

Abstract

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3
4 The U.S. Nuclear Regulatory Commission (NRC) considered the environmental impacts of
5 renewing nuclear power plant operating licenses (OLs) for a 20-year period in its *Generic*
6 *Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437,
7 Volumes 1 and 2, and codified the results in 10 CFR Part 51. The GEIS (and its Addendum 1)
8 identifies 92 environmental issues and reaches generic conclusions related to environmental
9 impacts for 69 of these issues that apply to all plants or to plants with specific design or site
10 characteristics. Additional plant-specific review is required for the remaining 23 issues. These
11 plant-specific reviews are to be included in a supplement to the GEIS.

12
13 This draft supplemental environmental impact statement (SEIS) has been prepared in response
14 to an application submitted to the NRC by the Rochester Gas and Electric Corporation (RG&E)
15 to renew the R.E. Ginna Nuclear Power Plant (Ginna) OL for an additional 20 years under
16 10 CFR Part 54. This draft SEIS includes the NRC staff's analysis that considers and weighs
17 the environmental impacts of the proposed action, the environmental impacts of alternatives to
18 the proposed action, and mitigation measures available for reducing or avoiding adverse
19 impacts. It also includes the staff's preliminary recommendation regarding the proposed action.

20
21 Regarding the 69 issues for which the GEIS reached generic conclusions, neither RG&E nor
22 NRC staff identified information that is both new and significant for any of these issues that
23 apply to Ginna. Therefore, the staff concludes that the impacts of renewing the Ginna OL will
24 not be greater than impacts identified for these issues in the GEIS. The GEIS conclusion is that
25 the impacts are of SMALL^(a) significance (except for collective offsite radiological impacts from
26 the fuel cycle and from high-level waste and spent fuel, which were not assigned a single
27 significance level).

28
29 The remaining issues that apply to Ginna are addressed in this draft SEIS. For each applicable
30 issue, the staff concludes that the significance of the potential environmental impacts of
31 renewal of the OL is SMALL. The staff also concludes that additional mitigation measures are
32 not likely to be sufficiently beneficial as to be warranted. The staff determined that information
33 provided during the scoping process did not identify any new issue that requires site-specific
34 assessment.

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

Abstract

1 The NRC staff's preliminary recommendation is that the Commission determine that the
2 adverse environmental impacts of license renewal for Ginna are not so great that preserving the
3 option of license renewal for energy-planning decisionmakers would be unreasonable. This
4 recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental
5 Report submitted by RG&E; (3) consultation and discussions with Federal, state, and local
6 agencies; (4) the staff's own independent review, and (5) the staff's consideration of public
7 comments received during the scoping process.

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Executive Summary

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4 By letter dated July 30, 2002, the Rochester Gas and Electric Corporation (RG&E) submitted an
5 application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating license
6 (OL) for the R.E. Ginna Nuclear Power Plant (Ginna) for an additional 20-year period. If the OL
7 is renewed, state regulatory agencies and RG&E will ultimately decide whether the plant will
8 continue to operate based on factors such as the need for power or other matters within the
9 state's jurisdiction or the purview of the owners. If the OL is not renewed, then the plant must
10 be shut down at or before the expiration date of the current OL, which is September 18, 2009.

11
12 Section 102 of the National Environmental Policy Act (NEPA) (42 USC 4321), directs that an
13 environmental impact statement (EIS) is required for major Federal actions that significantly
14 affect the quality of the human environment. The NRC has implemented Section 102 of NEPA
15 in 10 CFR Part 51, which identifies licensing and regulatory actions that require an EIS. In
16 10 CFR 51.20(b)(2), the Commission requires preparation of an EIS or a supplement to an EIS
17 for renewal of a reactor OL; 10 CFR 51.95(c) states that the EIS prepared at the OL renewal
18 stage will be a supplement to the *Generic Environmental Impact Statement for License
19 Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2.^(a)

20
21 Upon acceptance of the RG&E application, the NRC began the environmental review process
22 described in 10 CFR Part 51 by publishing a notice of intent to prepare an EIS and conduct
23 scoping. The staff visited Ginna in November 2002 and held public scoping meetings on
24 November 6, 2002, in Webster, New York. In preparing this draft supplemental environmental
25 impact statement (SEIS) for Ginna, the staff reviewed the RG&E Environmental Report (ER) for
26 Ginna and compared it to the GEIS; consulted with other agencies; conducted an independent
27 review of the issues following the guidance set forth in NUREG-1555, Supplement 1, the
28 *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1:
29 Operating License Renewal*; and considered the public comments received during the scoping
30 process. The public comments received during the scoping process and the staff's response to
31 the comments are provided in Appendix A, Part 1, of this draft SEIS.

32
33 The staff will hold two public meetings near Ginna in August 2003 to describe the preliminary
34 results of the NRC environmental review, answer questions, and provide members of the public
35 with information to assist them in formulating comments on this SEIS. When the comment
36 period ends, the staff will consider and disposition all of the comments received. These
37 comments will be addressed in Appendix A, Part 2, of the final SEIS. Additional details
38 concerning the meetings will be provided in a future meeting notice and in the Notice of
39 Availability concerning this draft SEIS in the *Federal Register*.

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

Executive Summary

1 This draft SEIS includes the NRC staff's preliminary analysis that considers and weighs the
2 environmental effects of the proposed action, the environmental impacts of alternatives to the
3 proposed action, and mitigation measures for reducing or avoiding adverse effects. It also
4 includes the staff's preliminary recommendation regarding the proposed action.

5
6 The Commission has adopted the following statement of purpose and need for license renewal
7 from the GEIS:

8
9 The purpose and need for the proposed action (renewal of an operating license) is to
10 provide an option that allows for power generation capability beyond the term of a
11 current nuclear power plant operating license to meet future system generating needs,
12 as such needs may be determined by State, utility, and, where authorized, Federal
13 (other than NRC) decisionmakers.

14
15 The goal of the staff's environmental review, as defined in 10 CFR 51.95(c)(4) and the GEIS, is
16 to determine

17
18 ...whether or not the adverse environmental impacts of license renewal are so great that
19 preserving the option of license renewal for energy planning decisionmakers would be
20 unreasonable.

21
22 Both the statement of purpose and need and the evaluation criterion implicitly acknowledge
23 that, even if an OL is renewed, there are other factors that will ultimately determine whether an
24 existing nuclear power plant continues to operate beyond the period of the current OL.

25
26 NRC regulations (10 CFR 51.95(c)(2)) contain the following statement regarding the content of
27 SEISs prepared at the license renewal stage:

28
29 The supplemental environmental impact statement for license renewal is not required to
30 include discussion of need for power or the economic costs and economic benefits of
31 the proposed action or of alternatives to the proposed action except insofar as such
32 benefits and costs are either essential for a determination regarding the inclusion of an
33 alternative in the range of alternatives considered or relevant to mitigation. In addition,
34 the supplemental environmental impact statement prepared at the license renewal stage
35 need not discuss other issues not related to the environmental effects of the proposed
36 action and the alternatives, or any aspect of the storage of spent fuel for the facility
37 within the scope of the generic determination in 51.23(a) ["Temporary storage of spent
38 fuel after cessation of reactor operation—generic determination of no significant
39 environmental impact"] and in accordance with 51.23(b).

1 The GEIS contains the results of a systematic evaluation of the consequences of renewing an
2 OL and operating a nuclear power plant for an additional 20 years. It evaluates
3 92 environmental issues using the NRC's three-level standard of significance – SMALL,
4 MODERATE, or LARGE – developed using Council on Environmental Quality guidelines. The
5 following definitions of the three significance levels are set forth in a footnote to Table B-1 of
6 10 CFR Part 51, Subpart A, Appendix B:

7
8 SMALL – Environmental effects are not detectable or are so minor that they will neither
9 destabilize nor noticeably alter any important attribute of the resource.

10
11 MODERATE – Environmental effects are sufficient to alter noticeably, but not to
12 destabilize, important attributes of the resource.

13
14 LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize
15 important attributes of the resource.

16
17 For 69 of the 92 issues considered in the GEIS, the analysis in the GEIS led to the following
18 conclusions:

- 19
20 (1) The environmental impacts associated with the issue have been determined to apply either
21 to all plants or, for some issues, to plants having a specific type of cooling system or other
22 specified plant or site characteristics.
- 23
24 (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the
25 impacts (except for collective offsite radiological impacts from the fuel cycle and from high-
26 level waste and spent fuel disposal).
- 27
28 (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis,
29 and it has been determined that additional plant-specific mitigation measures are not likely
30 to be sufficiently beneficial to warrant implementation.

31
32 These 69 issues were identified in the GEIS as Category 1 issues. The staff relies on
33 conclusions as amplified by supporting information in the GEIS for issues designated as
34 Category 1 in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B.

35
36 Of the 23 issues that do not meet the criteria set forth above, 21 are classified as Category 2
37 issues requiring analysis in a plant-specific supplement to the GEIS. The remaining two issues,
38 environmental justice and chronic effects of electromagnetic fields, were not categorized.
39 Environmental justice was not evaluated on a generic basis and must be addressed in a plant-
40 specific supplement to the GEIS. Information on the chronic effects of electromagnetic fields
41 was not conclusive at the time the GEIS was prepared.

Executive Summary

1 This draft SEIS documents the staff's evaluation of all 92 environmental issues considered in
2 the GEIS. The staff considered the environmental impacts associated with alternatives to
3 license renewal and compared the environmental impacts of license renewal and the
4 alternatives. The alternatives to license renewal that were considered include the no-action
5 alternative (not renewing the OL for Ginna) and alternative methods of power generation.
6 Based on projections made by the U.S. Department of Energy's Energy Information
7 Administration, gas- and coal-fired generation appear to be the most likely power-generation
8 alternatives if the power from Ginna is replaced. These alternatives are evaluated assuming
9 that the replacement power generation plant is located at either the Ginna site or some other
10 unspecified alternate location.

11
12 RG&E and the staff have established independent processes for identifying and evaluating the
13 significance of any new information on the environmental impacts of license renewal. RG&E
14 and the staff did not identify information that is both new and significant related to Category 1
15 issues that would call into question the conclusions in the GEIS. Neither the scoping process
16 nor the staff review has identified any new issue applicable to Ginna. Therefore, the staff relies
17 upon the conclusions of the GEIS for all of the Category 1 issues that are applicable to Ginna.
18

19 The Ginna ER presents an analysis of the Category 2 issues that are applicable to Ginna. In
20 addition, the staff has evaluated the two uncategorized issues, environmental justice and
21 chronic effects from electromagnetic fields. The staff has reviewed the RG&E analysis for each
22 issue and has conducted an independent review of each issue. Six Category 2 issues are not
23 applicable because they are related to plant design features or site characteristics not found at
24 Ginna. Four Category 2 issues are not discussed in this draft SEIS because they are
25 specifically related to refurbishment. RG&E has stated that its evaluation of structures and
26 components, as required by 10 CFR 54.21, did not identify any major plant refurbishment
27 activities or modifications as necessary to support the continued operation of Ginna for the
28 license renewal period. In addition, any replacement of components or additional inspection
29 activities that are within the bounds of normal plant operation are not expected to affect the
30 environment outside of the bounds of the plant operations evaluated in the *Final Environmental*
31 *Statement Related to the Operation of R.E. Ginna Nuclear Power Plant Unit 1, Rochester Gas*
32 *and Electric Corporation*, issued by the U.S. Atomic Energy Commission in 1973.
33

34 Ten Category 2 issues related to operational impacts and one related to postulated accidents
35 during the renewal term, as well as environmental justice and chronic effects of electromagnetic
36 fields, are discussed in detail in this draft SEIS. Five of the Category 2 issues and
37 environmental justice apply to both refurbishment and to operation during the renewal term and
38 are only discussed in this draft SEIS in relation to operation during the renewal term. For all
39 11 Category 2 issues and environmental justice, the staff preliminarily concludes that the
40 potential environmental effects are of SMALL significance in the context of the standards set

1 forth in the GEIS. In addition, the staff determined that appropriate Federal health agencies
2 have not reached a consensus on the existence of chronic adverse effects from
3 electromagnetic fields. Therefore, no further evaluation of this issue is required. For severe
4 accident mitigation alternatives (SAMAs), the staff concludes that a reasonable, comprehensive
5 effort was made to identify and evaluate SAMAs. Based on its review of the SAMAs for Ginna
6 and the plant improvements already made, the staff concludes that two of the candidate SAMAs
7 are cost beneficial. However, these SAMAs do not relate to adequately managing the effects of
8 aging during the period of extended operation. Therefore, they need not be implemented as
9 part of license renewal pursuant to 10 CFR Part 54.

10
11 Mitigation measures were considered for each Category 2 issue. Current measures to mitigate
12 the environmental impacts of plant operation were found to be adequate, and no additional
13 mitigation measures were deemed sufficiently beneficial to be warranted.

14
15 Cumulative impacts of past, present, and reasonably foreseeable future actions were
16 considered, regardless of what agency (Federal or non-Federal) or person undertakes such
17 other actions. For purposes of this analysis, where Ginna license renewal impacts are deemed
18 to be SMALL, the staff concluded that these impacts would not result in significant cumulative
19 impacts on potentially affected resources.

20
21 If the Ginna OL is not renewed and the plant ceases operation on or before the expiration of the
22 current OL, then the adverse impacts of likely alternatives will not be smaller than those
23 associated with continued operation of Ginna. The impacts may, in fact, be greater in some
24 areas.

25
26 The preliminary recommendation of the NRC staff is that the Commission determine that the
27 adverse environmental impacts of license renewal for Ginna are not so great that preserving the
28 option of license renewal for energy-planning decisionmakers would be unreasonable at the
29 license renewal stage. This recommendation is based on (1) the analysis and findings in the
30 GEIS; (2) the ER submitted by RG&E; (3) consultation with other Federal, State, and local
31 agencies; (4) the staff's own independent review; and (5) the staff's consideration of public
32 comments received during the scoping process.

Abbreviations/Acronyms

1	μm	micrometer
2		
3	ac	acre(s)
4	AC	alternating current
5	ACC	averted cleanup and decontamination costs
6	ADAMS	Agencywide Document Access and Management System
7	AEA	Atomic Energy Act of 1954, as amended
8	AEC	U.S. Atomic Energy Commission
9	AFW	auxiliary feedwater
10	ALARA	as low as reasonably achievable
11	AOC	averted offsite property damage costs
12	AOE	averted occupational exposure
13	AOSC	averted onsite costs
14	AOV	air-operated valve
15	APE	averted public exposure
16	ATWS	anticipated transient(s) without scram
17		
18	BACT	best available control technology
19	Bq	becquerel(s)
20	Bq/mL	becquerel(s) per milliliter
21	Btu	British thermal unit(s)
22		
23	$^{\circ}\text{C}$	degrees Celsius
24	CAA	Clean Air Act of 1970, as amended
25	CDF	core damage frequency
26	CEQ	Council on Environmental Quality
27	CFR	Code of Federal Regulations
28	Ci	curie(s)
29	cm	centimeter(s)
30	COE	cost of enhancement
31	CWA	Clean Water Act of 1977 (also known as Federal Water Pollution Control Act)
32		
33	DBA	design-basis accident
34	DC	direct current
35	DOE	U.S. Department of Energy
36	DOT	U.S. Department of Transportation
37	DSM	demand-side management
38		
39		

Abbreviations/Acronyms

1	EIA	Energy Information Administration (of DOE)
2	EIS	environmental impact statement
3	ELF-EMF	extremely low frequency-electromagnetic field
4	EPA	U.S. Environmental Protection Agency
5	ER	Environmental Report
6	ESA	Endangered Species Act
7		
8	°F	degrees Fahrenheit
9	FAA	U.S. Federal Aviation Administration
10	FERC	Federal Energy Regulatory Commission
11	FES	Final Environmental Statement
12	FR	Federal Register
13	ft	foot/feet
14	ft ³	cubic foot/feet
15	F-V	Fussel-Vessely
16	FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of
17		1977)
18	FWS	U.S. Fish and Wildlife Service
19		
20	g	gram(s)
21	gal	gallon(s)
22	GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants,
23		NUREG-1437
24	Ginna	R.E. Ginna Nuclear Power Plant
25	GJ	gigajoule(s)
26	gpd	gallon(s) per day
27	gpm	gallon(s) per minute
28	GWh	gigawatt hour(s)
29		
30	ha	hectare(s)
31	hr	hour(s)
32	Hz	hertz
33		
34	IEEE	Institute of Electrical and Electronics Engineers
35	in.	inch(es)
36	IPE	individual plant examination
37	IPEEE	individual plant examination of external events
38	ISLOCA	interfacing system loss-of-coolant accident
39		
40	J	joule(s)

Abbreviations/Acronyms

1	kg	kilogram(s)
2	kJ	kilojoule(s)
3	km	kilometer(s)
4	kV	kilovolt(s)
5	kWh	kilowatt hour(s)
6		
7	L	liter(s)
8	L/d	liter(s) per day
9	L/s	liter(s) per second
10	LAER	lowest achievable emissions rate
11	lb	pound(s)
12	LERF	large early release frequency
13	LOCA	loss-of-coolant accident
14		
15	m	meter(s)
16	mA	milliampere(s)
17	MAB	maximum attainable benefit
18	MACCS2	MELCOR Accident Consequence Code System 2
19	MBq	megabecquerel(s)
20	MCWA	Monroe County Water Authority
21	MGD	million gallons per day
22	m/s	meter(s) per second
23	m ³ /d	cubic meter(s) per day
24	m ³ /min	cubic meter(s) per minute
25	m ³ /s	cubic meter(s) per second
26	mi	mile(s)
27	min	minute(s)
28	MJ/m ³	megajoule(s) per cubic meter
29	ml	milliliter(s)
30	MMBtu	million British thermal units of heat
31	MOV	motor-operated valve
32	mrem	millirem(s)
33	msl	mean sea level
34	mSv	millisievert(s)
35	MT	metric ton(s) (or tonne[s])
36	MTHM	metric ton(s) (or tonne[s]) heavy metal
37	MTU	metric ton(s) uranium
38	MW	megawatt(s)
39	MWd	megawatt-day(s)
40	MW(e)	megawatt(s) electric
41	MW(t)	megawatt(s) thermal

Abbreviations/Acronyms

1	MWh	megawatt hour(s)
2		
3	NA	not applicable
4	NAS	National Academy of Sciences
5	NEI	Nuclear Energy Institute
6	NEPA	National Environmental Policy Act of 1969
7	NESC	National Electrical Safety Code
8	ng	nanograms
9	NHPA	National Historic Preservation Act of 1966
10	NIEHS	National Institute of Environmental Health Sciences
11	NMFS	National Marine Fisheries Service
12	NO _x	nitrogen oxide(s)
13	NOAA	National Oceanic and Atmospheric Administration
14	NPDES	National Pollutant Discharge Elimination System
15	NRC	U.S. Nuclear Regulatory Commission
16	NRHP	National Register of Historic Places
17	NYS	New York State
18	NYSDEC	New York State Department of Environmental Conservation
19	NYSERDA	New York State Energy Research and Development Authority
20		
21	ODCM	Offsite Dose Calculation Manual
22	OL	operating license
23		
24	PARS	Publicly Available Records portion of ADAMS
25	PCB	polychlorinated biphenyl(s)
26	pCi	picocurie(s)
27	PCR	plant change request
28	PM ₁₀	particulate matter with aerodynamic diameter $\leq 10 \mu\text{m}$
29	PORV	power-operated relief valves
30	PRA	probabilistic risk assessment
31	PSA	probabilistic safety assessment
32	PSD	prevention of significant deterioration
33	psig	pounds per square inch gauge
34	PWR	pressurized water reactor
35		
36	RAI	request for additional information
37	RAW	risk achievement worth
38	RCP	reactor coolant pump
39	RCRA	Resource Conservation and Recovery Act of 1976
40	RCS	reactor coolant system

Abbreviations/Acronyms

1	rem	special unit of dose equivalent, equal to 0.01 Sv
2	REMP	radiological environmental monitoring program
3	RG&E	Rochester Gas and Electric Corporation
4	RHR	residual heat removal
5	RMWT	reactor makeup water tank
6	ROC	Greater Rochester International Airport
7	RPC	replacement power cost
8	RWST	refueling water storage tank
9		
10	s	second(s)
11	SAFW	standby auxiliary feedwater
12	SAMA	severe accident mitigation alternative
13	SAR	safety analysis report
14	SBO	station blackout
15	SCR	selective catalytic reduction
16	SEIS	supplemental environmental impact statement
17	SEP	systematic evaluation program
18	SER	safety evaluation report
19	SGTR	steam generator tube rupture
20	SHPO	State Historic Preservation Officer
21	SO ₂	sulfur dioxide
22	SO _x	sulfur oxides
23	SPDES	State Pollutant Discharge Elimination System
24	SQUG	Seismic Qualification Utility Group
25	STC	source term category
26	Sv	sievert, special unit of dose equivalent
27	SW	service water
28		
29	THPO	Tribal Historic Preservation Officer
30		
31	UFSAR	updated final safety analysis report
32	USC	United States Code
33	USCB	U.S. Census Bureau
34	USI	unresolved safety issue
35		
36	VAC	volt(s) alternating current
37	VCT	volume control tank
38		
39	WEC	Westinghouse Electric Company
40		