Abstract

The U.S. Nuclear Regulatory Commission (NRC) considered the environmental effects of renewing nuclear power plant operating licenses for a 20-year period in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, and codified the results in 10 CFR Part 51. The GEIS (and its Addendum 1) identifies 92 environmental issues and reaches generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. Additional plant-specific review is required for the remaining issues. These plant-specific reviews are to be included in a supplement to the GEIS.

This draft supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted to the NRC by Southern Nuclear Operating Company (SNC) to renew the operating licenses (OLs) for Edwin I. Hatch Nuclear Plant (HNP), Units 1 and 2, for an additional 20 years under 10 CFR Part 54. This draft SEIS includes the staff's analysis that considers and weighs the environmental effects of the proposed action, the environmental effects of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse effects. It also includes the staff's preliminary recommendation regarding the proposed action.

Neither SNC nor the staff has identified significant new information for any of the 69 issues for which the GEIS reached generic conclusions and which apply to HNP. Therefore, the staff concludes for these issues that the impacts of renewing the HNP OLs will not be greater than impacts identified in the GEIS for these issues. For each of these issues, the GEIS conclusion is that the impact is of SMALL significance (except for collective offsite radiological impacts from the fuel cycle, high-level waste and spent fuel, which were not assigned a single significance level) and that additional mitigation measures are likely not to be sufficiently beneficial to be warranted.

Each of the remaining 23 issues that applies to HNP is addressed in this draft SEIS. For each applicable issue, the staff concludes that the significance of the potential environmental effects of renewal of the OLs is SMALL. The staff has not identified any new issue applicable to HNP that has a significant environmental impact. The staff also concludes that additional mitigation measures are likely not to be sufficiently beneficial as to be warranted.

The NRC staff's preliminary recommendation is that the Commission determine that the adverse environmental impacts of license renewal for HNP Units 1 and 2 are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable. This preliminary recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental Report submitted by SNC; (3) consultation with Federal, State,

and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments during the scoping process.

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Executive Summary

By letter dated February 29, 2000, Southern Nuclear Operating Company (SNC) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses for Units 1 and 2 of the Edwin I. Hatch Nuclear Plant (HNP) for an additional 20-year period. If the operating licenses are renewed, Federal (other than NRC) agencies, State regulatory agencies, and the owners of the plant will ultimately decide whether the plant will continue to operate. This decision will be based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the operating licenses are not renewed, HNP Units 1 and 2 will be shut down on or before the expiration dates of the current operating licenses, which are August 6, 2014, and June 13, 2018, respectively.

Under the National Environmental Policy Act of 1969 (NEPA), an environmental impact statement (EIS) is required for major Federal actions that significantly affect the quality of the human environment. The NRC has implemented Section 102 of NEPA in 10 CFR Part 51. In 10 CFR 51.20(b)(2), the Commission requires preparation of an EIS or a supplement to an EIS for renewal of a reactor operating license; 10 CFR 51.95(c) states that the EIS prepared at the operating license renewal stage will be a supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plant*s (GEIS), NUREG-1437.[(a)]

Upon acceptance of the SNC application, the NRC staff began the environmental review process described in 10 CFR Part 51 by publishing a notice of intent to prepare an EIS and to conduct scoping. The staff visited the HNP site in May 2000 and held public scoping meetings on May 10, 2000, in Vidalia, Georgia. The staff reviewed the SNC Environmental Report (ER) and compared it with the GEIS; consulted with Federal, State, and local agencies; conducted an independent review of the issues following the guidance set forth in *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*, NUREG-1555, Supplement 1; and considered the public comments received during the scoping process for HNP. This draft supplemental environmental impact statement (SEIS) includes the NRC staff's preliminary analysis that considers and weighs the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse effects. It also includes the staff's preliminary recommendation regarding the proposed action.

(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.

The Commission has adopted the following definition of purpose and need for license renewal from the GEIS:

> 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) decision makers.

The goal of the staff's environmental review, as defined in 10 CFR 51.95(c)(4) and the GEIS, is to determine

> ... 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.

Both the statement of purpose and need and the evaluation criterion implicitly acknowledge that there are factors, in addition to license renewal, that will ultimately determine whether HNP continues to operate beyond the period of the current operating licenses.

The GEIS contains the results of a systematic evaluation of the consequences of renewing an operating license and operating a nuclear power plant for an additional 20 years. It evaluates 92 environmental issues using a three-level standard of significance—SMALL, MODERATE, or LARGE—based on Council on Environmental Quality guidelines. These significance levels are 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.

For 69 of the 92 issues considered in the GEIS, the analysis in the GEIS shows the following:

(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 plant or site characteristics.

(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.

These 69 issues are identified in the GEIS as Category 1 issues. In the absence of significant new information, the staff relied on conclusions as amplified by supporting information in the GEIS for issues designated Category 1 in 10 CFR Part 51, Subpart A, Appendix B, Table B-1.

Of the 23 issues not meeting the criteria set forth above, 21 are classified as Category 2 issues requiring analysis in a plant-specific supplement to the GEIS. The remaining two issues, environmental justice and chronic effects of electromagnetic fields, are not categorized. Environmental justice was not evaluated on a generic basis and must also be addressed in a plant-specific supplement to the GEIS. Information on the chronic effects of electromagnetic fields was not conclusive at the time the GEIS was prepared.

This draft SEIS documents the staff's evaluation of all 92 environmental issues considered in the GEIS. The staff considered the environmental impacts associated with alternatives to license renewal and compared the environmental impacts of license renewal and the alternatives. The alternatives to license renewal that are considered include the no-action alternative (not renewing the HNP operating licenses) and alternative methods of power generation. Among the alternative methods of power generation, coal-fired and gas-fired generation appear to be the most likely if the power from HNP is replaced. These alternatives are evaluated assuming that the replacement power-generation plant is located at either the HNP site or an unspecified "greenfield" site (an undisturbed, pristine site).

SNC and the staff have established independent processes for identifying and evaluating the significance of any new information on the environmental impacts of license renewal. Neither SNC nor the staff has identified any significant new information related to Category 1 issues

that would call into question the conclusions in the GEIS. Similarly, neither SNC nor the staff has identified any new issue applicable to HNP that has a significant environmental impact. Therefore, the staff relies upon the conclusions of the GEIS for all 69 Category 1 issues.

The staff has reviewed the SNC analysis for each Category 2 issue and has conducted an independent review of each issue. Five Category 2 issues are not applicable because they are related to plant design features or site characteristics not found at HNP. Four Category 2 issues are not discussed in this draft SEIS because they are specifically related to refurbishment. Five additional Category 2 issues and environmental justice apply to both refurbishment and to operation during the renewal term and are only discussed in relation to operation during the renewal term. SNC has stated that its evaluation of structures and components, as required by 10 CFR 54.21, did not identify any major plant refurbishment activities or modifications necessary to support the continued operation of HNP beyond the end of the existing operating licenses. In addition, routine replacement of components or additional inspection activities are within the bounds of normal plant component replacement and, therefore, are not expected to affect the environment outside of the bounds of the plant operations evaluated in the final environmental statements for HNP.

Twelve Category 2 issues, as well as environmental justice and chronic effects of electromagnetic fields, are discussed in detail in this draft SEIS. For all 12 Category 2 issues and environmental justice, the staff concludes that the potential environmental effects are of SMALL significance in the context of the standards set forth in the GEIS. In addition, the staff concluded that a consensus has not been reached by appropriate Federal health agencies that there are adverse effects from electromagnetic fields. Therefore, no further evaluation of this issue is required. For severe accident mitigation alternatives (SAMAs), it is the staff's preliminary conclusion that a reasonable, comprehensive effort was made to identify and evaluate SAMAs and that none of the candidate SAMAs is cost-beneficial.

Mitigation measures were considered for each Category 2 issue. Current measures to mitigate environmental impacts of plant operation were found to be adequate, and no additional mitigation measures were deemed sufficiently beneficial to be warranted.

In the event that the HNP operating licenses are not renewed and the units cease operation on or before the expiration of their current operating licenses, the adverse impacts of likely alternatives will not be smaller than those associated with continued operation of HNP. The impacts may, in fact, be greater in some areas.

The NRC staff's preliminary recommendation is that the Commission determine that the adverse environmental impacts of license renewal for HNP are not so great that preserving the

option of license renewal for energy-planning decisionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS; (2) the ER submitted by SNC; (3) consultation with other Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments.

Abbreviations/Acronyms

AC	alternating current
ACC	averted cleanup and decontamination costs
ADAMS	Agencywide Document Access Management System
AEA	Atomic Energy Act of 1954
AEC	U.S. Atomic Energy Commission
ALARA	as low as reasonably achievable
ALI	annual limit on intake
AOC	averted offsite property damage costs
AOE	averted occupational exposure
AOSC	averted onsite costs
APE	averted public exposure
ATWS	Anticipated Transient Without Scram
BTU	British thermal unit
BWR	boiling-water reactor
CAA	Clean Air Act
CDF	core damage frequency
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeter
CoE	U.S. Army Corps of Engineers
COE	cost of enhancement
CWA	Clean Water Act
DAC	derived air concentration
DBA	design-basis accident
DC	direct current
DOE	U.S. Department of Energy
EIA	Energy Information Administration (of DOE)
EIS	environmental impact statement
ELF-EMF	extremely low frequency-electromagnetic field
EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Division (of GADNR)
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act of 1973

ESRP	Environmental Standard Review Plan, NUREG-1555, Supplement 1, Operating License Renewal
FERC	Federal Energy Regulatory Commission
FES	final environmental statement
FR	Federal Register
ft	feet
FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of 1977)
FWS	U.S. Fish and Wildlife Service
GADNR	Georgia Department of Natural Resources
GDA	Georgia Department of Audits
GDCA	Georgia Department of Community Affairs
GDL	Georgia Department of Labor
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
GOPB	Georgia Office of Planning and Budget
GPC	Georgia Power Company
gpd	gallons per day
gpm	gallons per minute
GTC	Georgia Transmission Company
ha	hectare
HEPA	high-efficiency particulate air (filter)
HLW	high-level waste
HNP	Edwin I. Hatch Nuclear Plant
HPCI	high-pressure coolant injection
in.	inch
IPA	integrated plant assessment
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination for External Events
ISLOCA	Interfacing System Loss of Coolant Accident
kg	kilogram
km	kilometer
kV	kilovolt
kWh	kilowatt hour

L	liter
LERF	Large Early Release Frequency
LOCA	loss-of-coolant accident
m^3/d	cubic meters per day
mA	milliampere
MAAP	Modular Accident Analysis Program
m	meter
MACCS	Melcor Accident Consequence Code System
mi	mile
mgd	millions of gallons per day
MTHM	metric tonnes of heavy metal
MT	metric ton (or tonne)
MTU	metric ton-uranium
MW	megawatt
MW(e)	megawatt electric
MW(t)	megawatt thermal
MWh	megawatt hour
MWd/MTU	megawatt-days per metric ton of uranium
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act of 1969
NESC	National Electric Safety Code
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NO_x	nitrogen oxide(s)
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OL	operating license

PARS	Publicly Available Records (a component of ADAMS)
PM_{10}	particulate matter, 10 microns or less in diameter
ppm	parts per million
PRA	Probabilistic Risk Assessment
PSA	Probabilistic Safety Assessment
PSW	plant service water
RAI	request for additional information
RCRA	Resource Conservation and Recovery Act
REMP	radiological environmental monitoring program
RPC	averted replacement power cost
ry	reactor year
SAMA	Severe Accident Mitigation Alternative
SEIS	supplemental environmental impact statement
SNC	Southern Nuclear Operating Company
SO_2	sulfur dioxide
SO_x	sulfur oxide(s)
STI	Southeastern Technical Institute
Sv	Sievert
TCDA	Toombs County Development Authority
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture