

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. Use of the GEIS guides the preparation of complete plant-specific information in support of the OL renewal process.

Duke Energy Corporation (Duke)^(b) operates McGuire Nuclear Station, Units 1 and 2 (McGuire) in southwestern North Carolina under OLs NPF-9 and NPF-17, which were issued by the NRC. These OLs will expire in June 2021 for Unit 1 and in March 2023 for Unit 2. On June 13, 2001, Duke submitted an application to the NRC to renew the McGuire OLs for an additional 20 years under 10 CFR Part 54 (Duke 2001b). The application also included renewal for Catawba Nuclear Station in Rock Hill, South Carolina. A separate environmental evaluation is being conducted for Catawba Nuclear Station. Duke 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), Duke submitted an Environmental Report (ER) (Duke 2001a) in which Duke 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 McGuire 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.

(b) Duke Energy Corporation has held the license for McGuire Units 1 and 2 since **September 16, 1997**. Before this date, Duke Power Company held the license. Duke Power Company remains a division of Duke Energy Corporation.

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 OLS for McGuire; (3) discuss the purpose and need for the proposed action; and (4) present the status of Duke'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 the adverse impacts that cannot be avoided (the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and the irreversible or irretrievable commitment of resources). Chapter 9 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 to those comments. Appendixes B through F, respectively, list the following:

- the preparers of the supplement
- the chronology of correspondence between NRC and Duke with regard to this SEIS
- the organizations contacted during the development of this SEIS
- Duke's compliance status in Table E-1
- GEIS environmental issues that are not applicable to McGuire.

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 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.

In the GEIS, the staff 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 in the GEIS, the staff (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 (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 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.

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

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

3
4 In the GEIS, the staff includes a determination of whether the analysis of the environmental
5 issue could be applied to all plants and whether additional mitigation measures would be
6 warranted. Issues are then assigned a Category 1 or a Category 2 designation. As set forth in
7 the GEIS, **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 to
19 not 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 the 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 latter 2 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, 6
31 are related only to decommissioning, 67 apply only to operation during the renewal term, and 8
32 apply to both refurbishment and operation during the renewal term. A summary of the findings
33 for all 92 issues in the GEIS is codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B.

34 35 **1.2.2 License Renewal Evaluation Process**

36
37 An applicant seeking to renew its OLS is required to submit an ER as part of its application.
38 The license renewal evaluation process involves careful review of the applicant's ER and
39 assurance

1 that all new and potentially significant information not already addressed in or available during
2 the GEIS evaluation is identified, reviewed, and assessed to verify the environmental impacts of
3 the proposed license renewal.

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

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

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

- 14
15 • consider the economic benefits and costs of the proposed action and alternatives to the
16 proposed action except insofar as such benefits and costs are either (1) essential for
17 making a determination regarding the inclusion of an alternative in the range of
18 alternatives considered or (2) relevant to mitigation.
- 19
20 • consider the need for power and other issues not related to the environmental effects of
21 the proposed action and the alternatives.
- 22
23 • discuss any aspect of the storage of spent fuel within the scope of the generic
24 determination in 10 CFR 51.23(a) in accordance with 10 CFR 51.23(b).
- 25
26 • contain an analysis of any Category 1 issue unless there is significant new information
27 on a specific issue—this is pursuant to 10 CFR 51.53(c)(3)(iii) and (iv).

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

34
35 In preparing to submit its application to renew the McGuire OLS, Duke developed a process to
36 ensure that information not addressed in or available during the GEIS evaluation regarding the
37 environmental impacts of license renewal for McGuire would be properly reviewed before
38 submitting the ER and to ensure that such new and potentially significant information related to
39 renewal of the licenses for McGuire would be identified, reviewed, and assessed during the
40 period of NRC review. Duke reviewed the Category 1 issues that appear in Table B-1 of 10

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1 CFR Part 51, Subpart A, Appendix B, to verify that the conclusions of the GEIS remained valid
2 with respect to McGuire. This review was performed by personnel from Duke in consultation
3 with Federal (other than NRC), State, and local environmental and natural resource agencies.
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* (ESRP), NUREG-1555, Supplement 1
8 (NRC 2000). The search for new information includes (1) review of an applicant's ER and the
9 process for discovering and evaluating the significance of new information; (2) review of
10 records of public comments; (3) review of environmental quality standards and regulations; (4)
11 coordination with Federal, State, and local environmental protection and resource agencies;
12 and (5) review of the technical literature. New information discovered by the staff is evaluated
13 for significance using the criteria set forth in the GEIS. For Category 1 issues where new and
14 significant information is identified, reconsideration of the conclusions for those issues is limited
15 in scope to the assessment of the relevant new and significant information; the scope of the
16 assessment does not include other facets of the issue that are not affected by the new
17 information.
18

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

31 The NRC prepares an independent analysis of the environmental impacts of license renewal
32 and compares these impacts with the environmental impacts of alternatives. The evaluation of
33 the Duke license renewal application began with publication of a notice of acceptance for
34 docketing and opportunity for a hearing in the *Federal Register* (FR; 66 FR 42893 [NRC
35 2001a]) on August 15, 2001. The staff published a notice of intent to prepare an EIS and
36 conduct scoping (66 FR 44386 [NRC 2001b]) on August 23, 2001. Two public scoping
37 meetings were held on September 25, 2001, in Huntersville, North Carolina. Comments
38 received during the scoping periods were summarized in the *Environmental Impact Statement*
39 *Scoping Process: Summary Report – McGuire Units 1 and 2, Huntersville, North Carolina*

1 (NRC 2002). Comments that are applicable to this environmental review are presented in Part
2 1 of Appendix A.

3
4 The staff followed the review guidance contained in NUREG-1555, Supplement 1, in the
5 *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1:*
6 *Operating License Renewal* (NRC 2000). The staff and its contractors retained to assist the
7 staff visited the McGuire site on September 24, 2001, to gather information and to become
8 familiar with the site and its environs. The staff also reviewed the comments received during
9 scoping and consulted with Federal, State, regional, and local agencies. A list of the
10 organizations consulted is provided in Appendix D. Other documents related to McGuire were
11 reviewed and are referenced.

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

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

28 29 **1.3 The Proposed Federal Action**

30
31 The proposed Federal action is renewal of the OLs for McGuire. The McGuire Nuclear Station
32 is located in southwestern North Carolina, in northwestern Mecklenburg County on the shore of
33 Lake Norman, approximately 27 km (17 mi) north-northwest of Charlotte and 10 km (6 mi) west
34 of Huntersville. The plant has two Westinghouse-designed, pressurized, light-water reactors,
35 each with a design rating for a net electrical power output of approximately 1129 megawatts
36 electric (MW[e]). Water for the plant's once-through cooling system is drawn from and
37 discharged back into Lake Norman. McGuire produces electricity to supply the needs of more
38 than 619,000 homes. The current OL for Unit 1 expires on June 12, 2021, and that for Unit 2
39 on March 3, 2023. By letter dated June 13, 2001, Duke submitted an application to the NRC
40 (Duke 2001b) to renew these OLs for up to an additional 20 years of operation.

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 (NRC 1996, Section 1.3):

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

Duke is required to hold certain Federal, State, and local environmental permits, as well as meet relevant Federal and State statutory requirements. In the McGuire ER, Duke provided a list of the authorizations from Federal, State, and local authorities for current operations as well as environmental approvals and consultations associated with license renewal of McGuire. 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 Duke 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
1						
2						
3						
4	NRC	Atomic Energy Act, 10 CFR Part 50	Operating license	NPF-9 (Unit 1) NPF-17 (Unit 2)	June 12, 2021 (Unit 1) March 3, 2023 (Unit 2)	Operation of McGuire Units 1 and 2
5	FWS	Endangered Species Act, Section 7	Consultation	NA	Consultation initiated October 10, 2001	Operation during renewal term
6	NCDENR	Clean Water Act, Section 402	NPDES wastewater permit	NCOO24392	February 28, 2005	Permit for discharge of wastewater and once-through cooling water to discharge canal that empties into Lake Norman
7	NCDENR	Clean Water Act, Section 402	NPDES stormwater permit	NCS000020	February 28, 2005	Collection, treatment, and discharge of stormwater
8	Mecklenburg County	Clean Air Act, Section 112	Air emissions permit	00-019-269	Renewed annually	Emissions from diesel emergency generators, miscellaneous diesel engines, and other miscellaneous units
9	Department of Environmental Protection					
10						
11						
12						
13	NCDCR	National Historic Preservation Act, Section 106	Consultation	NA	Consultation initiated January 31, 2000	Impact on sites listed or eligible for listing in the National Register of Historic Places
14	FWS - U.S. Fish and Wildlife Service.					
15	NCDCR - North Carolina Department of Cultural Resources.					
16	NCDENR - North Carolina Department of Environment and Natural Resources.					
17	NPDES - National Pollutant Discharge Elimination System.					
18	NA - Not applicable.					
19						
20						

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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 McGuire ER states that Duke is in compliance with applicable
5 environmental standards and requirements for McGuire. The staff has also not identified any
6 environmental issues that are both new and significant.
7

8 **1.6 References**

9
10 10 CFR 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, “Environmental Protection
11 Regulations for Domestic Licensing and Related Regulatory Functions.”
12

13 10 CFR 54. Code of Federal Regulations, Title 10, *Energy*, Part 54, “Requirements for
14 Renewal of Operating Licenses for Nuclear Power Plants.”
15

16 40 CFR 1508. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 1508,
17 “Terminology and Index.”
18

19 Atomic Energy Act of 1954 (AEA). 42 USC 2011, et seq.
20

21 Clean Air Act (CAA). 42 USC 7401, et seq.
22

23 Duke Energy Corporation (Duke). 2001a. *Applicant’s Environmental Report – Operating*
24 *License Renewal Stage — McGuire Nuclear Station*. Charlotte, North Carolina.
25

26 Duke Energy Corporation (Duke). 2001b. *Application to Renew the Operating Licenses of*
27 *McGuire Nuclear Station, Units 1 and 2 and the Catawba Nuclear Station, Units 1 and 2*.
28 Charlotte, North Carolina.
29

30 Endangered Species Act (ESA). 16 USC 1531, et seq.
31

32 Federal Water Pollution Control Act. 33 USC 1251, et seq. (Also known as the Clean Water
33 Act [CWA]).
34

35 National Environmental Policy Act of 1969 (NEPA). 42 USC 4321, et seq.
36

37 National Historic Preservation Act of 1966 (NHPA). 16 USC 470, et seq.
38

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

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

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

12
13 U.S. Nuclear Regulatory Commission (NRC). 2001a. "Duke Energy Corporation, McGuire,
14 Units 1 and 2, and Catawba, Units 1 and 2; Notice of Acceptance for Docketing of the
15 Application and Notice of Opportunity for a Hearing Regarding Renewal of Facility Operating
16 License Nos. NPF-9, NPF-17, NPF-35, and NPF-52 for an Additional 20-Year Period." *Federal*
17 *Register*. Vol. 66, No. 158, pp. 42893-42894. August 15, 2001.

18
19 U.S. Nuclear Regulatory Commission (NRC). 2001b. "Duke Energy Corporation, McGuire
20 Nuclear Station, Units 1 and 2; Notice of Intent to Prepare an Environmental Impact Statement
21 and Conduct Scoping Process." *Federal Register*. Vol. 66, No. 164, pp. 44386-44388.
22 August 23, 2001.

23
24 U.S. Nuclear Regulatory Commission (NRC). 2002. *Environmental Impact Statement Scoping*
25 *Process: Summary Report — McGuire Nuclear Station Units 1 & 2, Huntersville, North*
26 *Carolina*. Washington, D.C.