.** The significant interface requirements for those systems that are beyond the scope of the DCD are identified in DCD Tier 1.
- **Verification of Site Parameters.** FSAR Chapter 2 provides information demonstrating that the site characteristics fall within the ESBWR site parameters specified in the referenced certified design application. Chapter 2 also provides information demonstrating that the design of the facility falls within the site characteristics and bounding design parameters for the ESP.
- **COL Items and Permit Conditions.** FSAR Section 1.10 identifies specific FSAR sections that address the COL information items from the referenced certified design, and COL Action Items and Permit Conditions from the ESP.
- **Changes and Departures from the Referenced Certified Design.** FSAR Section 1.8 and Table 1.8-201 identify that there are no generic changes or departures from the referenced certified design.
- **Variances from the ESP and ESP SSAR.** The FSAR states that requests for variances from the ESP and SSAR comply with the requirements of 10 CFR 52.39 and 10 CFR 52.93. Variances are listed in Table 1.8-202 and the section of the FSAR in which each is discussed. The variances are described and evaluated in COL application Part 7.
- **Conceptual Design Information.** The referenced DCD includes conceptual design information (CDI) for certain systems, or portions of systems, that are outside the scope of the standard plant design. FSAR Table 1.8-203 identifies systems for which either the CDI in the DCD is adopted as the actual system design information, or the CDI in the DCD is replaced with site-specific design information, along with cross references to FSAR sections

where the CDI is treated. The FSAR states that, where there are differences between the conceptual design and the actual design, the applicant has evaluated the differences and concluded that there are no impacts on the safety evaluations provided in the referenced certified design.

- **Probabilistic Risk Assessment.** The FSAR states that the applicant reviewed site- and plant-specific information that included site meteorological data, site-specific population distribution, and plant-specific design information that replaced conceptual design information described in the DCD with respect to the DC PRA. FSAR Section 19.5 documents the conclusion that there is no significant change from the certified design PRA.
- **References.** The FSAR references are updated to include the Early Site Permit (ESP) for the North Anna ESP Site, No. ESP-003, November 2007.

### Section 1.9 Conformance with Standard Review Plan and Applicability of Codes and Standards

Section 1.9 of the FSAR incorporates by reference Section 1.9 of the ESBWR DCD, Revision 5, and contains supplemental information as follows:

- **Conformance with Standard Review Plan.** Table 1.9-201 evaluates conformance with the SRP sections and Branch Technical Positions (BTPs) that were in effect six months prior to submitting the COL application. Table 1.9-201 does not re-address conformance with the SRP for those portions of the facility design included in the referenced certified design application. Similarly, Table 1.9-201 does not re-address SSAR conformance with the applicable Review Standard RS-002 sections. In the table, the term “Conforms” means that no exception is being taken to the guidance in the SRP section/acceptance criteria as they apply to site-specific design information, operational aspects of the facility, or siting information in the FSAR that supplements the SSAR. The term “Not applicable” in the table means that the SRP section/acceptance criteria do not apply to the ESBWR or to Unit 3. Any differences with the SRP acceptance criteria are identified and justified, with references to the applicable FSAR section(s) that address the difference, as necessary.
- **Applicability to Regulatory Criteria.** Table 1.9-202 evaluates conformance with Division 1, 4, 5, and 8 RGs that were in effect six months prior to submitting the COL application. All Division 1 RGs are evaluated in Division 4, 5, and 8 RGs that were identified in the SRP, in RG 1.206, or in DCD Table 1.9-21 as COL responsibility are also evaluated. (Conformance with Division 4 RGs is also addressed in COL application Part 3, Section 1.4.) Table 1.9-202 does not re-address conformance with RGs for those portions of the facility design included in the referenced certified design application. Similarly, Table 1.9-202 does not re-address SSAR conformance with the applicable RGs. In the table, the term “Conforms” means that no exception is being taken to the guidance in the regulatory positions as they apply to site-specific design information, operational aspects of the facility, or siting information in the FSAR that supplements the SSAR. The term “Not applicable” in the table means that the regulatory positions do not apply to the ESBWR or to Unit 3.
- **Regulatory Guide 1.206.** Table 1.9-203 evaluates conformance with the FSAR content guidance in RG 1.206. Where necessary, the table identifies the FSAR section where the required information is provided. In the table, the term “Conforms” means that the information called for in RG 1.206 is either 1) already addressed in the DCD or SSAR; or 2) addressed by adding new information beyond that contained in the DCD or SSAR. The term “Not applicable” in the table means that the information called for in RG 1.206 does not

apply to the ESBWR or to Unit 3. Table 1.9-203 evaluates conformance with RG 1.206, Section C.III.2, "Information Needed for a Combined License Application Referencing a Certified Design and an Early Site Permit." Section C.III.1, "Information Needed for a Combined License Application Referencing a Certified Design," and Section C.I, "Standard Format and Content of Combined License Applications for Nuclear Power Plants-Light-Water Reactor Edition," were also evaluated, as applicable, if portions of these sections were referenced or identified in RG 1.206, Section C.III.2, or Section C.III.1, respectively.

- **Industrial Codes and Standards.** Table 1.9-204 identifies the Industrial Codes and Standards that are applicable to those portions of the Unit 3 design that are beyond the scope of the DCD or the SSAR, and to the operational aspects of the facility.
- **Applicability of Experience Information.** Table 1.9-205 addresses operational experience information, as described in applicable NUREG reports, for those portions of the Unit 3 design and operation that are beyond the scope of the ESBWR DCD. The comment column of Table 1.9-205 includes a reference to the applicable FSAR section that provides further discussion of the operational experience.

#### Section 1.10 Summary of COL Items

Section 1.10 of the FSAR incorporates by reference Section 1.10 of the ESBWR DCD, Revision 5, and contains supplemental information as follows: (1) Table 1.10-201 lists the FSAR location(s) where the individual COL items from the DCD are addressed, and (2) Table 1.10-202 lists the FSAR location(s) that address individual COL Action Items and Permit Conditions from the ESP.

#### Section 1.11 Technical Resolutions of Task Action Plan Items, New Generic Issues, New Generic Safety Issues and Chernobyl Issues

Section 1.11 of the FSAR incorporates by reference Section 1.11 of the ESBWR DCD, Revision 5, and contains supplemental information as follows:

- Table 1.11-201 supplements DCD Table 1.11-1, Resolutions To NUREG-0933 Table II Task Action Plan Items, New Generic Issues, Human Factors Issues and Chernobyl Issues, to address the site-specific aspects of (1) activities required by the action plan that the COL applicant is to complete and (2) environmental issues that are outside the scope of the DCD.
- Table 1.11-202 supplements DCD Table 1.11-1 to provide references to FSAR locations that provide additional information on specific issues.

#### Section 1.12 Impact of Construction Activities on Units 1 and 2

Section 1.12 of the FSAR contains a summary of the applicant's evaluation of the potential impact of the construction of Unit 3 on Units 1 and 2 SSCs important to safety, along with a description of the managerial and administrative controls used to provide assurance that Units 1 and 2 limiting conditions for operation (LCOs) are not exceeded as a result of Unit 3 construction activities. This evaluation involved the following sequential steps:

- Identification of potential construction activity hazards
- Identification of SSCs important to safety
- Identification of LCOs applicable to Units 1 and 2

- Identification of impacted SSCs and LCOs
- Identification of applicable managerial and administrative controls

### 1.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD. In addition, the relevant requirements of the Commission regulations for the information contained in FSAR Chapter 1, and the associated acceptance criteria, are contained in Section 1.0 of NUREG-0800.

The applicable regulatory requirements are as follows:

- 10 CFR 52.77 and 10 CFR 52.79 as they relate to general introductory matters.
- 10 CFR 52.79(d)(2) requires 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 52.79(a)(41) as they relate 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(a)(20) as they relate to proposed technical resolutions of those Unresolved Safety Issues and medium- and high-priority generic safety issues which 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)(17) as they relate to compliance with technically relevant positions of the Three Mile Island requirements.
- 10 CFR 52.79(a)(37) as they relate to the information necessary to demonstrate how operating experience insights have been incorporated into the plant design.
- 10 CFR 50.43(e) as it relates to requirements for approval of applications for a DC, combined license, 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 52.79(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 structures, systems, and components 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 limiting conditions for operation are not exceeded as a result of construction activities at the multi-unit sites.

The related acceptance criteria are as follows.

- There are no specific SRP acceptance criteria associated with the general requirements.
- For regulatory considerations, acceptance is based on addressing the regulatory requirements as discussed within FSAR Chapter 1 or within the FSAR section referenced in

Chapter 1. The SRP acceptance criteria associated with the referenced section will be reviewed within the context of that review.

- For performance of new safety features, the FSAR information is to be sufficient to provide reasonable assurance that (1) the 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 that an applicant should perform an evaluation for conformance with the Regulatory Guides that were in effect six months prior to the submittal of the COL application.

#### **1.4.4 Technical Evaluation**

The staff reviewed Chapter 1 of the North Anna 3 COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the information in the COL represent the complete scope of information relating to this review topic.<sup>2</sup> The NRC staff review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to this introduction chapter. Chapter 1 of the ESBWR DCD is being reviewed by the staff on Docket No. 52-010. The NRC staff's consideration of the information incorporated by reference will be documented in the corresponding SER.

The staff's review of information contained in the COL FSAR is documented in the following paragraphs.

#### Sections 1.1, 1.2, 1.3, 1.4, 1.6, and 1.7

The information in these sections is related to the general information and provides the reader with a basic overview of the nuclear power plant and the structure of the FSAR itself. There are no specific SRP acceptance criteria for reviewing the information presented in these sections, therefore there are no specific regulatory findings.

#### Section 1.5

10 CFR 50.43(e) requires additional testing or analysis for applicants for a DC or combined license that propose nuclear reactor designs which 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 is addressed in the DCD. The COL application does not contain any additional design features that require testing.

#### Section 1.8

The staff reviewed the information contained in FSAR Section 1.8 and evaluated the contents of Table 1.8-201 pertaining to departures, Table 1.8-202 pertaining to variances, Table 1.8-203 pertaining to CDI, and Table 1.10-201 pertaining to COL items. The technical evaluations and

---

<sup>2</sup> See Section 1.2.2, "Finality of Referenced NRC Approvals" for a discussion on the staff's review related to verification of the scope of information to be included within a COL application that references a design certification.

conclusions pertaining to the contents of these tables are presented in their respective chapters (Chapters 2 through 19) in this SER.

#### Section 1.9, 1.10, and 1.11

The staff reviewed Tables 1.9-201, 1.9-202, 1.9-203, 1.9-204, 1.9-205, 1.10-201, 1.10-202, 1.11-201, and 1.11-202 and evaluated the contents against the guidance provided in SRP Section 1.0, Introduction and Interfaces. The review concludes that the applicant provided sufficient information to address the regulatory considerations identified in RG 1.206 (C.I.1.9) and SRP Section 1.0 and, therefore, is acceptable. The staff's technical evaluation of information contained or referenced in Sections 1.9, 1.10 and 1.11 of the FSAR is addressed in Chapters 2 through 19 of this FSER as needed.

#### Section 1.12

The staff reviewed the information contained in Section 1.12 and determined that the applicant has performed an evaluation of the potential hazards to the SSCs important to the safety of Units 1 and 2 resulting from construction activities associated with Unit 3 and described the management and administrative controls to be used to provide assurance that the limiting conditions for operation of Units 1 and 2 are not exceeded as a result of construction activities. The staff's review is ongoing and is being tracked as an **Open Item 1-2**.

#### **1.4.5 Post Combined License Activities**

The applicant identified the following commitment:

- STD COL 1.7-1-H– Final Design Configuration Confirmation

The FSAR, Section 1.7.2, states that the final P&IDs used for construction will be available upon completion of the final design configuration and that design changes that result in revisions to the simplified diagrams will be incorporated in subsequent updates to the FSAR.

#### **1.4.6 Conclusions**

The NRC staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant addressed the required information relating to Chapter 1 and there is no outstanding information expected to be addressed in the COL FSAR related to this chapter.

The staff is reviewing the information in ESBWR DCD Chapter 1 on Docket No. 52-010. The results of the NRC staff's technical evaluation of the information related to Chapter 1 incorporated by reference in the North Anna 3 COL FSAR will be documented in the staff SER on the design certification application for the ESBWR. The SER for the ESBWR is not yet complete, and is being tracked as **Open Item 1-1**. The staff will update Chapter 1 of this SER to reflect the final disposition of the design certification application.

In addition, the staff is unable to finalize its conclusions regarding FSAR Chapter 1 due to **Open Item 1-2**.

## **1.5 Other Regulatory Considerations**

### **1.5.1 Applicant Technical Qualifications (10 CFR 52.97(iv))**

DVP and ODEC currently own the North Anna Power Station, which includes two existing nuclear power plants (Units 1 and 2). DVP is the licensed operator of Units 1 and 2. In addition, DVP is the licensed operator of the two nuclear power plants (Units 1 and 2) at the Surry Power Station in southeastern Virginia. Based on the applicant's experience and demonstrated performance related to the construction and operation of these existing nuclear units, the staff concludes that the applicant is technically qualified to engage in the activities associated with a COL for North Anna Unit 3 in accordance with the provisions of 10 CFR 52.97(iv).

### **1.5.2 Applicant Financial Qualifications and Organization Considerations**

The staff's evaluation of the applicant's financial qualifications, decommissioning funding assurance, antitrust, foreign ownership, and nuclear insurance and indemnity are provided in Appendix A to this SER.

### **1.5.3 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 01-03, the staff requested that the applicant provide the Department of Energy (DOE) contract number for disposal of high-level radioactive waste and spent nuclear fuel or for the applicant to provide its plans, including the time frame, for entering into such a contract. **RAI 01-03** is being tracked as an **Open Item**.

### **1.5.4 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 (DHS).

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

In the North Anna Unit 3 COL application transmittal letter, dated November 26, 2007, and in Part 1, General and Administrative Information, of the application, Dominion requested such other licenses as would be required for receipt, possession and use of source, byproduct and special nuclear material in connection with the operation of Unit 3. The staff notes that such licenses would be in accordance with Commission regulations in 10 CFR Parts 30, 40, and 70.

In a memorandum (ML083030065) dated December 9, 2008, the staff proposed standard license conditions and requirements regarding 10 CFR Parts 30, 40, and 70. The staff intends that holders of a COL under 10 CFR Part 52 will also be authorized to receive, possess, and use source, byproduct, and special nuclear material in accordance with the Commission's regulations in 10 CFR Parts, 30, 40, and 70. Standard license conditions will be incorporated in

the COL such that licensees will be required to comply with all applicable regulations of 10 CFR Parts 30, 40, and 70, as well as the regulations in 10 CFR Parts 20, 50, and 52.

Accordingly, in RAI 01-04 (ID 2829), the staff requested that the applicant supplement the COL application regarding the request to receive, possess, and use source, byproduct, and special nuclear material with sufficient information to support compliance with the applicable portions of 10 CFR Parts 30, 40, and 70. **RAI 01-04** is being tracked as an **Open Item**.