

1.0 Introduction

Under the Nuclear Regulatory Commission's (NRC) environmental protection regulations in Title 10 of the Code of Federal Regulations (CFR) Part 51, which implement the National Environmental Policy Act of 1969 (NEPA), renewal of a nuclear power plant operating license (OL) requires the preparation of an environmental impact statement (EIS). In preparing the EIS, the NRC staff is required first to issue the statement in draft form for public comment, and then issue a final statement after considering public comments on the draft. To support the preparation of the EIS, the staff has prepared a *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999)^(a). The GEIS is intended to (1) provide an understanding of the types and severity of environmental impacts that may occur as a result of license renewal of nuclear power plants under 10 CFR Part 54, (2) identify and assess the impacts that are expected to be generic to license renewal, and (3) support 10 CFR Part 51 to define the number and scope of issues that need to be addressed by the applicants in plant-by-plant renewal proceedings. Use of the GEIS guides the preparation of complete plant-specific information in support of the OL renewal process.

The South Carolina Electric and Gas Company (SCE&G) operates Virgil C. Summer Nuclear Power Station (V.C. Summer) in South Carolina on behalf of itself and of the South Carolina Public Service Authority (Santee Cooper), which has a one-third non-operating interest in the station. SCE&G operates V.C. Summer under OL NPF-12, which was issued by the NRC. This OL will expire on August 6, 2022. On August 6, 2002, SCE&G submitted an application to the NRC to renew the V.C. Summer OL for an additional 20 years under 10 CFR Part 54. SCE&G is a *licensee* for the purposes of its current OL and an *applicant* for the renewal of the OL. Pursuant to 10 CFR 54.23 and 51.53(c), SCE&G submitted an Environmental Report (ER) (SCE&G 2002a) in which SCE&G analyzed the environmental impacts associated with the proposed license renewal action, considered alternatives to the proposed action, and evaluated mitigation measures for reducing adverse environmental effects.

This report is the draft plant-specific supplement to the GEIS (the supplemental EIS [SEIS]) for the SCE&G license renewal application. This draft SEIS is a supplement to the GEIS because it relies, in part, on the findings of the GEIS. The staff will also prepare a separate safety evaluation report in accordance with 10 CFR Part 54.

(a) The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

1.1 Report Contents

The following sections of this introduction (1) describe the background for the preparation of this SEIS, including the development of the GEIS and the process used by the staff to assess the environmental impacts associated with license renewal, (2) describe the proposed Federal action to renew the V.C. Summer OL, (3) discuss the purpose and need for the proposed action, and (4) present the status of SCE&G's compliance with environmental quality standards and requirements that have been imposed by Federal, State, regional, and local agencies that are responsible for environmental protection.

The ensuing chapters of this SEIS closely parallel the contents and organization of the GEIS. Chapter 2 describes the site, power plant, and interactions of the plant with the environment. Chapters 3 and 4, respectively, discuss the potential environmental impacts of plant refurbishment and plant operation during the renewal term. Chapter 5 contains a summary of the evaluation of potential environmental impacts of plant accidents and includes consideration of severe accident mitigation alternatives (SAMAs); a more detailed discussion of SAMAs is in Appendix G. Chapter 6 discusses the uranium fuel cycle and solid waste management. Chapter 7 discusses decommissioning, and Chapter 8 discusses alternatives to license renewal. Finally, Chapter 9 summarizes the findings of the preceding chapters and draws conclusions about the adverse impacts that cannot be avoided, the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity, and the irreversible or irretrievable commitment of resources. The final chapter also presents the staff's preliminary recommendation with respect to the proposed license renewal action.

Additional information is included in appendices. Appendix A contains public comments received on the environmental review for license renewal and staff responses. Appendices B through G, respectively, list the following:

- the preparers of the supplement,
- the chronology of correspondence between NRC and SCE&G with regard to this SEIS,
- the organizations contacted during the development of this SEIS,
- SCE&G's compliance status in Table E-1 (this appendix also contains copies of consultation correspondence prepared and issued during the evaluation process),
- GEIS environmental issues that are not applicable to V.C. Summer, and
- SAMAs.

1.2 Background

Use of the GEIS, which examines the possible environmental impacts that could occur as a result of renewing individual nuclear power plant OLs under 10 CFR Part 54, and the established license renewal evaluation process supports the thorough evaluation of the impacts of renewal of OLs.

1.2.1 Generic Environmental Impact Statement

The NRC initiated a generic assessment of the environmental impacts associated with the license renewal term to improve the efficiency of the license renewal process by documenting the assessment results and codifying the results in the Commission's regulations. This assessment is provided in the GEIS, which serves as the principal reference for all nuclear power plant license renewal EISs.

The GEIS documents the results of the systematic approach that was taken to evaluate the environmental consequences of renewing the licenses of individual nuclear power plants and operating them for an additional 20 years. For each potential environmental issue, the GEIS (1) describes the activity that affects the environment, (2) identifies the population or resource that is affected, (3) assesses the nature and magnitude of the impact on the affected population or resource, (4) characterizes the significance of the effect for both beneficial and adverse effects, (5) determines whether the results of the analysis apply to all plants, and (6) considers whether additional mitigation measures would be warranted for impacts that would have the same significance level for all plants.

The NRC's standard of significance was established using the Council on Environmental Quality terminology for "significantly" (40 CFR 1508.27, which requires consideration of both "context" and "intensity"). Using the Council on Environmental Quality terminology, the NRC established three significance levels—SMALL, MODERATE, or LARGE. The definitions of the three significance levels are set forth in the footnotes to Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, as follows:

SMALL - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE - Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

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1 LARGE - Environmental effects are clearly noticeable and are sufficient to destabilize
2 important attributes of the resource.

3
4 The GEIS assigns a significance level to each environmental issue, assuming that ongoing
5 mitigation measures would continue.

6
7 The GEIS includes a determination of whether the analysis of the environmental issue could be
8 applied to all plants and whether additional mitigation measures would be warranted. Issues
9 are then assigned a Category 1 or a Category 2 designation. As set forth in the GEIS,
10 **Category 1** issues are those that meet all of the following criteria:

11
12 (1) The environmental impacts associated with the issue have been determined to apply either
13 to all plants or, for some issues, to plants having a specific type of cooling system or other
14 specified plant or site characteristic.

15
16 (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the
17 impacts (except for collective offsite radiological impacts from the fuel cycle and from high-
18 level waste [HLW] and spent fuel disposal).

19
20 (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis,
21 and it has been determined that additional plant-specific mitigation measures are likely not
22 to be sufficiently beneficial to warrant implementation.

23
24 For issues that meet the three Category 1 criteria, no additional plant-specific analysis is
25 required in this SEIS unless new and significant information is identified.

26
27 **Category 2** issues are those that do not meet one or more of the criteria of Category 1 and,
28 therefore, additional plant-specific review for these issues is required.

29
30 In the GEIS, the staff assessed 92 environmental issues and determined that 69 qualified as
31 Category 1 issues, 21 qualified as Category 2 issues, and 2 issues were not categorized. The
32 latter two issues, environmental justice and chronic effects of electromagnetic fields, are to be
33 addressed in a plant-specific analysis. Of the 92 issues, 11 are related only to refurbishment,
34 6 are related only to decommissioning, 67 apply only to operation during the renewal term, and
35 8 apply to both refurbishment and operation during the renewal term. A summary of the
36 findings for all 92 issues in the GEIS is codified in Table B-1 of 10 CFR Part 51, Subpart A,
37 Appendix B.

1.2.2 License Renewal Evaluation Process

An applicant seeking to renew its OL is required to submit an ER as part of its application. The license renewal evaluation process involves careful review of the applicant's ER and assurance that all new and potentially significant information not already addressed in or available during the GEIS evaluation is identified, reviewed, and assessed to verify the environmental impacts of the proposed license renewal.

In accordance with 10 CFR 51.53(c)(2) and (3), the ER submitted by the applicant must

- provide an analysis of the Category 2 issues in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B in accordance with 10 CFR 51.53(c)(3)(ii) and
- discuss actions to mitigate any adverse impacts associated with the proposed action and environmental impacts of alternatives to the proposed action.

In accordance with 10 CFR 51.53(c)(2), the ER does not need to

- consider the economic benefits and costs of the proposed action and alternatives to the proposed action except insofar as such benefits and costs are either (1) essential for making a determination regarding the inclusion of an alternative in the range of alternatives considered or (2) relevant to mitigation,
- consider the need for power and other issues not related to the environmental effects of the proposed action and the alternatives,
- discuss any aspect of the storage of spent fuel within the scope of the generic determination in 10 CFR 51.23(a) in accordance with 10 CFR 51.23(b), and
- contain an analysis of any Category 1 issue unless there is significant new information on a specific issue—this is pursuant to 10 CFR 51.23(c)(3)(iii) and (iv).

New and significant information is (1) information that identifies a significant environmental issue not covered in the GEIS and codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B or (2) information that was not considered in the analyses summarized in the GEIS and that leads to an impact finding that is different from the finding presented in the GEIS and codified in 10 CFR Part 51.

In preparing to submit its application to renew the V.C. Summer OL, SCE&G developed a process to ensure that information not addressed in or available during the GEIS evaluation

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1 regarding the environmental impacts of license renewal for V.C. Summer would be properly
2 reviewed before submitting the ER, and to ensure that such new and potentially significant
3 information related to renewal of the license for V.C. Summer would be identified, reviewed,
4 and assessed during the period of NRC review. SCE&G reviewed the Category 1 issues that
5 appear in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, to verify that the conclusions of
6 the GEIS remained valid with respect to V.C. Summer. This review was performed by
7 personnel from SCE&G and its support organization who were familiar with NEPA issues and
8 the scientific disciplines involved in the preparation of a license renewal ER.

9
10 The NRC staff also has a process for identifying new and significant information. That process
11 is described in detail in *Standard Review Plans for Environmental Reviews for Nuclear Power
12 Plants, Supplement 1: Operating License Renewal*, NUREG-1555, Supplement 1 (NRC 2000).
13 The search for new information includes (1) review of an applicant's ER and the process for
14 discovering and evaluating the significance of new information; (2) review of records of public
15 comments; (3) review of environmental quality standards and regulations; (4) coordination with
16 Federal, State, and local environmental protection and resource agencies; and (5) review of the
17 technical literature. New information discovered by the staff is evaluated for significance using
18 the criteria set forth in the GEIS. For Category 1 issues where new and significant information
19 is identified, reconsideration of the conclusions for those issues is limited in scope to the
20 assessment of the relevant new and significant information; the scope of the assessment does
21 not include other facets of the issue that are not affected by the new information.

22
23 Chapters 3 through 7 discuss the environmental issues considered in the GEIS that are
24 applicable to V.C. Summer. At the beginning of the discussion of each set of issues, there is a
25 table that identifies the issues to be addressed and lists the sections in the GEIS where the
26 issue is discussed. Category 1 and Category 2 issues are listed in separate tables. For
27 Category 1 issues for which there is no new and significant information, the table is followed by
28 a set of short paragraphs that state the GEIS conclusion codified in Table B-1 of 10 CFR
29 Part 51, Subpart A, Appendix B, followed by the staff's analysis and conclusion. For Category 2
30 issues, in addition to the list of GEIS sections where the issue is discussed, the tables list the
31 subparagraph of 10 CFR 51.53(c)(3)(ii) that describes the analysis required and the draft SEIS
32 sections where the analysis is presented. The draft SEIS sections that discuss the Category 2
33 issues are presented immediately following the table.

34
35 The NRC prepares an independent analysis of the environmental impacts of license renewal
36 and compares these impacts with the environmental impacts of alternatives. The evaluation of
37 the SCE&G license renewal application began with publication of a notice of acceptance for
38 docketing and opportunity for a hearing in the *Federal Register* (67 FR 62272 [NRC 2002a]) on
39 October 4, 2002. The staff published a notice of intent to prepare an EIS and conduct scoping
40 (67 FR 65612 [NRC 2002b]) on October 25, 2002. Two public scoping meetings were held on

1 December 11, 2002, in Jenkinsville, South Carolina. Comments received during the scoping
2 period were summarized in the *Environmental Scoping Summary Report, V.C. Summer Nuclear*
3 *Station, Fairfield County, South Carolina* (NRC 2003) dated January 14, 2003. Comments that
4 are applicable to this environmental review are presented in Part 1 of Appendix A.

5
6 The staff followed the review guidance contained in NUREG-1555, Supplement 1, in the
7 *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1:*
8 *Operating License Renewal* (NRC 2000). The staff and contractors retained to assist the staff
9 visited the V.C. Summer site on December 10 and 11, 2002, to gather information and to
10 become familiar with the site and its environs. The staff also reviewed the comments received
11 during scoping and consulted with Federal, State, regional, and local agencies. A list of the
12 organizations contacted is provided in Appendix D. Other documents related to V.C. Summer
13 were reviewed and are referenced.

14
15 This draft SEIS presents the staff's analysis that considers and weighs the environmental
16 effects of the proposed renewal of the OL for V.C. Summer, the environmental impacts of
17 alternatives to license renewal, and mitigation measures available for avoiding adverse
18 environmental effects. Chapter 9, "Summary and Conclusions," provides the NRC staff's
19 preliminary recommendation to the Commission on whether or not the adverse environmental
20 impacts of license renewal are so great that preserving the option of license renewal for energy-
21 planning decisionmakers would be unreasonable.

22
23 A 75-day comment period will begin on the date of publication of the U.S. Environmental
24 Protection Agency FR Notice of Filing of the draft SEIS to allow members of the public to
25 comment on the preliminary results of the NRC staff's review. During this comment period, two
26 public meetings will be held in Jenkinsville, South Carolina, in August 2003. During these
27 meetings, the staff will describe the preliminary results of the NRC environmental review and
28 answer questions related to it to provide members of the public with information to assist them
29 in formulating their comments.

30 31 **1.3 The Proposed Federal Action**

32
33 The proposed Federal action is renewal of the OL for V.C. Summer. V.C. Summer is located in
34 north-central South Carolina, in Fairfield County, approximately 42 km (26 mi) northwest of
35 Columbia, South Carolina. The current OL for V.C. Summer expires on August 6, 2022. By
36 letter dated August 6, 2002, SCE&G submitted an application to the NRC (SCE&G 2002b) to
37 renew this OL for an additional 20 years of operation (i.e., until August 6, 2042).

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1 The plant has one Westinghouse-designed pressurized light-water reactor, with a design rating
2 for a net electrical power output of 966 megawatts electric [MW(e)]. Plant cooling is provided
3 by a once-through cooling water system that dissipates heat primarily by discharge into
4 Monticello Reservoir. V.C. Summer produces electricity to supply the needs of more than
5 13,000 homes.
6

7 **1.4 The Purpose and Need for the Proposed Action**

8
9 Although a licensee must have a renewed license to operate a reactor beyond the term of the
10 existing OL, the possession of that license is just one of a number of conditions that must be
11 met for the licensee to continue plant operation during the term of the renewed license. Once
12 an OL is renewed, State regulatory agencies and the owners of the plant will ultimately decide
13 whether the plant will continue to operate based on factors such as the need for power or other
14 matters within the State's jurisdiction or the purview of the owners.
15

16 Thus, for license renewal reviews, the NRC has adopted the following definition of purpose and
17 need (GEIS Section 1.3):
18

19 The purpose and need for the proposed action (renewal of an operating license) is to
20 provide an option that allows for power generation capability beyond the term of a
21 current nuclear power plant operating license to meet future system generating needs,
22 as such needs may be determined by State, utility, and where authorized, Federal (other
23 than NRC) decisionmakers.
24

25 This definition of purpose and need reflects the Commission's recognition that, unless there are
26 findings in the safety review required by the Atomic Energy Act of 1954 or findings in the NEPA
27 environmental analysis that would lead the NRC to reject a license renewal application, the
28 NRC does not have a role in the energy-planning decisions of State regulators and utility
29 officials as to whether a particular nuclear power plant should continue to operate. From the
30 perspective of the licensee and the State regulatory authority, the purpose of renewing an OL is
31 to maintain the availability of the nuclear plant to meet system energy requirements beyond the
32 current term of the plant's license.
33

34 **1.5 Compliance and Consultations**

35
36 SCE&G is required to hold certain Federal, State, and local environmental permits, as well as
37 meet relevant Federal and State statutory requirements. In its ER, SCE&G provided a list of
38 the authorizations from Federal, State, and local authorities for current operations as well as
39 environmental approvals and consultations associated with V.C. Summer license renewal.

1 Authorizations and consultations relevant to the proposed OL renewal action are included in
2 Appendix E.

3
4 The staff has reviewed SCE&G's authorizations and consultations and has consulted with the
5 appropriate Federal, State, and local agencies to identify any compliance or permit issues or
6 significant environmental issues of concern to the reviewing agencies. These agencies did not
7 identify any new and significant environmental issues. The ER states that SCE&G is in
8 compliance with applicable environmental standards and requirements for V.C. Summer. The
9 staff has not identified any environmental issues that are both new and significant.

10 11 **1.6 References**

12
13 10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental
14 Protection Regulations for Domestic Licensing and Related Regulatory Functions."

15
16 10 CFR Part 54. Code of Federal Regulations, Title 10, *Energy*, Part 54, "Requirements for
17 Renewal of Operating Licenses for Nuclear Power Plants."

18
19 40 CFR Part 1508. Code of Federal Regulations, Title 40, *Protection of Environment*, Part
20 1508, "Terminology and Index."

21
22 Atomic Energy Act of 1954 (AEA). 42 USC 2011, et seq.

23
24 National Environmental Policy Act of 1969 (NEPA). 42 USC 4321, et seq.

25
26 South Carolina Electric and Gas Company (SCE&G). 2002a. *Virgil C. Summer Nuclear Station*
27 *License Renewal Application*. "Appendix E, Environmental Report." Docket Number 50/395;
28 License Number NPF-12. Jenkinsville, South Carolina.

29
30 South Carolina Electric and Gas Company (SCE&G). 2002b. *License Renewal Application for*
31 *Virgil C. Summer Nuclear Station*, V.C. Summer Nuclear Station. Jenkinsville, South Carolina.

32
33 U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement*
34 *for License Renewal of Nuclear Plants*. NUREG-1437, Volumes 1 and 2. Washington, D.C.

35
36 U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement*
37 *for License Renewal of Nuclear Plants Main Report*, "Section 6.3 – Transportation, Table 9.1,
38 Summary of findings on NEPA issues for license renewal of nuclear power plants, Final
39 Report." NUREG-1437, Volume 1, Addendum 1. Washington, D.C.

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- 1 U.S. Nuclear Regulatory Commission (NRC). 2000. *Standard Review Plans for Environmental*
2 *Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*. NUREG-1555,
3 Supplement 1, Washington, D.C.
4
- 5 U.S. Nuclear Regulatory Commission (NRC). 2002a. "South Carolina Electric and Gas
6 Company, Virgil C. Summer Nuclear Station; Notice of Acceptance for Docketing of the
7 Application and Notice of Opportunity for a Hearing Regarding Renewal of License No. NPF-12
8 for an Additional Twenty-Year Period." *Federal Register*. Vol. 67, No. 193, pp. 62272-62273.
9 October 4, 2002.
10
- 11 U.S. Nuclear Regulatory Commission (NRC). 2002b. "Notice of Intent to Prepare an
12 Environmental Impact Statement and Conduct Scoping Process." *Federal Register*. Vol. 67,
13 No. 207, pp. 65612-65613. October 25, 2002.
14
- 15 U.S. Nuclear Regulatory Commission (NRC). 2003. *Environmental Scoping Summary Report*
16 *V.C. Summer Nuclear Station, Fairfield County, South Carolina*. Rockville, MD. (January 14,
17 2003).