

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 March 27, 2008, as supplemented by several letters, the South Carolina Electric & Gas Company (SCE&G or the applicant), acting on behalf of itself and the South Carolina Public Service Authority (referred to as "Santee Cooper"), 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*, and Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, "Licenses, Certifications and Approvals for Nuclear Power Plants." These reactors would be identified as V.C. Summer Nuclear Station (VCSNS), Units 2 and 3, and would be located approximately 1 mile from the center of VCSNS Unit 1 in western Fairfield County, South Carolina.

Unless otherwise noted, this SER is based on Revision 2 of VCSNS's COL application, which was submitted via letter dated January 28, 2010.

In its January 28, 2010, Revision 2 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 AP1000 DCD referenced in this application is the design certification (DC) amendment request to revise Appendix D to 10 CFR Part 52.

In developing the safety evaluation (SE) for VCSNS Units 2 and 3, the staff reviewed the AP1000 DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to a particular review topic. Because of its reliance on both the AP1000 DCD and the DCD SE, the staff did not issue a final SE for a particular VCSNS SER chapter until the AP1000 DC amendment (DCA) SE was issued. This allowed the staff to review the AP1000 DCA SE and identify any issues that could affect the review of the VCSNS COL application. The changes to the Revision 17 of the AP1000 DCD that affect the

VCSNS COL application are reflected in this SER by a reference to the Westinghouse letter that commits to making the change in the AP1000 DCD application.

There is one AP1000 DCA SER chapter that has been issued that does not have a corresponding VCSNS COL SER chapter. Specifically, AP1000 DCA SER Chapter 23, “Design Changes Proposed in Accordance with ISG-11,” that has been issued, does not have a corresponding VCSNS COL SER chapter associated with it. Chapter 23 describes the staff’s evaluation and findings for the information Westinghouse submitted after the submittal of AP1000 DCD, Revision 17, in order to address one or more of the criteria identified in Interim Staff Guidance (ISG), DC/COL-ISG-11, “Interim Staff Guidance Finalizing Licensing-basis Information.” The staff has reviewed the information that Westinghouse provided subsequent to AP1000 DCD, Revision 17 that is described and evaluated in the AP1000 DCA SE, to identify any issues that could affect the VCSNS COL SE. Where a Westinghouse DCA proposed a design change associated with ISG-11 that affected the VCSNS COL application, the staff requested that the applicant provide a letter referencing the design change and identify the corresponding changes to the VCSNS COL application (e.g., STD COL 5.2-3). The changes then are evaluated in the report for the sections that are affected by the design change.

The AP1000 nuclear reactor design is a PWR with a power rating of 3400 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 VCSNS 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 SCE&G pursuant to 10 CFR 50.33(a) – (d).

- **Part 2 Final Safety Analysis Report**

Part 2 includes information pursuant to the requirements of 10 CFR 52.79, “Contents of applications; technical information in final safety analysis report” 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[light-water reactor] Edition).”

- **Part 3 Environmental Report**

Part 3 includes environmental information pursuant to the requirements of 10 CFR 52.80, “Contents of applications; additional technical information” and 10 CFR 51.50(c), “Environmental report—construction permit, early site permit, or combined license stage.”

- **Part 4 Technical Specifications**

Part 4 addresses how the AP1000 Generic Technical Specifications (GTS) and Bases are incorporated by reference into the VCSNS Plant-Specific Technical Specifications (PTS) and

Bases. Specifically, Section A addresses completion of bracketed information. Section B provides a complete copy of the VCSNS PTS and Bases.

- **Part 5 Emergency Plan**

Part 5 includes the VCSNS COL Emergency Plan, supporting information (e.g., evacuation time estimates (ETEs)), 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 includes information regarding “departures” and “exemptions.” SCE&G identified four departures related to: (1) administrative departure for organization and numbering for the FSAR sections; (2) administrative departure for organization and numbering for FSAR Chapter 2; (3) maximum safety wet bulb (noncoincident) air temperature; and (4) the emergency response facility locations. SCE&G also identified two exemptions: (1) from 10 CFR Part 52, Appendix D, “Design Certification Rule for the AP1000 Design,” Section IV.A.2.a related to COL application organization and numbering; and (2) from 10 CFR Part 52, Appendix D, Section IV.A.2.d related to maximum safety wet bulb (noncoincident) air temperature. In a letter dated October 20, 2010, the applicant proposed to include a departure from AP1000 DCD Section 8.3.2.2 clarifying the current limiting feature of voltage regulating transformers. In a letter dated November 30, 2010, the applicant requested an exemption from the requirements of 10 CFR 50, 10 CFR 70.22(b), 10 CFR 70.32(c) and in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51.

- **Part 8 Security Plan**

Part 8 addresses the VCSNS Safeguards and Security Plans. This part describes safeguards information that is to be withheld from public disclosure. Part 8 was submitted to the NRC by separate transmittal dated March 27, 2008.

- **Part 9 Withheld Information**

Part 9 identifies sensitive information that is withheld from public disclosure under 10 CFR 2.390, “Public inspections, exemptions, requests for withholding.” The information in this part includes sensitive unclassified nonsafeguards information, proprietary financial information, and figures from Part 2 of the application that meet the sensitive unclassified nonsafeguards information (SUNSI) guidance for withholding from the public. In addition, this part of the application includes the following information:

- The withheld portion of the Mitigative Strategies Description and Plans for loss of large areas of the plant due to explosions or fire, as required by 10 CFR 52.80(d), and
- VCSNS Units 2 and 3 Cyber Security Plan, as required by 10 CFR 73.54, “Protection of Digital Computer and Communication Systems and Networks.”

- **Part 10 Proposed Combined License Conditions and ITAAC**

Part 10 includes VCSNS proposed license conditions and inspections, tests, analyses, and acceptance criteria (ITAAC) information in accordance with 10 CFR 52.80. A table of the proposed license conditions is provided in Part 10 of Section 1.3 of this SER.

The environmental protection plan license conditions are not evaluated in this SER. Part 10 of the application incorporated by reference the AP1000 Tier 1 information including ITAAC. In addition, the application includes site-specific ITAAC (e.g., emergency planning, physical security, electrical, and piping).

- **Parts 11-16 Enclosures**

Parts 11-14 provide information submitted by the applicant in support of the VCSNS Units 2 and 3 application. Specifically, these sections include:

- Part 11 includes a subsurface report detailing the results of geotechnical exploration and testing at the proposed site for VCSNS Units 2 and 3.
- Part 12 includes a seismic technical advisory review letter detailing the background and conclusions reached by the Seismic Technical Advisory Group (TAG). The TAG was engaged by the applicant to perform a participatory peer review of the methods and procedures used to develop the VCSNS Units 2 and 3 application, as well as the conclusions and results presented in the FSAR.
- Part 13 describes the SCE&G new nuclear deployment 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 COL/construction/preoperation and operation activities conducted by or for SCE&G.
- Part 14 includes mitigative strategies description and plans for loss of large areas of the plant due to explosions or fire, as required by 10 CFR 52.80(d).
- Part 15 of the application includes the cyber security plan. In revision 3 of the VCSNS COL application, the applicant provided revision 0 of its cyber security plan. The SUNSI version of the cyber security plan is provided in Part 9 of the application.
- Part 16 of the application includes VCSNS Special Nuclear Material Control and Accounting Program Description. In a letter dated November 30, 2010, the applicant provided this information and indicated that it will be provided as Part 16 of its application in the next revision to the VCSNS COL application.

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, "Contents of applications; technical information in final safety analysis report," 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, "Contents of applications; additional technical information," provides additional technical information outside of the FSAR (ITAAC and the environmental report).
- 10 CFR 52.81, "Standards for review of applications," provides standards for reviewing the application.
- 10 CFR 52.83, "Finality of referenced NRC approvals; partial initial decision on site suitability," provides for the finality of referenced NRC approvals (i.e., standard DC).
- 10 CFR 52.85, "Administrative review of applications; hearings," provides requirements for administrative reviews and hearing.
- 10 CFR 52.87, "Referral to the Advisory Committee on Reactor Safeguards (ACRS)," provides for referral to the ACRS.

The NRC staff reviewed this application according to the standards set out in

- 10 CFR Part 20, "Standards for Protection Against Radiation"
- 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"
- 10 CFR Part 40, "Domestic Licensing of Source Material"
- 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"
- 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions"
- 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants"
- 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants"

- 10 CFR Part 55, “Operators’ Licenses”
- 10 CFR Part 70, “Domestic Licensing of Special Nuclear Material”
- 10 CFR Part 73, “Physical Protection of Plants and Materials”
- 10 CFR Part 74, “Material Control and Accounting of Special Nuclear Material”
- 10 CFR Part 100, “Reactor Site Criteria”
- 10 CFR Part 140, “Financial Protection Requirements and Indemnity Agreements”

The staff evaluated the application against the acceptance criteria provided in the following:

- NUREG-0800, “Standard Review Plan [SRP] 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 Regulatory Guide (RG) 1.206¹ for the COL application.

1.2.2 Finality of Referenced NRC Approvals

In accordance with 10 CFR 52.83, 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 COL 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, 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).

The certified AP1000 design currently incorporated by reference in 10 CFR Part 52, Appendix D is based on the AP1000 DCD as amended through Amendment 15. This COL application also

¹ Appendix D, Section IV.A.2.a to 10 CFR Part 52 requires the COL application to include a plant-specific DCD that includes 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, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition),” 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 VCSNS Units 2 and 3 COL application and the guidance of RG 1.206.

incorporates by reference the AP1000 DCA application. The results of the NRC staff's technical evaluation of the AP1000 DCA application are documented in NUREG-1793, "Final Safety Evaluation Report [FSER] Related to Certification of the AP1000 Standard Design," and its supplements. Since the AP1000 DCA is not yet certified, the applicant has not incorporated the 10 CFR Part 52 - codified version of the DCA in to its application. The incorporation of the AP1000 DCA into the VCSNS COL application is **Confirmatory Item 1-1**.

While the reference version of the AP1000 design has been docketed but not certified, 10 CFR 52.55(c), "Duration of certification," allows an applicant, at its own risk, to incorporate by reference a design that is not certified. The NRC staff's acceptance of the AP1000 DCA application, as documented in NUREG-1793 and its supplements, is sufficient to demonstrate compliance with 10 CFR 52.81 for the information incorporated by reference from the AP1000 DCD into the COL application. Until Appendix D to 10 CFR Part 52 is revised by rulemaking to incorporate the AP1000 DCA application, the provisions of 10 CFR 52.63 do not apply to this supplemental information.

The contents of the COL application are specified by 10 CFR 52.79(a), which requires the submission of information in the FSAR 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 (SSCs) of the facility as a whole. For a COL application that references a DC, 10 CFR 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 include 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 DC rulemaking.

During its evaluation of the COL application, the staff confirmed that the complete set of information required to be addressed in the COL application was addressed in the DC, the DC as supplemented by the COL application, or completely in the COL application. Following this confirmation, the staff's review of the COL application is limited to the COL review items.

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 (SRM) 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, which is the Commission's policy intended to promote standardization of COL applications, is beyond the scope of information included in the DC. This policy directs 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. In some cases the staff has expanded the use of this standard approach to other areas with essentially identical information for regulatory purposes. For example, the quality assurance plan for the AP1000 COL applicants is essentially identical with

the exception of title names being different. Other areas where this approach was used include cyber security, technical specifications, and loss of large area fire reviews.

The first COL application submitted for NRC staff review is designated in a design center as the reference COL (RCOL) application, and the subsequent applications in the design center are designated as subsequent COL (SCOL) applications. The VCSNS Units 2 and 3 COL application has been designated as an SCOL application in the AP1000 design center².

SCE&G, as an SCOL applicant in the AP1000 design center, organized and annotated its FSAR, Part 2 of the COL application, to clearly identify: a) sections that incorporate by reference 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 VCSNS Units 2 and 3. 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.
- VCS – 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.

The following text is added to the Technical Evaluation sections in this SER whenever the staff uses standard content evaluation material to resolve departures and/or supplements to the referenced DCD:

Section 1.2.3 of this SER provides a discussion of the strategy used by the NRC to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application (Vogtle Electric Generating Plant [VEGP] Units 3 and 4) were equally applicable to the VCSNS Units 2 and 3 COL application, the staff undertook the following reviews:

² In a letter dated April 28, 2009, the NuStart Energy Development, LLC, consortium informed the NRC that it had changed the RCOL designation for the AP1000 design center from Bellefonte Nuclear Plant (BLN) Units 3 and 4 to the Vogtle Electric Generating Plant (VEGP) Units 3 and 4. The transition of the RCOL from BLN Units 3 and 4 to VEGP Units 3 and 4 occurred after the issuance of the BLN Units 3 and 4 SER with open items. As part of the transition, the NRC staff concluded that the BLN evaluation material identified as Standard (STD COL, STD SUP, STD DEP and Interfaces for Standard Design) in the BLN SER was directly applicable to the VEGP review. As a result, standard content material from the SER for the RCOL (VEGP) application and referenced in the VCSNS SER includes evaluation material from the SER for the BLN COL application.

- The staff compared the VEGP COL FSAR, Revision 2 to the VCSNS COL FSAR. In performing this comparison, the staff considered changes made to the VCSNS COL FSAR (and other parts of the COL application, as applicable) resulting from requests for additional information (RAIs).
- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff has completed its review and found the evaluation performed for the standard content to be directly applicable to the VCSNS COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) includes evaluation material from the SER for the BLN Units 3 and 4 COL application.

To support the text added to the Technical Evaluation sections as described above, the staff evaluates any differences between the information provided by the VCSNS applicant and that provided by the VEGP applicant, regarding details in the application for the standard content material, to determine whether the standard content material of the VEGP SER is still applicable to the VCSNS application. These evaluations are in the SER sections that reference the standard content.

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 SCE&G pursuant to 10 CFR 50.33, "Contents of applications; general information," is provided in Section 1.5.1 of this SER.

- **Part 2 Final Safety Analysis Report**

The staff's evaluation of information in the VCSNS 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 includes the staff's evaluation of the VCSNS Units 2 and 3 PTS and Bases (specifically completion of bracketed text).

- **Part 5 Emergency Plan**

Chapter 13 of this SER includes the staff's evaluation of the VCSNS Emergency Plan, supporting information such as ETEs, 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 for organization and numbering for FSAR Chapter 2	2.0
Departure for the maximum safety wet bulb (noncoincident) air temperature	2.0, 2.3.1, 5.4, 6.2, 6.4, 9.1.3, 9.2.2, and 9.2.7
Departure for the emergency response facility locations	13.3
Departure for Class 1E voltage regulating transformer current limiting features	8.3.2
Exemption from 10 CFR Part 52, Appendix D, Section IV.A.2.a related to COL application organization and numbering	1.5.4
Exemption from 10 CFR Part 52, Appendix D, Section IV.A.2.d related to maximum safety wet bulb (noncoincident) air temperature	2.0, 2.3.1, 5.4, 6.2, 6.4, 9.1.3, 9.2.2, and 9.2.7
Exemption from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41 and 10 CFR 74.51	1.5.4

- **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 of the staff's evaluation is 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. A summary of the staff’s evaluation of the Mitigative Strategies Description and Plans for loss of large areas of the plant due to explosions is provided in Appendix 19A of this SER. The staff’s complete evaluation is documented separately from this SER and is withheld from the public in accordance with 10 CFR 2.390.

The staff’s evaluation of the VCSNS Units 2 and 3 Cyber Security Plan is provided in Section 13.8 of this SER.

• **Part 10 Proposed Combined License Conditions and ITAAC**

The staff’s evaluation of the proposed combined license conditions and ITAAC is provided in the applicable chapter of this SER. The table below provides a description of the proposed license conditions and where the evaluation is addressed in this SER. The staff has identified certain license conditions and ITAAC that it will recommend the Commission impose if a COL is issued to the applicant. Appendix A 1 (of Appendix A) to this SER lists those license conditions. Each license condition is sequentially numbered in individual chapters of this SER. The staff has provided an explanation of each license condition in the applicable section of the SER. These license conditions are based on the provisions of 10 CFR 52.97, “Issuance of combined license.” This SER highlights the applicant’s proposed ITAAC and the staff’s review and acceptance of them. Appendix A.2 (of Appendix A) lists those ITAAC.

Proposed Combined License Condition	Location of Evaluation in this SER
ITAAC	14.3 and throughout this SER
COL information items that cannot be resolved prior to issuance of a COL.	The proposed license conditions are evaluated throughout this SER.
Implementation requirements related to portions of operational programs identified in VCSNS COL FSAR Table 13.4-201 on or before the associated milestones in Table 13.4-201.	The operational programs are evaluated throughout this SER.
Requirements for a fully developed set of site-specific emergency action levels (EALs) to be submitted to the NRC.	13.3
Requirements associated with revisions to the physical security plan.	13.6
Requirements associated with submittal schedules to the NRC related to the operation programs listed in VCSNS COL FSAR Table 13.4-201.	The operational programs are evaluated throughout this SER
First-Plant-Only and first-Three-Plant-only Testing requirements.	14.2
Reporting requirements related to any changes made to the Initial Startup Test Program described in Chapter 14 of the VCSNS COL FSAR.	14.2

Proposed Combined License Condition	Location of Evaluation in this SER
Power-ascension testing requirements.	14.2
Requirement that the issuance of this COL is in accordance with the <i>National Environmental Policy Act</i> of 1969, as amended, and with applicable sections of 10 CFR Part 51.	Final Environmental Impact Statement

- **Parts 11-16 Information Incorporated by Reference**

Parts 11 and 12 of the application are evaluated as part of the staff’s review documented in Section 2.5, “Geology, Seismology, and Geotechnical Engineering,” of this SER. The staff’s review of Part 13 of the VCSNS COL application is documented in Chapter 17 of this SER. As discussed above, the staff’s review of Part 14 of the VCSNS COL application regarding mitigative strategies description and plans for loss of large areas of the plant due to explosions is provided in Appendix 19A of this SER. The staff’s complete evaluation is documented separately from this SER and is withheld from the public in accordance with 10 CFR 2.390.

Part 15 of the application includes the cyber security plan and as discussed above, the staff’s evaluation of this plan is contained in Section 13.8 of this SER. Part 16 of this application includes the special nuclear material, material control and accounting program description. The evaluation of this program is contained in Section 1.5.5 of this SER.

Organization of SER

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 and its supplements. However, the referenced DCD and the VCSNS 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 or COL FSAR or in both.
- For sections that were completely incorporated by reference without any supplements or departures, the SER simply points to the DCD and related NUREG-1793 and its supplements and confirms that all the relevant review items were addressed in the AP1000 DCD and the staff’s evaluation was documented in NUREG-1793 and its supplements.

- For subject matter within the scope of the COL application that supplements or departs from the DCD, this SER generally follows a six-section 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 the regulatory 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 the proposed license conditions, ITAAC or FSAR information commitments that are post-COL activities
 - “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 VCSNS COL FSAR Chapter 1

1.4.1 Introduction

There are two types of information provided in Chapter 1 of the VCSNS COL 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 applies 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 VCSNS COL FSAR, Revision 2, incorporates by reference Section 1.1, “Introduction,” of the AP1000 DCD, Revision 17 with the following supplements. In a letter dated November 16, 2010, the applicant endorsed a VEGP letter dated November 11, 2010,

that added a discussion of incorporation of the proprietary information and safeguards information referenced in the AP1000 DCD.

- STD SUP 1.1-1

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

- VCS SUP 1.1-2

The applicant clarified that the FSAR was being submitted to NRC by SCE&G 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, "Combined Licenses."

- VCS COL 2.1-1

The applicant provided additional information in VCS COL 2.1-1 to address COL Information Item 2.1-1 (COL Action Item 2.1.1-1). Specifically, VCSNS Units 2 and 3 are to be located approximately 1 mile from the center of Unit 1 in western Fairfield County, South Carolina. This is a brief introductory summary of the plant location. An expanded discussion of VCS COL 2.1-1 is included in VCSNS COL FSAR Section 2.1.

- VCS COL 1.1-1

The applicant provided the anticipated schedule for construction and operation of VCSNS Units 2 and 3 in VCSNS 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 VCSNS 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," in VCSNS COL FSAR Section 1.8 and Part 7 of the VCSNS COL application. The staff's 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 VCSNS 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 VCSNS COL FSAR. Proprietary material was provided in Part 9 of the COL application.

- VCS SUP 1.1-5

The applicant provided additional information to identify acronyms and system designations used in the VCSNS COL FSAR that are in addition to those identified in the AP1000 DCD.

Section 1.2 General Plant Description

Section 1.2 of the VCSNS COL FSAR, Revision **2**, incorporates by reference Section 1.2, “General Plant Description,” of the AP1000 DCD, Revision **17** with the following departures and supplements:

- VCS DEP 18.8-1

The applicant provided VCSNS COL FSAR Figure 1.2-201 to replace AP1000 DCD Figure 1.2-18 to reflect the proposed relocation of the Technical Support Center (TSC) and the Operations Support Center (OSC). The staff’s evaluation of the locations of the TSC and OSC is discussed in Section 13.3 of this SER.

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

The applicant provided additional information on the site plan for VCSNS Units 2 and 3 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 VCSNS COL FSAR.³

Section 1.3 Comparisons with Similar Facility Designs

Section 1.3 of the VCSNS COL FSAR, Revision **2**, 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 VCSNS COL FSAR, Revision **2**, incorporates by reference Section 1.4, “Identification of Agents and Contractors,” of the AP1000 DCD, Revision **17** with the following supplements:

³ Table 1.8-202 of the VCSNS COL FSAR provides a COL information item index of occurrences in the VCSNS COL FSAR.

- VCS SUP 1.4-1

The applicant provided additional information to identify SCE&G as the agent acting on behalf of Santee Cooper for VCSNS Units 2 and 3. Additionally, the applicant identified SCE&G as the operator of VCSNS Units 2 and 3.

SCE&G is the principal subsidiary of SCANA Corporation. Santee Cooper is South Carolina's state-owned electric and water utility. In a letter dated June 29, 2010, the applicant proposed changes to VCS SUP 1.4-1 to clarify the ownership role and that SCE&G retains sole responsibility for operations of VCSNS Units 2 and 3.

- VCS SUP 1.4-2

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

SCE&G received support from the following contractors in preparing the COL:

- Bechtel Power Corporation
- MACTEC Engineering and Consulting, Inc.
- NuStart Energy, Inc.
- Risk Engineering, Inc.
- Tetra Tech NUS, Inc.
- William A. Lettis and Associates, Inc.
- Westinghouse Electric Company LLC

- VCS SUP 1.4-3

In a letter dated June 29, 2010, SCE&G provided a proposed revision to VCSNS COL FSAR Section 1.4.1 to add VCS SUP 1.4-3 to describe Westinghouse's and Shaw's roles in the construction of VCSNS Units 2 and 3.

Section 1.5 Requirements for Further Technical Information

Section 1.5 of the VCSNS COL FSAR, Revision 2, 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 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 VCSNS COL FSAR, Revision 2, incorporates by reference Section 1.6, "Material Referenced," of the AP1000 DCD, Revision 17 with the following supplements:

- STD SUP 1.6-1

The applicant provided additional information to identify the technical documents incorporated by reference in the VCSNS 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 VCSNS COL FSAR, Revision 2, incorporates by reference Section 1.7, "Drawings and Other Detailed Information," of the AP1000 DCD, Revision 17, with the following supplements:

- VCS SUP 1.7-1

The applicant identified the site-specific system drawings. These are the circulating water system, raw water system, and switchyard single line diagram.

Section 1.8 Interfaces for Standard Design

Section 1.8 of the VCSNS COL FSAR, Revision 2, incorporates by reference Section 1.8, "Interfaces for Standard Design," of the AP1000 DCD, Revision 17 with the following supplements:

- VCS SUP 1.8-1

The applicant identified four departures in VCS 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 VCSNS COL FSAR sections to be consistent with RG 1.206 and NUREG-0800.
- VCS DEP 2.0-1 related to numbering and organization of the VCSNS COL FSAR Chapter 2 sections to be consistent with RG 1.206 and NUREG-0800, which differs from STD DEP 1.1-1.
- VCS DEP 2.0-2 related to the maximum safety wet bulb (noncoincident) air temperature.
- VCS DEP 18.8-1 related to the location of the TSC and the OSC.

The applicant also proposed to add another departure to VCSNS COL FSAR Table 1.8-201 related to the voltage regulating transformers.

- VCS SUP 1.8-2

The applicant provided a list of the COL information items in the AP1000 DCD. In VCSNS COL FSAR Table 1.8-202, SCE&G 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. SCE&G'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 license condition presented in Part 10 of this COL application.

- VCS SUP 1.8-3

The applicant provided in VCSNS COL FSAR Table 1.8-203 a list of interface items from the AP1000 DCD and the corresponding VCSNS COL FSAR section(s) that address those interface items.

Section 1.9 Compliance With Regulatory Criteria

Section 1.9 of the VCSNS COL FSAR, Revision 2, 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 VCSNS COL FSAR. Table 1.9-201 identifies the RG revision and provides VCSNS 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 VCSNS COL FSAR. In certain RGs design aspects were beyond the scope of the DCD and are also presented in the VCSNS COL FSAR.

- STD COL 1.9-2

The applicant provided additional information related to operational experience. VCSNS COL FSAR Table 1.9-204 provides a list of Bulletins and Generic Letters (GLs), the appropriate VCSNS COL FSAR cross-references and whether the subject matter was addressed in the AP1000 DCD.

- STD COL 1.9-3

The applicant provided additional information related to review of unresolved safety issues and generic safety issues (GSIs). 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 AP1000 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 1.9-1

The applicant provided additional information related to conformance with NUREG-0800. Specifically VCSNS COL FSAR Table 1.9-202 delineates conformance with NUREG-0800 for design aspects as stated in the AP1000 DCD and conformance for subjects beyond the scope of the DCD as presented in the VCSNS COL FSAR.

- 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 VCSNS COL FSAR; but is addressed in the COL application Environmental Report.

- STD SUP 1.9-3

The applicant provided information related to station blackout (SBO) procedures and training for operators to include actions necessary to restore offsite power after 72 hours by addressing alternating current (ac) power restoration and severe weather guidance in accordance with NUMARC-87-00.

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 SSCs important to safety for an operating unit, in accordance with 10 CFR 52.79(a)(31). This section of the VCSNS 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 VCSNS COL application that was not part of the referenced DCD.

- VCS SUP 1.10-1

The applicant identified that the power blocks for VCSNS Units 2 and 3 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 NUREG-1793 and its supplements.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the introductory information in VCSNS COL FSAR Chapter 1 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), “Additional standards and provisions affecting class 103 licenses and certifications for commercial power,” 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 LWR designs that were licensed before 1997, or use simplified, inherent, passive, or other innovative means to accomplish their safety functions.
- 10 CFR 52.77, “Contents of applications; general information,” 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 GSIs that are identified in the version of NUREG-0933, “Resolution of Generic Safety Issues (Formerly entitled ‘A Prioritization of Generic Safety Issues’),” 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, “Contents of applications; technical information,” have been met.
- 10 CFR 52.97(a)(1)(iv), “Issuance of combined licenses,” 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 NUREG-0800 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 VCSNS COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to this review topic.⁴ The NRC staff's review confirmed that the information in the application and incorporated by reference addresses the required information relating to this introduction. The results of the NRC staff's evaluation of the information incorporated by reference in the VCSNS COL application are documented in NUREG-1793 and its supplements.

Section 1.2.3 of this SER provides a discussion of the strategy used by the NRC to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application (VEGP Units 3 and 4) were equally applicable to the VCSNS Units 2 and 3 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 2 to the VCSNS COL FSAR. In performing this comparison, the staff considered changes made to the VCSNS COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

⁴ 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.

The staff has completed its review and found the evaluation performed for the standard content to be directly applicable to the VCSNS COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) includes evaluation material from the SER for the Bellefonte Nuclear Station (BLN) Units 3 and 4 COL application. Any confirmatory items in the standard content material retain the numbers assigned in the VEGP SER. Confirmatory items that are first identified in this SER section have a VCSNS designation (e.g., VCSNS Confirmatory Item 1.4-1).

The staff reviewed the information in the VCSNS COL FSAR:

VCSNS COL FSAR Sections 1.1, 1.2, 1.3, 1.6, and 1.7

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 VCSNS COL FSAR, itself.

In VCSNS COL FSAR Section 1.1, VCS COL 1.1-1 states that a site-specific construction plan and startup schedule will be provided 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**.

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the VEGP SER:

*In a letter dated November 11, 2010, the applicant added a discussion of incorporation of the proprietary information and safeguards information referenced in the AP1000 DCD. This information is included to meet the requirements of 10 CFR Part 52, Appendix D, Section IV.A.3 which indicates the applicant must "include, in the plant specific DCD, the proprietary information and safeguards information referenced in the AP1000 DCD" and therefore, is acceptable. The incorporation of the above information into a future revision of the VEGP COL FSAR is **Confirmatory Item 1.4-1***

VCSNS COL FSAR Section 1.4

- VCS SUP 1.4-1, VCS SUP 1.4-2, and VCS SUP 1.4-3

This evaluation is limited to SCE&G'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.

Based on Revision 2 of the VCSNS COL application, the staff determined that the ownership and operation of VCSNS Units 2 and 3, and the roles of Westinghouse and Shaw in designing and constructing the units was not clearly described. The issue was identified as RAI 1-4. In response to the question, SCE&G proposed changes to VCSNS COL FSAR Section 1.4 to clarify these issues as follows:

- SCE&G retains sole responsibility for operation of VCSNS Units 2 and 3 and ensuring that the requirements of 10 CFR 52.103(g), "Operation under a combined license," are met.
- SCE&G will jointly own the facility and share in the costs and output of the facility with SCE&G having a 55 percent share and Santee Cooper a 45 percent share.
- SCE&G has an Engineering, Procurement, and Construction (EPC) contract with a consortium comprised of Westinghouse Electric Company, LLC and Shaw. SCE&G notes that the consortium will act as the AP1000 provider, architect-engineer and constructor for VCSNS Units 2 and 3.

In addition, in VCSNS COL FSAR Section 1.4 of the application, SCE&G notes that it constructed and currently operates VCSNS Unit 1. Because SCE&G holds a 10 CFR Part 50 license for a nuclear power plant and has demonstrated its ability to build and operate a nuclear unit, the staff finds that SCE&G is qualified to hold a 10 CFR Part 52 license. The staff notes that Section 17.5 of the VCSNS 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 SCE&G's EPC contractor, Westinghouse and Shaw. The staff's evaluation of Section 17.5 of the VCSNS COL FSAR is in Section 17.5 of this SER. Based on SCE&G's experience with building and operating a nuclear power plant and the staff's evaluation of SCE&G's QA program, the staff finds that SCE&G is technically qualified to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.79(a)(1)(iv). Changes to VCSNS COL FSAR Section 1.4 described in SCE&G's response to RAI 1-4 is **VCSNS Confirmatory Item 1.4-1**.

VCSNS COL 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 LWR 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 AP1000 DCD and evaluated by the staff in NUREG 1793 Chapter 21, "Testing and Computer Code Evaluation." The COL application does not include any additional design features that require additional testing.

VCSNS COL FSAR Section 1.6

There are no specific NUREG-0800 acceptance criteria related to the information presented in Section 1.6 and no specific regulatory findings.

VCSNS COL FSAR Section 1.8

- VCS SUP 1.8-1

As discussed in SER Section 1.4.2, the applicant identified four departures in VCSNS COL FSAR Table 1.8-201 from the referenced AP1000 DCD and proposed one additional departure. Section 1.3 of this SER provides a cross-reference to where these departures are discussed in this SER.

- VCS SUP 1.8-2

VCS SUP 1.8-2 contains the same type of information as VEGP SUP 1.8-2. Therefore, the following portion of this technical evaluation section is reproduced from Section 1.4.4 of the VEGP SER:

*In Sections 1.3 and 1.4.4 of the BLN SER, the staff identified a standard content **Open Item 1-2** related to the decision on which the BLN COL FSAR commitments, if any should become a license condition. On January 21, 2010, the NRC issued ISG-15, "Final Interim Staff Guidance on the Post-Combined License Commitments," ESP/DC/COL-ISG-15. This guidance discusses options regarding completion of COL items that cannot be completed until after issuance of the COL. The VEGP applicant identified that certain COL information items cannot be resolved prior to the issuance of a COL. The applicant has identified proposed License Condition 2 in Part 10 of the COL application to ensure these COL items will be completed by the identified 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. In addition, using the guidance of ISG-15, the staff has identified certain FSAR commitments in individual sections of this SER and these FSAR commitments are listed in Appendix A.3 of this SER. The staff considers **Open Item 1-2** is resolved..*

- VCS SUP 1.8-3

AP1000 DCD Table 1.8-1 presents interface items for the AP1000. 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).⁵ As required by 10 CFR 52.79(d)(2), the COL application must demonstrate how these interface items have been met. In the VCSNS COL FSAR, the applicant did not explicitly identify how these interface items have been met. In a letter dated September 4, 2009, the applicant provided VCSNS COL FSAR Table 1.8-203, which explicitly identifies the FSAR location of information addressing the interface items identified in Section 1.8 of the AP1000 DCD. The staff's review of the identified FSAR locations confirmed that interface items are adequately addressed in the VCSNS COL FSAR. The technical discussions related to specific interface requirements are addressed in related sections of this SER (e.g., SER Sections 8.2.4, and 11.3.2).

VCSNS COL FSAR Section 1.9

In this section of the application, the applicant demonstrates conformance with RGs and NUREG-0800 and addresses unresolved safety issues, GSIs, TMI action items, and operating experience.

⁵ Following the update to 10 CFR Part 52 (72 FR 49517), this provision has changed to 10 CFR 52.47(a)(25).

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the VEGP SER⁶:

AP1000 COL Information Item

- 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.

⁶ The text reproduced from Section 1.4.4 of the VEGP is unaltered, but is presented in sequential order of the COL and SUP items.

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.

Resolution of Standard Content Confirmatory Item 1.4-2

The NRC staff verified that VEGP COL FSAR Table 1.9-201 was updated to provide an acceptable cross reference of where each RG is discussed in the COL application. As a result, Confirmatory Item 1.4-2 is resolved for VEGP.

Resolution of Standard Content Open Item 1.4-2

In a letter dated September 21, 2009, the VEGP applicant provided clarification to a previously submitted response dated January 27, 2009 from the BLN applicant. Specifically, the applicant proposed to revise the discussion in the "General comment" portion related to preserving the finality of the certified design in VEGP COL FSAR Sections 1.9.1.1, 1.9.1.2, 1.9.1.3, 1.9.1.4 and Appendix 1AA Note (b); to clarify in VEGP COL FSAR Section 17.5 the "DCD scope" and the

“remaining scope” discussion for QA-related RGs (including RG 1.28; RG 1.30, Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment (Safety Guide 30)”; RG 1.33, “Quality Assurance Program Requirements (Operation),” Revision 2; RG 1.38, “Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants,” Revision 2; RG 1.39, “Housekeeping Requirements for Water-Cooled Nuclear Power Plants,” Revision 2; RG 1.94, “Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants,” Revision 1; and RG 1.116, “Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems”). In addition, the applicant proposed to revise the VEGP COL FSAR, Appendix 1AA Note (c) to clarify the purpose of a “General” entry under the column labeled “section Criteria” discussion. It is stated that a “Criteria Section” entry of “General” indicates a scope for the conformance statement of “all regulatory guide positions related to programmatic and/or operational aspects.” Thus an associated conformance statement of “Conforms” indicates that the applicant “complies with all regulatory guide positions related to programmatic and or/or operational aspects.” The proposed clarifications clearly provide the scope of conformance to the RGs and, therefore, it is acceptable. The staff verified that the VEGP COL FSAR was updated to reflect above. The staff considers Open Item 1.4-2 resolved for VEGP.

Evaluation of Site-Specific Information Related to Standard Content

In comparing VEGP COL FSAR Table 1.9-201 and Appendix 1AA to the respective tables in the VCSNS COL FSAR, the staff notes that there are several differences. These differences are associated with site-specific information and are reflected in the VCSNS COL FSAR by a “VCS COL 1.9-1” designation. The staff reviewed the site-specific differences in Table 1.9-201 and Appendix 1AA and has determined that the VCS COL 1.9-1 information in these tables was updated consistent with the update provided for the standard information; therefore, the staff considers the standard content open item as it relates to issues associated with the site-specific information resolved.

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the VEGP 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.

The evaluation of GSI 163, "Multiple Steam Generator Tube Leakage," is described below because otherwise its evaluation would be spread across several SER chapters.

GSI 163 identified a safety concern associated with the potential multiple steam generator (SG) tube leaks triggered by a main steamline break outside containment that cannot be isolated. The issue was evaluated as part of the AP1000 DCD review and was resolved for the AP1000 design. The evaluation was documented in NUREG-1793, Chapter 20. The evaluation states in part the following:

The staff agrees that the issue should be closed for the AP1000 design. Issue 163 concerns the possibility that a multiple steam generator tube rupture (SGTR), resulting from a main steam line break and degraded SG tubes, could result in core damage due to depletion of the reactor coolant and safety injection fluid in the refueling water storage tank. For the AP1000 design, an SGTR is mitigated using the passive core cooling system, initially through the passive residual heat removal heat exchanger, and the core makeup tanks (CMTs). After the CMTs drain to the low level to actuate the automatic depressurization system, the reactor coolant depressurization would result in gravity injection from the in containment refueling water storage tank (IRWST), and eventually from the containment recirculation. The scenario that the safety injection from the refueling water storage tank, which is outside the containment in the existing plants, will be depleted to result in core damage is not likely for the AP1000 design because the IRWST and containment recirculation will continue to provide core cooling.

Since the resolution of Issue 163 is an ongoing NRC effort, any future requirements for the resolution of this issue will be required of the COL applicant, if applicable to the AP1000 design.

Subsequent to the original issuance of NUREG-1793, GSI 163 was closed via a July 16, 2009, memorandum. In the safety evaluation accompanying the closure of the issue, the following is stated:

the staff concludes that the technical specification requirements relating to SG tube integrity provide reasonable assurance that all tubes will exhibit acceptable structural margins against burst or rupture during normal operation and DBAs (including MSLB [main steam line break]), and that leakage from one or multiple tubes under DBAs will be limited to very small amounts, consistent with the applicable regulations for offsite and control room dose.

Therefore, in addition to the unique design features of the AP1000 cited in NUREG-1793 and its supplements as a basis for closure of the issue, the staff

notes that for PWR designs in general the issue is resolved based on the technical specification requirements. The staff discusses these technical specification requirements in Section 5.4, "Component and Subsystem Design," of this SER. Based on the evaluation in NUREG-1793 and its supplements, and based on the staff's evaluation of the SG tube surveillance program in Section 5.4 of this SER, the staff considers GSI 163 resolved for VEGP.

- **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 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 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 VCSNS COL FSAR; but is

addressed in the VCSNS COL Environmental Report. The staff is reviewing this information as part of its development of the Final Environmental Impact Statement. Therefore, no further evaluation is needed for STD SUP 1.9-2.

The following portion of this technical evaluation section is reproduced from of Section 1.4.4 of the VEGP SER:

- *STD SUP 1.9-3*

This COL supplemental item is addressed as VEGP SUP 8.1-2 [VCS SUP 8.1-2] in SER Section 8.1. .

VCSNS COL 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).

The following portion of this technical evaluation section is reproduced from of Section 1.4.4 of the VEGP SER:

- *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.

Resolution of Standard Content Open Item 1.4-4

In a letter dated July 29, 2009, the applicant proposed to revise VEGP COL FSAR Section 1.10.3 to positively state that these programs will be in place when there is an operating unit on the site. The staff verified that the VEGP COL FSAR was appropriately updated to include the above. As a result, Open Item 1.4-4 is resolved.

- VCS SUP 1.10-1

The supplemental information states that the power blocks for VCSNS Units 2 and 3 have a minimum separation of at least 800 feet between plant centerlines and notes that new unit SSCs important to safety are described in VCSNS COL FSAR Chapter 3 and the LCOs for VCSNS Units 2 and 3 are identified in Part 4 of the COL application. VCSNS Unit 1 SSCs important to safety are described in Chapter 3 of the updated FSAR. In the standard portion of VCSNS COL 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's review of this SUP item is included in resolution of Open Item 1.4-3.

The following portion of this technical evaluation section is reproduced from of Section 1.4.4 of the VEGP SER:

Resolution of Standard Content Open Item 1.4-3

A new draft ISG-22 is being issued to assist the staff with the evaluation of COL applicants' compliance with the requirements of 10 CFR 52.79(a)(31). The above draft ISG document was made available to the public including the applicant and was discussed at a public meeting on August 26, 2010.

The regulation at 10 CFR 52.79(a)(31) requires, in part, that applicants for a COL intending to construct and operate new nuclear power plants on multi-unit sites provide an evaluation of the potential hazards to the structures, SSCs important to safety for operating units resulting from construction activities on the new units. The requirement in 10 CFR 52.79(a)(31) can be viewed as having two subparts:

- 1. The COL applicant must evaluate the potential hazards from constructing new plants on SSCs important to safety for existing operating plants that are located at the site.*
- 2. The COL applicant must evaluate the potential hazards from constructing new plants on SSCs important to safety for newly constructed plants that begin operation at the site.*

The interim guidance recommends that the applicant provide a construction impact evaluation plan that includes:

- *A discussion of the construction activity identification process and the impact evaluation criteria used to identify and evaluate the construction*

activities that may pose potential hazards to the SSCs important to safety for operating unit(s).

- *A table of those construction activities and the potential hazards that are identified using that construction impact evaluation plan, the SSCs important to safety for the operating unit potentially impacted by the construction activity, and expected mitigation method.*
- *Identification of the managerial and administrative controls, such as proposed license conditions that may involve construction schedule constraints or other restrictions on construction activities, that are credited to preclude and/or mitigate the impacts of potential construction hazards to the SSCs important to safety for the operating unit(s).*
- *A discussion of the process for communications and interactions planned and credited between the construction organization and the operations organization to ensure appropriate coordination and authorization of construction activities and implementation of the prevention or mitigation activities as necessary.*
- *A memorandum of understanding or agreement (MOU or MOA) between the COL applicant and the operating unit(s) licensee as a mechanism for communications, interactions, and coordination to manage the impact of the construction activities.*
- *An implementation schedule corresponding to construction tasks or milestones to ensure the plan is reviewed on a recurring basis and maintained current as construction progresses.*

The staff reviewed the VEGP COL FSAR Section 1.10 which provides information to address compliance with 10 CFR 52.79(a)(31). In order to complete the staff's review, in RAI 1.5-2, the staff requested that the applicant to provide a construction impact evaluation plan that includes:

- *A discussion of the process for communications and interactions planned and credited between the construction organization and the operations organization to ensure appropriate coordination and authorization of construction activities and implementation of the prevention or mitigation activities as necessary.*
- *A memorandum of understanding or agreement (MOU or MOA) between the COL applicant and the operating unit(s) licensee as a mechanism for communications, interactions, and coordination to manage the impact of the construction activities.*
- *An implementation schedule corresponding to construction tasks or milestones to ensure the plan is reviewed on a recurring basis and maintained current as construction progresses.*

In addition, the applicant was requested to identify the managerial and administrative controls (VEGP COL FSAR Table 1.10-203) that are credited to preclude and/or mitigate the impacts of potential construction hazards to the SSCs important to safety for the operating units (VEGP Units 1 and 2).

In a letter dated November 2, 2010, the applicant stated:

- *VEGP COL FSAR Sections 1.10.2 and 13AA will be revised to include the discussion of the process for communications and interactions planned and credited between the construction organization and the operations organization.*
- *The COL applicant and the operating unit(s) licensee are the same entity, thus, no MOU or MOA is considered necessary.*
- *VEGP COL FSAR Sections 1.10.3 and 13AA will be revised to include the discussion of the implementation schedule corresponding to construction tasks or milestones.*
- *VEGP COL FSAR will be revised to indicate that managerial and administrative controls are developed and implemented as work progresses on site. These controls are intended to preclude and/or mitigate the impacts of potential construction hazards to the SSCs important to safety for the operating units.*

*The proposed changes to the VEGP COL FSAR meet the draft guidance of ISG-22 and therefore meet the requirements of 10 CFR 50.79(a)(31). The incorporation of the above proposed changes into a future revision of the VEGP COL FSAR is **Confirmatory Item 1.4-2**.*

License Conditions

- *Part 10, License Condition 1, ITAAC*

The applicant proposed that the ITAAC identified in the tables in Appendix B of Part 10 of the VEGP COL application be incorporated into the COL. The proposed license condition also states that after the Commission has made the finding required by 10 CFR 52.103(g), "Operation under a combined license," the ITAAC do not constitute regulatory requirements; except for specific ITAAC, which are subject to a hearing under 10 CFR 52.103(a), their expiration will occur upon final Commission action in such proceeding.

The ITAAC identified in tables in Appendix B of Part 10 of the VEGP COL application are evaluated throughout this SER. The remaining text of the proposed license condition is already covered by regulatory requirements of 10 CFR 52.103(h). Therefore, there is no need for a license condition.

1.4.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the following FSAR commitment is identified as the responsibility of the licensee:

- Commitment (1.4-1) - A site-specific construction plan and startup schedule will be provided after issuance of the COL.

1.4.6 Conclusion

The NRC staff reviewed the application and checked the referenced DCD. The NRC staff's review confirmed that, pending resolution of **VCSNS Confirmatory Item 1.4-1** and **Confirmatory Item 1.4-1 and 1.4-2**, the applicant addressed the required information relating to principal review matters, and there is no outstanding information expected to be addressed in the VCSNS COL FSAR related to this section. The results of the NRC staff's technical evaluation of the information incorporated by reference in the VCSNS COL application are documented in NUREG-1793 and its supplements.

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:

South Carolina Electric and Gas Company

According to the COL application, SCE&G is the principal subsidiary of SCANA Corporation, an energy-based holding company with headquarters in Columbia, South Carolina. SCE&G is an investor owned utility regulated by the South Carolina Public Service Commission (SCPSC). Historically, SCE&G and its parent company SCANA have had excellent access to the capital markets and continue to be highly rated by all credit rating agencies.

South Carolina Public Service Authority

According to the COL application, Santee Cooper, a body corporate and politic created under the laws of South Carolina, is South Carolina's state-owned electric and water utility, with corporate headquarters in Columbia, South Carolina.

REGULATORY EVALUATION:

The applicant's request for the NRC to issue two COLs pursuant to Section 103 of the Atomic Energy Act of 1954, as amended is subject to, among other things, the requirements of 10 CFR Part 52, Subpart C; 10 CFR Part 50; and 10 CFR Part 140. This SER 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 include all of the information required by 10 CFR 50.33.

Construction Permit:

Pursuant to 10 CFR 50.33(f)(1):

[T]he applicant[s] shall submit information that demonstrates that the applicant[s] possess or [have] reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. The applicant[s] 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, "A Guide for the Financial Data and Related Information Required To Establish Financial Qualifications for Construction Permits and Combined Licenses," Section I.A.1:

[E]ach applicant's estimate of the total cost of the proposed facility has been 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.

As stated in the RAI response dated January 15, 2009, the projected overnight costs⁷ for the construction of two AP1000 nuclear units at the VCSNS site are outlined below. This information was subsequently provided in a revision to the VCSNS COL application. Specifically, Part 1, "General and Financial Information," of the application provides the cost information in the January 15, 2009, letter. The proprietary portion of the cost estimates in the January 15, 2009, letter is in VCSNS COL application Part 9, "Withheld Information."

⁷ Overnight cost is the cost of a construction project if neither interest nor cost escalation 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.

**Projected Project Cost VCSNS Units 2 and 3
SCE&G and Santee Cooper
(in millions of 2008 \$)**

	<u>Total</u>
Total Nuclear Production Plant Costs	\$9,838.3
Transmission, Distribution and General Plant Costs	\$924.7

The RAI response and the VCSNS COL application also included a “nuclear fuel inventory cost for the first core.” The RAI response and application also provide a total estimated cost, which is the sum of the following: 1) total nuclear production plant costs; 2) transmission, distribution and general plant costs; and 3) nuclear fuel inventory for the first core. The applicant requested that both the nuclear fuel inventory cost for the first core and the total cost be considered proprietary information and that this information be withheld from the public. In a letter dated May 12, 2010, the staff found these two values to be proprietary and determined that these values would be withheld from the public.

The applicant described the bases for the foregoing cost estimate. According to the RAI response submitted June 24, 2009:

The cost basis provided [...] is obtained from the Engineering, Procurement and Construction (EPC) contract that has been developed between SCE&G, Westinghouse, and Stone and Webster. The contract was signed by all three parties on May 23, 2008. Transmission costs were developed based on expected system construction and upgrade that will be necessary to deliver the output of the new units to the customers. Nuclear fuel inventory costs are based on projected costs and are currently being negotiated with the associated vendors.

The estimated dates for completion are between April 1, 2016, and June 1, 2018, for Unit 2 and January 1, 2019, and June 1, 2021, for Unit 3. VCSNS is expected to operate at an estimated gross electrical power output of approximately 2234 MWe (1117 MWe per unit). Therefore, the total overnight cost in Part 9 of the VCSNS COL application can be converted to \$/kilowatt electric (kWe) installed. The NRC staff has been reviewing studies from independent sources⁸ and collecting projected project cost estimates from all COL applications, as they are submitted, for comparison and reasonableness.⁹ According to these studies, the cost of constructing a plant comparable to VCSNS is in the approximate range of \$3,222/kWe to \$5,072/kWe installed.

⁸ See, e.g., the 2009 the Massachusetts Institute of Technology (MIT) study entitled Update on the Cost of Nuclear Power; the 2003 the MIT interdisciplinary study entitled “The Future of Nuclear Power”; the U.S. Department of Energy’s (DOE’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 has clear oversight of the plant and fuel, an 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, “Completeness and accuracy of information,” and no further assessment of that estimate is performed.

The applicant's overnight cost estimate is within the range derived from the studies developed from independent sources, and is also greater than construction cost estimates reviewed to date for comparable plants. Accordingly, the NRC staff finds the applicant's overnight cost estimate is reasonable.

Sources of Construction Funds:

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

[t]he 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 COL application, in May 2007, the South Carolina Legislature passed the Base Load Review Act (BLRA), which provides for the expedited recovery of prudently incurred capital and operating costs associated with new coal-fired or nuclear base load electric generating facilities larger than 350 megawatts. The legislation also provides for approval of initial prudence and annual recovery of cost of capital on construction work in process (CWIP).

According to the COL application, the BLRA allows for "expedited recovery of prudently incurred capital and operating costs" relating to VCSNS, including recovery of cost of capital on CWIP.

Also according to the COL application, initial capital requirements will be met through "accessing the capital markets for debt and equity as needed to balance the company's capital structure."

Financial Statements

Pursuant to 10 CFR Part 50, Appendix C, Section I.A.3:

[t]he application should also include the applicant's latest published annual financial report, together with any current interim financial statements that are pertinent. If an annual financial report is not published, the balance sheet and operating statement covering the latest complete accounting year together with all pertinent notes thereto and certification by a public accountant should be furnished.

South Carolina Electric and Gas Company

SCE&G has filed current financial statements with the Securities and Exchange Commission (SEC), which can be found at the following website:

http://www.scana.com/NR/rdonlyres/B50E6105-B908-4CA0-8337-BA2DE461133F/0/yearend08form10k_revised.pdf.

South Carolina Public Service Authority

Santee Cooper has filed current financial statements with the SEC, which can be found at the following website:

https://www.santeecooper.com/portal/page/portal/santeecooper/aboutus/corporatepublications/ar2008_spreads_final_web.pdf.

The applicant submitted, pursuant to 10 CFR Part 50, Appendix C, Section I.A.3, annual financial statements. The NRC staff did not identify anything to indicate that the general financial plan of the applicant is unreasonable.

In consideration of the foregoing, the NRC staff finds that the applicants have demonstrated that they possess or have reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. Therefore, the NRC staff finds that the applicants are financially qualified to construct the facilities.

Operating License

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:

[e]xcept 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, "Definitions" states, in part, that an electric utility is:

[a]ny 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.

South Carolina Electric and Gas Company

According to the COL application, the regulatory statutes provide for the recovery of costs prudently incurred on behalf of the retail customers. These costs include depreciation, taxes other than income, operations and maintenance expenses, fuel expenses, income taxes, and cost of capital.

South Carolina Public Service Authority

According to the COL application, Santee Cooper's Board of Directors is empowered and required to set rates as necessary, except for wholesale transmission rates, to provide for expenses, including debt service, of Santee Cooper. There is no agency other than Santee Cooper that has jurisdiction over the rates, except for wholesale transmission rates, of Santee Cooper.

In consideration of the foregoing, the NRC staff finds the applicants are electric utilities and not subject to financial qualifications pursuant to 10 CFR 50.33(f)(2).

DECOMMISSIONING FUNDING ASSURANCE:

Regulatory Requirements:

Pursuant to 10 CFR 50.33(k)(1):

[A]n application for [a ...] combined license for a production or utilization facility, information in the form of a report, as described in § 50.75, indicating how reasonable assurance will be available to decommission the facility.

Under 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning," the report must include a certification that the applicant will provide financial assurance for decommissioning using one or more of the methods allowed under the regulation at 10 CFR 50.75(e) no later than 30 days after the Commission publishes notice in the *Federal Register* under 10 CFR 52.103(a). 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 COL 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 COL is granted, the holder of a COL must submit an instrument as provided in 10 CFR 50.75(e)(3)).

Decommissioning Funding Estimate:

VCSNS is a two-unit PWR (Units 2 and 3) that is being licensed in accordance with the Westinghouse AP1000 certified design, as documented in the referenced DCD including any supplemental material.

According to the COL application, the cost of decommissioning will be provided as follows: SCE&G will provide 55 percent of decommissioning; Santee Cooper will provide 45 percent of decommissioning funding.

The COL application acknowledged the requirements of 10 CFR 50.75 regarding the certification requirements, stating that the applicants will provide decommissioning funding assurance in an amount of \$365.61 million (2006 dollars) per unit. The NRC staff calculated the minimum funding amount required under 10 CFR 50.75(c) and found the applicants' amounts to be acceptable.

Decommissioning Funding Mechanism:

The COL application stated that both the applicants 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 decommissioning, are assumed to meet this condition.

The NRC 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 the COL.

Therefore, at this time, the NRC staff finds the applicants have complied with applicable decommissioning funding assurance requirements.

ANTITRUST REVIEW:

The Energy Policy Act of 2005 (EPA) 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 EPA. 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.

10 CFR 50.38 is the regulatory provision that implements this statutory prohibition.

SCE&G is an investor owned utility regulated by the SCPSC whose principal place of business is in South Carolina. The shares of common stock of SCE&G are publicly traded and widely held. Santee Cooper is a body corporate and politic created under the laws of South Carolina whose principal place of business is in South Carolina.

The COL application includes the names and addresses of the directors and officers of SCE&G and Santee Cooper and indicates that all are United States citizens. According to the COL application, neither SCE&G nor Santee Cooper is owned, controlled or dominated by any alien, foreign corporation or foreign government. The NRC staff does not know or have reason to believe otherwise.

NUCLEAR INSURANCE and 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 SCE&G and Santee Cooper provide satisfactory documentary evidence that they have obtained the maximum liability insurance coverage pursuant to 10 CFR 140.11(a)(4), "Amounts of financial protection for certain reactors," and not less than the amount required by 10 CFR 50.54(w), "Conditions of licenses," with respect to property insurance prior to fuel being brought on site.

CONCLUSION:

Based on the foregoing, the NRC staff finds that there is reasonable assurance that SCE&G and Santee Cooper are financially qualified to engage in the proposed activities regarding VCSNS Units 2 and 3, as described in the application, and that there are no problematic decommissioning funding assurance issues, foreign ownership issues, or nuclear insurance and indemnity issues.

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 Table 1.2-1 of Part 3 of this application, the applicant provided verification that they have entered into contracts with the Department of Energy (DOE) for disposal of spent nuclear fuel and high-level radioactive waste generated at the proposed VCSNS Units 2 and 3 site. The referenced DOE contract numbers are DE-CR01-09RW09014 for VCSNS Unit 2 and DE-CR01-09RW09015 for VCSNS Unit 3.

Because SCE&G has entered into contracts with the DOE for the disposal of high-level radioactive waste and spent nuclear fuel for VCSNS Units 2 and 3, the staff considers the applicable requirements of Section 302(b) of the Nuclear Waste Policy Act of 1982 to be met.

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 in the Application and Exemption Associated with Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program

Evaluation of Departures and Exemption Associated with Numbering in the Application

In STD DEP 1.1-1 the applicant renumbered VCSNS COL FSAR Sections 9.2.11, 9.2.12, 9.2.13, 9.5.1.8, 9.5.1.9, 13.1, 13.1.4, 13.5, 13.5.3, 13.7, 17.5, 17.6, 17.7, 17.8 to include content

consistent with RG 1.206 and NUREG-0800. The departure and the exemption associated with the numbering scheme of the FSAR are closely related. The applicant also requested that portions of Chapter 2 be renumbered in VCS DEP 2.0-1. The evaluation of VCS DEP 2.0-1 can be found in Section 2.0 of this SER.

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 VCSNS 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 NUREG-0800.

Pursuant to 10 CFR 52.7, 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, "Specific exemptions," 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 associated with STD DEP 1.1-1, 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. In addition, this exemption is consistent with the *Atomic Energy Act* or any other statute and is therefore authorized by law. Therefore, 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 associated with STD DEP 1.1-1 is justified. Because the departure from the numbering scheme in the VCSNS COL FSAR is related to the exemption request, the staff also finds the departure acceptable.

Exemption Associated with Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program

In a letter dated November 30, 2010, the applicant requested an exemption from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51. The provision of 10 CFR 70.22(b) requires an application for a license for SNM to include a full description of the applicant's program for MC&A of SNM under

10 CFR 74.31, 10 CFR 74.33, 10 CFR 74.41, and 10 CFR 74.51¹⁰. 10 CFR 70.32(c) requires a license authorizing the use of SNM to include and be subjected to a condition requiring the licensee to maintain and follow an SNM MC&A program. However, 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51 include exceptions for nuclear reactors licensed under 10 CFR Part 50. The regulations applicable to the MC&A of SNM for nuclear reactors licensed under 10 CFR Part 50 are provided in 10 CFR Part 74, Subpart B, 10 CFR 74.11 through 10 CFR 74.19, excluding 10 CFR 74.17. The applicant stated that the purpose of this exemption request is to seek a similar exception for this COL under 10 CFR Part 52, such that the same regulations will be applied to the SNM MC&A program as nuclear reactors licensed under 10 CFR Part 50. In addition, the applicant stated that the exemption request is evaluated under 10 CFR 52.7, which incorporates the requirements of 10 CFR 50.12. That section allows the Commission to grant an exemption if: 1) the exemption is authorized by law; 2) will not present an undue risk to the public health and safety; 3) is consistent with the common defense and security; and 4) special circumstances are present as specified in 10 CFR 50.12(a)(2). The criteria in 10 CFR 50.12 encompass the criteria for an exemption in 10 CFR 70.17(a) and 10 CFR 74.7, the specific exemption requirements for 10 CFR Part 70 and 10 CFR Part 74, respectively. Therefore, by demonstrating that the exemption criteria in 10 CFR 50.12 are satisfied, this request also demonstrates that the exemption criteria in 10 CFR 52.7, 10 CFR 70.17(a), and 10 CFR 74.7 are satisfied.

The applicant stated that the subject exemption would allow nuclear reactors licensed under 10 CFR Part 52 to be explicitly excepted from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51. There is no technical or regulatory basis to treat nuclear reactors licensed under 10 CFR Part 52 differently than reactors licensed under 10 CFR Part 50 with respect to the MC&A provisions in 10 CFR Part 74. As indicated in the Statement of Considerations for 10 CFR 52.0(b) (72 Federal Register 49352, 49372, 49436 (August 28, 2007)), applicants and licensees under 10 CFR Part 52 are subject to all of the applicable requirements in 10 CFR Chapter I, whether or not those provisions explicitly mention a COL under 10 CFR Part 52. This regulation clearly indicates that plants licensed under 10 CFR Part 52 are to be treated no differently than plants licensed under 10 CFR Part 50 with respect to the substantive provisions in 10 CFR Chapter I (which includes 10 CFR Part 70 and 10 CFR Part 74). In particular, the exception for nuclear reactors licensed under 10 CFR Part 50, as in 10 CFR 70.22(b), 10 CFR 74.31, 10 CFR 74.41, or 10 CFR 74.51, should also be applied to reactors licensed under 10 CFR Part 52.

The staff agrees with the applicant's justification that nuclear reactors licensed under 10 CFR Part 52 should be treated the same as the reactors licensed under 10 CFR Part 50 regarding the MC&A for SNM.

Pursuant to 10 CFR 70.17(a), the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

In addition, pursuant to 10 CFR 74.7, the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the

¹⁰ While not including an explicit exception for 10 CFR Part 50 reactors, 10 CFR 74.33 applies only to uranium enrichment facilities and thus is not directly implicated in this exemption request.

regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.

Pursuant to 10 CFR 52.7, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. Section 10 CFR 52.7 further states that the Commission's consideration will be governed by 10 CFR 50.12, "Specific exemptions," 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 have a similar exception for the COL under 10 CFR Part 52, such that the same regulations will be applied to the SNM MC&A program as nuclear reactors licensed under 10 CFR Part 50, and determined that this requested exemption will not present an undue risk to the public health and safety and is otherwise in the public interest. In addition, this exemption is consistent with the *Atomic Energy Act* or any other statute and is therefore authorized by law. Therefore, 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 initial fuel load. Since the exemption criteria in 10 CFR 50.12 are satisfied, the staff considers that this request also demonstrates that the exemption criteria in 10 CFR 52.7, 10 CFR 70.17(a), and 10 CFR 74.7 are satisfied. Therefore, the staff finds that the exemption to 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51 is justified.

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

In SCE&G's letter transmitting Revision 2 of the COL application, dated January 28, 2010, and in Part 1, "General and Financial Information," of the application SCE&G requested material licenses for receipt, possession and use of source, byproduct and SNM in accordance with Commission regulations in 10 CFR Parts 30, 40, and 70. The reviews conducted for compliance with the requirements of 10 CFR Part 52 to support the issuance of the COL encompass those necessary to support granting 10 CFR Parts 30, 40, and 70 licenses. The standard 10 CFR Part 52 license that the staff intends to issue will be based, in part, on operating licenses for nuclear power plants licensed in accordance with 10 CFR Part 50. The staff considered the following standard license provisions for the VCSNS COL as it relates to authorization pursuant to the regulations in 10 CFR Parts 30, 40, and 70:

Subject to the conditions and requirements incorporated herein, the Commission hereby licenses SCE&G:

- (a) (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;

- (b) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, such byproduct, source, and special nuclear material as: sealed neutron sources for reactor startup; sealed sources for reactor instrumentation and radiation monitoring equipment calibration; and fission detectors in amounts that do not exceed the quantities in Schedule C of 10 CFR 30.72 and that do not include uranium hexafluoride in excess of 50 Kilograms in a single container or 1000 Kilograms total;
- (c) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as restricted by Section(b) above, any byproduct, source, or special nuclear material that is not in (1) unsealed form; (2) on foils or plated surfaces, or (3) sealed in glass, for sample analysis or instrument calibration or other activities associated with radioactive apparatus or components; and
- (d) 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 VCSNS COL FSAR Table 13.4-201. "Operational Programs Required by NRC Regulations," provides milestones for the implementations of various operational programs. 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 as low as is reasonably achievable [ALARA] principles) – prior to initial receipt of byproduct, source, or SNMs (excluding exempt quantities as described in 10 CFR 30.18, "Exempt quantities")
- Fire Protection Program – prior to initial receipt of byproduct, source, or SNMs (excluding exempt quantities as described in 10 CFR 30.18, "Exempt quantities")
- Security Program including physical security, safeguards contingency programs, training and qualification program – prior to receipt of fuel onsite (protected area)

- Non-licensed plant staff training program associated with receipt of the radioactive material – prior to initial receipt of byproduct, source, or SNMs (excluding exempt quantities as described in 10 CFR 30.18, “Exempt quantities”)

In a letter dated November 30, 2010, the applicant proposed to revise the VCSNS COL FSAR Table 13.4-201 to add information (milestones and requirements) related to the SNM MC&A program. In addition, in letters dated January 20, 2010, August 25, 2010, November 18, 2010, and November 30, 2010, VCSNS endorsed VEGP standard content letters related to this subject. Specifically, the VCSNS letters provided above endorsed VEGP letters dated July 29, 2009, July 9, 2010, October 15, 2010 and November 23, 2010. These letters identified licensing basis documents that satisfy the regulatory basis for meeting requirements of 10 CFR Parts 30, 40, 70, and 74. Also, in a letter dated November 30, 2010, the applicant requested an exemption from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51. This exemption request is addressed in Section 1.5.4 of this SER.

Section 1.2.3 of this SER provides a discussion of the strategy used by the NRC to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application (VEGP Units 3 and 4) were equally applicable to the VCSNS Units 2 and 3 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 2 to the VCSNS COL FSAR. In performing this comparison, the staff considered changes made to the VCSNS COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.
- The staff confirmed that the November 30, 2010, VCSNS submittal transmitting the SNM Material and Control Accounting Program Description was identical to the November 23, 2010, VEGP submittal transmitting its SNM Material Control and Accounting Program Description. The only exceptions are that the title of the units are different and the identification that VCSNS and not Southern Nuclear Operating Company is responsible for implementation of the program is different.
- The staff verified that the site-specific differences were not relevant.

The staff has completed its review and found the evaluation performed for the standard content to be directly applicable to the VCSNS COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) includes evaluation material from the SER for the BLN Units 3 and 4 COL application.

The following portion of this technical evaluation section is reproduced from Section 1.5.5 of the VEGP 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.

Resolution of Standard Content Open Item 1.5-1

In letters dated July 29, 2009, July 9, 2010, October 15, 2010, the applicant provided additional information related to source, byproduct and SNM and its purposes, radiation safety personnel, personnel training, facilities and equipment, waste management, and the radiation safety program in general. With respect to the requirements of 10 CFR Parts 30, 40, and 70 that are related to radiation protection, the applicant provided information on the purpose, storage and security of sources in VEGP COL FSAR Sections 12.2 and 12.5. Information related to the radiation protection program itself, including procedures for the use of these sources, is also described in VEGP COL FSAR Chapter 12. In addition, VEGP COL FSAR Section 13.4 states that the radiation protection program will be implemented according to the milestones listed in VEGP COL FSAR Table 13.4-201, Item 10. These milestones ensure that those portions of the program necessary to comply with the requirements of 10 CFR Parts 20, 30, 40, and 70, are implemented prior to the receipt of byproduct, source, SNM, or fuel, onsite.

The staff finds that the information provided by the applicant that describes the radiation protection measures (Chapter 12 of the VEGP COL FSAR) that will be implemented prior to receipt of byproduct, source or SNM, conforms to the applicable guidance in NUREG-1556, "Consolidated Guidance about Materials Licenses," and is therefore acceptable. The radiation protection program milestones included in the VEGP COL FSAR Table 13.4-201 are evaluated in Section 12.5 of this SER.

In a letter dated July 9, 2010, the applicant provided supplemental information relative to Item 14, Emergency Planning, in VEGP COL FSAR Table 13.4-201. Specifically, the applicant proposed to revise the term 'portions applicable to SNM' to 'portions applicable to radioactive materials' for Item 14; Item 8, Fire

Protection Program; Item 11, Non-License Plant Staff Training Program; and Item 15, Physical Security Program. In addition, the applicant proposed to revise the correct references to regulatory citations of 10 CFR 30.32, "Application for specific licenses"; 10 CFR 40.31, "Application for specific licenses"; and 10 CFR 70.22, "Contents of applications." It also proposed to revise the "Requirements" column for Item 14 of the VEGP COL FSAR Table 13.4-201 to reference 10 CFR 30.32(i)(1), 10 CFR 40.31(j)(1), and 10 CFR 70.22(i)(1). It also proposed to revise Part 10 of the VEGP COL application, Proposed License Condition 3, "Operational Program Implementation," Section C, "Receipt of Materials," to include implementation of the portions of the emergency planning program applicable to SNM. In addition to the evaluation of the implementation milestones noted above, the staff's evaluation that supports the issuance of the 10 CFR Parts 30, 40, and 70 licenses is addressed in Chapter 9 (new fuel storage, spent fuel storage, and the fire protection program) and in Chapter 13 (security program).

The operational programs are specific programs that are required by regulations. VEGP COL FSAR Table 13.4-201 lists each operational program, the regulatory source for the program, the section of the FSAR in which the operational program is described, and the associated implementation milestone(s). The applicant proposed a license condition in Part 10, License Condition 3, Item C.3 of the VEGP COL application, which provides the milestones for implementing the portions of the non-licensed plant staff training program applicable to receipt of the radioactive material. However, Table 13.4-201 specifies implementation requirements (10 CFR 30.32(a), 10 CFR 40.31(a), and 10 CFR 70.22(a)) for the non-licensed plant staff training program associated with receipt of the radioactive material. Therefore, the staff determined that Item C.3 of proposed License Condition 3 is not needed because the implementation milestones for the non-licensed plant staff training program associated with receipt of radioactive material are governed by the applicable regulations.

The applicant proposed a license condition in Part 10 of the VEGP COL application to provide a schedule to support the NRC's inspection of operational programs, including the non-licensed plant staff training program applicable to receipt of the radioactive material. The proposed license condition is consistent with the policy established in SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," for operational programs and is acceptable.

In response to RAI 1.5-1, the applicant stated, in a letter dated October 15, 2010, that no byproduct material will be received, possessed, or used at AP1000 units of a physical form that is in unsealed form, on foils or plated sources, or sealed in glass, that exceeds the quantities in Schedule C of 10 CFR 30.72. Since the quantities do not exceed Schedule C, an emergency plan that meets the requirements of 10 CFR 30.32(i)(3) is not required. As such, the implementation of the emergency plan prior to the receipt of byproduct material will be removed from VEGP COL FSAR Table 13.4-201 and from Part 10 proposed License

*Condition 3, Item C.4. The request for a 10 CFR Part 40 license does not involve authorization to receive, possess, or use uranium hexafluoride in excess of 50 kilograms in a single container or 1000 kilograms total. Since the above quantities are not exceeded, an emergency plan for responding to the radiological hazards of an accidental release of source material and to any associated chemical hazards related to the material is not required. As such, the implementation of the emergency plan prior to the receipt of source material will be removed from VEGP COL FSAR Table 13.4-201. This applicant's proposal meets the requirements of 10 CFR 30.32 and 10 CFR 40.31 and is, therefore, acceptable. The incorporation of changes into a future revision of the VEGP COL FSAR is **Confirmatory Item 1.5-1**. The applicant also proposed an FSAR commitment to address the limitations during the period prior to the implantation of the emergency plan (prior to initial fuel loading, following the 10 CFR 52.103(g) finding). However, using the guidance of ISG-15, the staff has determined that the FSAR commitment is not sufficient and instead the staff is proposing to add a restriction in the license condition related to 10 CFR Parts 30 and 40.*

In RAI 1.5-3, the staff requested the applicant to review the requirements of 10 CFR 70.22(b) for the program addressing the control and accounting of SNM and provide descriptions of how the applicable requirements for material accounting and controls under 10 CFR Part 74 will be met for the possession and storage of SNM during construction and prior to the operation of the nuclear power plant. In addition, the staff requested the applicant to provide a proposed license condition to clearly establish full implementation of the material control and accounting program meeting the applicable requirements of 10 CFR Part 74 prior to receipt of SNM, consistent and concurrent with the proposed license condition for implementing the applicable security (i.e., physical protection) requirements of 10 CFR Part 73.

In response to RAI 1.5-3, the applicant, in a letter dated November 23, 2010, stated that all non-irradiated SNM for the AP1000 units is identified as Category III, SNM of low strategic significance, as defined in 10 CFR 74.4. No SNM at an AP1000 nuclear facility will exceed an uranium-235 isotope enrichment of 10 percent. The quantity of SNM will be documented, controlled, and communicated to the NRC as required in 10 CFR 74.13, 10 CFR 74.15, and 10 CFR 74.19.

In its response to RAI 1.5-3, the applicant also described the SNM MC&A program and stated that this program will be provided as an enclosure in the VEGP COL application, Part 11. The SNM MC&A program will be developed for control and accounting of SNM in accordance with the applicable requirements of 10 CFR Part 74, Subparts A and B. This program will be consistent with guidance of ANSI 15.8-2009, "Material Control Systems – Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants." The SNM MC&A program will be implemented prior to receipt of SNM at the plant site and will remain in effect until it is shipped from the plant site. The procedures constituting the SNM MC&A program will delineate the requirements,

responsibilities, and methods of SNM control necessary to address the following programmatic elements:

- 1. Establish, maintain, and follow written material control and accounting procedures to account for SNM.*
- 2. Maintain adequate records of the initial receipt or current inventory of SNM, including records of isotopic content, material received, material shipped, and material lost (material balance reports and physical inventory listing reports).*
- 3. Develop adequate inventory procedures and maintain adequate perpetual inventory records.*
- 4. Inventory SNM within the 12-month prescribed frequency.*
- 5. Report SNM inventories on the applicable forms.*
- 6. Establish an individual responsible for the control and accountability of SNM.*
- 7. Report the loss of or inability to find SNM items in a timely manner.*
- 8. Control access to SNM.*
- 9. Control the shipping and transfer of SNM.*

The applicant proposed to add a new FSAR Section 13.5.2.2.9, which will summarize the use of plant procedures to address material control and accounting of SNM. The applicant also stated that VEGP COL FSAR Table 13.4-201 will be revised to provide information related to implementation of the SNM MC&A program.

In order to address the applicable 10 CFR Part 74 material control and accounting requirements prior to power operation, the applicant proposed a license condition that will require implementation of a material control and accounting program prior to receipt of SNM on site. Implementation of the SNM MC&A program prior to SNM receipt will also address the SNM possession and storage requirements during construction and prior to operation of the nuclear power plant.

*The applicant's MC&A program for SNM is consistent with ANSI 15.8 and meets reporting and recordkeeping requirements of 10 CFR 74.11, 10 CFR 74.13, 10 CFR 74.15 and 10 CFR 74.19. The documentation, submitted by the applicant, for a program addressing the control and accounting of SNM provided descriptions of how the applicable requirements for material accounting and controls under 10 CFR Part 74 are met and, therefore, is acceptable, subject to the proposed revision to the VEGP COL application and the VEGP COL FSAR (**Confirmatory Item 1.5-2**). In addition, the proposed license condition includes a provision to provide a schedule to support the NRC's inspection of the material*

control and accounting of the SNM program. This is consistent with the policy established in SECY-05-0197 and is thus acceptable.

With respect to the physical security requirements, the applicant states that protection of SNM will be in accordance with the requirements of 10 CFR 73.67 and the applicant's Physical Security Plan and, therefore, is acceptable. [As discussed in Section 13.6 of this SER, the Physical Security Plan needs to be implemented prior to receipt of fuel onsite in accordance with 10 CFR 73.55.]

For the reasons discussed above, the staff proposes to include the following license conditions for the VCSNS COL, as they relate to authorization pursuant to regulations in 10 CFR Parts 30, 40, and 70:

- License Condition (1-1) - Subject to the conditions and requirements incorporated herein, the Commission hereby licenses SCE&G:
 - (a) (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;
 - (b) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, such byproduct, source, and special nuclear material as: sealed neutron sources for reactor startup; sealed sources for reactor instrumentation and radiation monitoring equipment calibration; and fission detectors in amounts that do not exceed the quantities in Schedule C of 10 CFR 30.72 and that do not include uranium hexafluoride in excess of 50 Kilograms in a single container or 1000 Kilograms total;
 - (c) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as restricted by Section (b) above, any byproduct, source, or special nuclear material that is not in (1) unsealed form; (2) on foils or plated surfaces, or (3) sealed in glass, for sample analysis or instrument calibration or other activities associated with radioactive apparatus or components; and
 - (d) 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.

- License Condition (1-2) - Prior to initial receipt of special nuclear materials onsite, the licensee shall implement the SNM Material Control and Accounting program.
- License Condition (1-3) - The licensee shall submit to the Director of NRO, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of the SNM Material Control and Accounting program. The schedule shall be updated every 6 months until 12 months before scheduled fuel load, and every month thereafter until the SNM Material Control and Accounting program has been fully implemented.
- License Condition (1-4) – The licensee shall submit to the Director of NRO, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspection of the non-licensed plant staff training program. The schedule shall be updated every 6 months until 12 months before scheduled fuel load, and every month thereafter until either the non-licensed plant staff training program has been fully implemented or the plant has been placed in commercial service, whichever comes first.