

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 North Anna Power Station, Units 1 and 2, in central Virginia, under OLs NPF-4 and NPF-7 issued by the NRC. These OLs will expire on April 1, 2018, for Unit 1 and August 21, 2020, for Unit 2. On May 29, 2001, VEPCo submitted an application to the NRC to renew the North Anna Power Station, Units 1 and 2, OLs for an additional 20 years under 10 CFR Part 54. The application also included renewal for Surry Power Station in Surry, Virginia. A separate environmental evaluation is being conducted for Surry 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 draft 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 North Anna 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 North Anna Power Station, Units 1 and 2.

1.2 Background

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 thorough evaluation of the impacts of renewal of the 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.

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

3
4 The GEIS includes a determination of whether the analysis of the environmental issue could be
5 applied to all plants and whether additional mitigation measures would be warranted. Issues
6 are then assigned a Category 1 or a Category 2 designation. As set forth in the GEIS,
7 Category 1 issues are those that meet all of the following criteria:

- 8
9 (1) The environmental impacts associated with the issue have been determined to apply either
10 to all plants or, for some issues, to plants having a specific type of cooling system or other
11 specified plant or site characteristic.
12
13 (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the
14 impacts (except for collective offsite radiological impacts from the fuel cycle and from high-
15 level waste and spent fuel disposal).
16
17 (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis,
18 and it has been determined that additional plant-specific mitigation measures are likely not
19 to be sufficiently beneficial to warrant implementation.
20

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

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

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

36 **1.2.2 License Renewal Evaluation Process**

37
38 An applicant seeking to renew its OLS is required to submit an ER as part of its application.
39 The license-renewal evaluation process involves careful review of the applicant's ER and
40 assurance that all new and potentially significant information not already addressed in or

1 available during the GEIS evaluation is identified, reviewed, and assessed to verify the
2 environmental impacts of the proposed license renewal.

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

- 5
- 6 • provide an analysis of the Category 2 issues in Table B-1 of 10 CFR Part 51, Subpart A,
7 Appendix B in accordance with 10 CFR 51.53(c)(3)(ii)
- 8
- 9 • discuss actions to mitigate any adverse impacts associated with the proposed action and
10 environmental impacts of alternatives to the proposed action.
- 11

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

- 13
- 14 • consider the economic benefits and costs of the proposed action and alternatives to the
15 proposed action except insofar as such benefits and costs are either (1) essential for
16 making a determination regarding the inclusion of an alternative in the range of alternatives
17 considered, or (2) relevant to mitigation
- 18
- 19 • consider the need for power and other issues not related to the environmental effects of the
20 proposed action and the alternatives
- 21
- 22 • discuss any aspect of the storage of spent fuel within the scope of the generic
23 determination in 10 CFR 51.23(a) in accordance with 10 CFR 51.23(b)
- 24
- 25 • contain an analysis of any Category 1 issue unless there is significant new information on a
26 specific issue—this is pursuant to 10 CFR 51.23(c)(3)(iii) and (iv).
- 27

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

33
34 In preparing to submit its application to renew the North Anna Power Station, Units 1 and 2,
35 OLS, VEPCo developed a process to ensure that information not addressed in, or available,
36 during the GEIS evaluation regarding the environmental impacts of license renewal for North
37 Anna Power Station, Units 1 and 2, would be properly reviewed before submitting the ER and
38 that such new and potentially significant information related to renewal of the licenses for Units
39 1 and 2 would be identified, reviewed, and assessed during the period of NRC review. VEPCo
40 reviewed the Category 1 issues that appear in Table B-1 of 10 CFR Part 51, Subpart A,
41 Appendix B, to verify that the conclusions of the GEIS remained valid with respect to North

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1 Anna Power Station, Units 1 and 2. This review was performed by personnel from VEPCo and
2 its support organization who were familiar with NEPA issues and the scientific disciplines
3 involved in the preparation of a license-renewal ER.
4

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

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

30 The NRC prepares an independent analysis of the environmental impacts of license renewal
31 and compares these impacts with the environmental impacts of alternatives. The evaluation of
32 the VEPCo license-renewal application began with publication of a notice of acceptance for
33 docketing and opportunity for a hearing in the Federal Register (FR; 66 FR 39213 [NRC
34 2001a]) on July 27, 2001. The staff published a notice of intent to prepare an EIS and conduct
35 scoping (66 FR 46294 [NRC 2001b]) for North Anna on September 4, 2001. Two public
36 scoping meetings were held on October 18, 2001, in Louisa, Virginia. Comments received
37 during the scoping period were summarized in the *Environmental Impact Statement Scoping
38 Process: Summary Report – North Anna Power Station, Units 1 and 2, Virginia* (NRC 2002).
39 Comments that are applicable to this environmental review are presented in Part 1 of
40 Appendix A.
41

1 The staff followed the review guidance contained in *Standard Review Plans for Environmental*
2 *Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*, NUREG-1555,
3 Supplement 1 (NRC 2000). The staff and its contractors retained to assist the staff visited the
4 North Anna Power Station on October 17 and 18, 2001, to gather information and to become
5 familiar with the site and its environs. The staff also reviewed the comments received during
6 scoping and consulted with Federal, State, regional, and local agencies. A list of the organiza-
7 tions consulted is provided in Appendix D. Other documents related to North Anna Power
8 Station, Units 1 and 2, were reviewed and are referenced.

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

17
18 A 75-day comment period will begin on the date of publication of the U.S. Environmental
19 Protection Agency Notice of Filing of the draft SEIS to allow members of the public to comment
20 on the preliminary results of the NRC staff's review. During this comment period, two public
21 meetings will be held near North Anna Power Station in June 2002. During these meetings, the
22 staff will describe the preliminary results of the NRC environmental review and answer
23 questions related to it to provide members of the public with information to assist them in
24 formulating their comments.

25 26 **1.3 The Proposed Federal Action**

27
28 The proposed Federal action is renewal of the OLs for North Anna Power Station, Units 1 and
29 2. The North Anna Power Station is located in Louisa County in rural north-central Virginia.
30 The plant has two Westinghouse-designed light-water reactors, and each generating unit is
31 designed to operate at core power levels up to a net electrical output of approximately
32 895 MW(e). Plant cooling is provided by a once-through cooling system to remove waste heat
33 from the reactor-steam electric system. Cooling water is withdrawn from Lake Anna. Units 1
34 and 2 produce electricity to supply the needs of more than 450,000 homes. The current OL for
35 Unit 1 expires on April 1, 2018, and the OL for Unit 2 expires on August 21, 2020. By letter
36 dated May 29, 2001, VEPCo submitted an application to the NRC (VEPCo 2001) to renew
37 these OLs for an additional 20 years of operation (i.e., until April 1, 2038, for Unit 1 and
38 August 21, 2040, for Unit 2).

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 North Anna 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 | NPF-4 (Unit 1) NPF-7 (Unit 2) | April 1, 2018 (Unit 1) August 21, 2020 (Unit 2) | Operation of North Anna Power Station, Units 1 and 2 |
| FWS | Endangered Species Act, Section 7 | Consultation | NA | NRC letter to FWS (January 24, 2002) | Operation during the renewal term |
| FWS | Migratory Bird Treaty Act | Permit | MB705136-0 | December 31, 2001 | Removal of osprey nests causing safety hazards |
| VDEQ | FWPCA | NPDES permit and FWPCA Section 401 certification | VA0052451 | November 11, 2006 | Permit for plant and storm water discharges |
| VDEQ | 9 VAC 5-20-160 | Registration | 40726 | Annual recertification | Annual recertification of air emissions sources |
| VDEQ | 9 VAC 5-80-10 | Permit | None | None | New source review, emergency blackout generator |
| VDEQ | 9 VAC 5, Ch. 500 | Exclusionary general permit | None | None | Annual emissions from boilers, diesel generators, and blackout generator |
| VDEQ | Coastal Zone Management Act, Section 307 | Consistency determination | None | Letter from VDEQ to VEPCo (February 21, 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 |

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

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1 The staff has reviewed the list and consulted with the appropriate Federal, State, and local
2 agencies to identify any compliance or permit issues or significant environmental issues of
3 concern to the reviewing agencies. These agencies did not identify any new and significant
4 environmental issues. The ER states that VEPCo is in compliance with applicable environ-
5 mental standards and requirements for North Anna Power Station, Units 1 and 2. The staff has
6 also not identified any environmental issues that are both new and significant.
7

8 **1.6 References**

9
10 10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, “Domestic Licensing
11 of Production and Utilization Facilities.”

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

25
26 Endangered Species Act (ESA). 16 USC 1531, et seq.

27
28 Federal Water Pollution Control Act. 33 USC 1251, et seq. (Also known as the Clean Water
29 Act [CWA] of 1977).

30
31 Migratory Bird Treaty Act of 1918. 16 USC 703, et seq.

32
33 National Environmental Policy Act of 1969 (NEPA). 42 USC 4321, et seq.

34
35 National Historic Preservation Act of 1966 (NHPA). 16 USC 470, et seq.

36
37 U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement*
38 *for License Renewal of Nuclear Plants*. NUREG-1437, Volumes 1 and 2, Washington, D.C.
39

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

5
6 U.S. Nuclear Regulatory Commission (NRC). 2000. *Standard Review Plans for Environmental*
7 *Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*. NUREG-1555,
8 Supplement 1, Washington, D.C.

9
10 U.S. Nuclear Regulatory Commission (NRC). 2001a. “Virginia Electric Power Company, North
11 Anna, Units 1 and 2, and Surry, Units 1 and 2, Notice of Acceptance for Docketing of the
12 Application and Notice of Opportunity for a Hearing Regarding Renewal of License Nos. NPF-4,
13 NPF-7, DPR-32, and DPR-37 for an Additional 20-Year Period.” Federal Register: Vol. 66,
14 No. 145, pp. 39213-39214 (July 27, 2001).

15
16 U.S. Nuclear Regulatory Commission (NRC). 2001b. “Notice of Intent to Prepare an
17 Environmental Impact Statement and Conduct Scoping Process.” Federal Register: Vol. 66,
18 No. 171, pp. 46294-46295 (September 4, 2001).

19
20 U.S. Nuclear Regulatory Commission (NRC). 2002. *Environmental Impact Statement Scoping*
21 *Process: Summary Report – North Anna Power Station Units 1 & 2, Louisa, Virginia*.
22 Washington, D.C.

23
24 Virginia Administrative Codes (VAC). 1991. State Air Pollution Control Board, “Registration.”
25 9 VAC 5-20-160, Richmond, Virginia.

26
27 Virginia Administrative Codes (VAC). 1991. State Air Pollution Control Board, “Permits: New
28 and Modified Stationary Sources.” 9 VAC 5-80-10, Richmond, Virginia.

29
30 Virginia Administrative Codes (VAC). 1991. State Air Pollution Control Board, “Exclusionary
31 General Permit.” 9 VAC 5 Chapter 500, Richmond, Virginia.

32
33 Virginia Electric and Power Company (VEPCo). 2001. *Application for License Renewal for*
34 *North Anna Power Station, Units 1 and 2*, “Appendix E, Environmental Report - Operating
35 License Renewal Stage.” Richmond, Virginia.