1.0 Introduction

Under the Nuclear Regulatory Commission's (NRC's) environmental protection regulations in Title 10 of the Code of Federal Regulations (CFR) Part 51, which implement the National Environmental Policy Act (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. The GEIS guides the preparation of complete plant-specific information in support of the OL renewal process.

The Virginia Electric and Power Company (VEPCo) operates Surry Power Station, Units 1 and 2, in southeastern Virginia under OLs DPR-32 and DPR-37, which were issued by the NRC. These OLs will expire on May 25, 2012, for Unit 1 and January 29, 2013, for Unit 2. On May 29, 2001, VEPCo submitted an application to the NRC to renew the Surry Power Station, Units 1 and 2 OLs for an additional 20 years under 10 CFR Part 54. The application also included renewal for North Anna Power Station in Louisa, Virginia. A separate environmental evaluation is being conducted for North Anna Power Station. VEPCo is a *licensee* for the purposes of its current OLs and an *applicant* for the renewal of the OLs. Pursuant to 10 CFR 54.23 and 51.53(c), VEPCo submitted an Environmental Report (ER; VEPCo 2001), in which VEPCo 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 plant-specific supplement to the GEIS (i.e., the supplemental EIS [SEIS]) for the VEPCo license renewal application. This 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 Surry Power Station, Units 1 and 2 OLs, (3) discuss the purpose and need for the proposed action, and (4) present the status of VEPCo'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 an evaluation of potential environmental impacts of plant accidents and includes consideration of severe accident mitigation alternatives. 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 any 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 any 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 appendixes. Appendix A contains public comments received on the environmental review for license renewal and staff responses. Appendixes B through F, respectively, list the following:

- the preparers of the supplement
- the chronology of correspondence between NRC and VEPCo with regard to this SEIS
- the organizations contacted during the development of this SEIS
- VEPCo's compliance status in Table E-1 (this appendix also contains copies of consultation correspondence prepared and sent during the evaluation process)
- GEIS environmental issues that are not applicable to Surry Power Station, Units 1 and 2.

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 support 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 of impacts was established using the Council on Environmental Quality (CEQ) terminology for "significantly" (40 CFR 1508.27, which requires consideration of both "context" and "intensity"). Using the CEQ terminology, the NRC established three significance levels: SMALL, MODERATE, or LARGE. The definitions of the three significance levels are set forth in a footnote 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.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

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

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

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

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

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

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

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

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

1.2.2 License Renewal Evaluation Process

An applicant seeking to renew its OLs 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)

- 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)

- 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 Surry Power Station, Units 1 and 2 OLs, VEPCo developed a process to ensure that information not addressed in or available during the GEIS evaluation regarding the environmental impacts of license renewal for Surry Power Station, Units 1 and 2, would be properly reviewed before submitting the ER. VEPCo also ensured such new and potentially significant information related to renewal of the licenses for Units 1 and 2 would be identified, reviewed, and assessed during the period of NRC review. VEPCo reviewed the Category 1 issues that appear in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, to verify that the conclusions of the GEIS remained valid with respect to

Surry Power Station, Units 1 and 2. This review was performed by personnel from VEPCo and its support organization who were familiar with NEPA issues and the scientific disciplines involved in the preparation of a license renewal ER.

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

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

The NRC prepares an independent analysis of the environmental impacts of license renewal and compares these impacts with the environmental impacts of alternatives. The evaluation of the VEPCo license renewal application began with publication of a notice of acceptance for docketing and opportunity for a hearing in the Federal Register (FR; 66 FR 39213 [NRC 2001a]) on July 27, 2001. The staff published a notice of intent to prepare an EIS and conduct scoping (66 FR 42897 [NRC 2001b]) for Surry Power Station on August 15, 2001. Two public scoping meetings were held on September 19, 2001, in Surry, Virginia. Comments received during the scoping period were summarized in the *Environmental Impact Statement Scoping Process: Summary Report – Surry Power Station, Units 1 and 2, Virginia* (NRC 2002), dated January 16, 2002. Comments that are applicable to this environmental review are presented in Part I of Appendix A.

The staff followed the review guidance contained in *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*, NUREG-1555, Supplement 1 (NRC 2000). The staff and its contractors retained to assist the staff visited the Surry Power Station on September 19 and 20, 2001, to gather information and to become familiar with the site and its environs. The staff also reviewed the comments received during scoping and consulted with Federal, State, regional, and local agencies. A list of the organizations consulted is provided in Appendix D. Other documents related to Surry Power Station, Units 1 and 2 were reviewed and are referenced.

On April 26, 2002, the U.S. Environmental Protection Agency (EPA) published the Notice of Availability of the draft SEIS (67 FR 20763; EPA 2002). A 75-day comment period began on that date during which members of the public could comment on the preliminary results of the NRC staff's review. During this comment period, two public meetings were held in Surry, Virginia, on May 29, 2002. During these meetings, the staff described the preliminary results of the NRC environmental review and answered questions related to it to provide members of the public with information to assist them in formulating their comments. The comment period for the Surry Units 1 and 2 draft SEIS ended July 12, 2002. Comments made during the 75-day comment period, including those made at the two public meetings, are presented in Part II of Appendix A. The NRC responses to these comments are also provided.

This SEIS presents the staff's analysis in which the staff considers and weighs the environmental effects of the proposed renewal of the OLs for Surry Power Station, Units 1 and 2, the environmental impacts of alternatives to license renewal, and mitigation measures available for avoiding adverse environmental effects. Chapter 9, "Summary and Conclusions," provides the NRC staff's recommendation to the Commission on whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable.

1.3 The Proposed Federal Action

The proposed Federal action is renewal of the OLs for Surry Power Station, Units 1 and 2. The Surry Power Station is located in the southeastern part of Virginia, on the James River, across from Jamestown and Williamsburg, Virginia.

The current OL for Unit 1 expires on May 25, 2012, and for Unit 2 on January 29, 2013. By letter dated May 29, 2001, VEPCo submitted an application to the NRC (VEPCo 2001) to renew these OLs for an additional 20 years of operation (i.e., until May 25, 2032, for Unit 1 and January 29, 2033, for Unit 2). The plant has two Westinghouse-designed light-water reactors, each with a design rating for a gross electrical power output of 855 megawatts electric (MW[e]). Plant cooling is provided by a once-through cooling system to remove waste heat from the

reactor-steam electric system. Cooling water is withdrawn from the James River. Units 1 and 2 produce electricity to supply the needs of more than 400,000 homes.

1.4 The Purpose and Need for the Proposed Action

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

Thus, for license renewal reviews, the NRC has adopted the following definition of purpose and need (GEIS Section 1.3 [NRC 1996]):

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

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

1.5 Compliance and Consultations

VEPCo is required to hold certain Federal, State, and local environmental permits, as well as meet relevant Federal and State statutory requirements. In its ER, VEPCo provided a list of the authorizations from Federal, State, and local authorities for current operations as well as environmental approvals and consultations associated with Surry Power Station, Units 1 and 2, license renewal. Authorizations and consultations most relevant to the proposed OL renewal action are summarized in Table 1-1. The full list of authorizations and consultations provided by VEPCo is included in Appendix E.

Table 1-1. Federal, State, and Local Authorizations and Consultations

Agency	Authority	Requirement	Number	Permit Expiration or Consultation Date	Activity Covered
NRC	Atomic Energy Act, 10 CFR Part 50	Operating license	DPR-32 (Unit 1) DPR-37 (Unit 2)	May 25, 2013 (Unit 1) January 29, 2013 (Unit 2)	Operation of Surry Power Station, Units 1 and 2
FWS and NMFS	Endangered Species Act, Section 7	Consultation	NA	NRC letter to FWS (January 24, 2002); NMFS letter to VEPCo (March 23, 2001)	Operation during the renewal term
FWS	Migratory Bird Treaty Act	Permit	MB705136-0	March 31, 2003	Removal of osprey nests causing safety hazards
USCOE	FWPCA, Section 404	Permit	97-RP-19, Project 99-V1336; VMRC 92-1347	August 8, 2003	Periodic dredging to maintain intake channel in the James River.
VMRC	COV Title 28.2			December 31, 2002	
VDEQ	FWPCA	NPDES permit and FWPCA Section 401 certification	VA0004090	November 1, 2006	Permit for plant and storm water discharges
VDEQ	9 VAC 25-610-40	Permit	GW0003900	August 1, 2009	Withdrawal of groundwater
VDEQ	9 VAC 5-20-160	Registration	50336	None	Annual re-certification of air emission sources
VDEQ	Coastal Zone Management Act, Section 307	Consistency determination	NA	Letter from VDEQ to VEPCo (February 20, 2002)	Compliance with the Virginia Coastal Program
VDHR	National Historic Preservation Act, Section 106	Consultation	NA	NRC letter to VDHR (January 3, 2002)	Impact on sites listed or eligible for listing in the National Register of Historic Places

COV - Code of Virginia
FWPCA - Federal Water Pollution Control Act (also known as the Clean Water Act)
FWS - U.S. Fish and Wildlife Service
NMFS - National Marine Fisheries Service
NPDES - National Pollutant Discharge Elimination System
NA - Not applicable
USCOE - U.S. Army Corps of Engineers
VAC - Virginia Administrative Code
VDEQ - Virginia Department of Environmental Quality
VDHR - Virginia Division of Historic Resources
VMRC - Virginia Marine Resources Commission

The staff has reviewed the list and consulted with the appropriate Federal, State, and local agencies to identify any compliance or permit issues or significant environmental issues of concern to the reviewing agencies. These agencies did not identify any new and significant environmental issues. The ER states that VEPCo is in compliance with applicable environmental standards and requirements for Surry Power Station, Units 1 and 2. The staff has also not identified any environmental issues that are both new and significant.

1.6 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

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

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

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

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

Coastal Zone Management Act (CZMA). 16 USC 1451, et seq.

Endangered Species Act (ESA). 16 USC 1531, et seq.

Federal Water Pollution Control Act. 33 USC 1251, et seq. (Also known as the Clean Water Act [CWA]).

Migratory Bird Treaty Act of 1918. 16 USC 703, et seq.

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

National Historic Preservation Act of 1966 (NHPA). 16 USC 470, et seq.

U.S. Environmental Protection Agency (EPA). 2002. "Notice of Availability of Environmental Impact Statements". Federal Register, Vol. 67, No. 81, pp. 20763-20764 (April 26, 2002).

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

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

U.S. Nuclear Regulatory Commission (NRC). 2000. *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*. NUREG-1555, Supplement 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2001a. "Virginia Electric Power Company, North Anna, Units 1 and 2, and Surry, Units 1 and 2, Notice of Acceptance for Docketing of the Application and Notice of Opportunity for a Hearing Regarding Renewal of License Nos. NPF-4, NPF-7, DPR-32, and DPR-37 for an Additional 20-Year Period." Federal Register: Vol. 66, No. 145, pp. 39213-39214 (July 27, 2001).

U.S. Nuclear Regulatory Commission (NRC). 2001b. "Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process." Federal Register: Vol. 66, No. 158, pp. 42897-42898 (August 15, 2001).

U.S. Nuclear Regulatory Commission (NRC). 2002. *Environmental Impact Statement Scoping Process: Summary Report – Surry Power Station Units 1 & 2, Surry, Virginia*. Washington, D.C.

Virginia Electric and Power Company (VEPCo). 2001. *Application for License Renewal for Surry Power Station, Units 1 and 2,* "Appendix E, Environmental Report - Operating License Renewal Stage." Richmond, Virginia.