

4.0 Environmental Impacts of Operation

Environmental issues associated with operation of a nuclear power plant during the renewal term are discussed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996, 1999).^(a) The GEIS includes a determination of whether the analysis of the environmental issues could be applied to all plants and whether additional mitigation measures would be warranted. Issues are then assigned a Category 1 or a Category 2 designation. As set forth in the GEIS, Category 1 issues are those that meet all of the following criteria:

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

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

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

This chapter of the draft supplemental environmental impact statement (SEIS) addresses the issues related to operation during the renewal term that are listed in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, and are applicable to the R.E. Ginna Nuclear Power Plant (Ginna). Section 4.1 addresses issues applicable to the Ginna cooling system. Section 4.2 addresses issues related to transmission lines and onsite land use. Section 4.3 addresses the radiological impacts of normal operation, and Section 4.4 addresses issues related to the socioeconomic impacts of normal operation during the renewal term. Section 4.5 addresses issues related to groundwater use and quality, while Section 4.6 discusses the impacts of renewal-term operations on threatened or endangered species. Section 4.7 addresses potential new information that was raised during the scoping period. The results of the

(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.

evaluation of environmental issues related to operation during the renewal term are summarized in Section 4.8. Finally, Section 4.9 lists the references cited in the chapter. Category 1 and Category 2 issues that are not applicable because they are related to plant design features or site characteristics not found at Ginna are listed in Appendix F.

4.1 Cooling System

Category 1 issues in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, that are applicable to the operation of the Ginna cooling system during the renewal term are listed in Table 4-1. Rochester Gas and Electric Corporation (RG&E) stated in its Environmental Report (ER) (RG&E 2002a) that it is not aware of any new and significant information associated with the renewal of the Ginna operating license (OL). The staff has not identified any new and significant information related to operation of the cooling system during its independent review of the Ginna ER, the staff's site visit, the scoping process, discussions with other agencies, or its evaluation of other information including the State Pollutant Discharge Elimination System (SPDES) permit for Ginna issued by the New York State Department of Environmental Conservation (NYSDEC) (Permit No. NY0000493). Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For all of these issues, the staff concluded in the GEIS that the impacts are SMALL, and plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

A brief description of the staff's review and the GEIS conclusions, as codified in Table B-1, for each of these issues follows.

Altered current patterns at intake and discharge structures. Based on information in the GEIS, the Commission found that

Altered current patterns have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of altered current patterns during the renewal term beyond those discussed in the GEIS.

Table 4-1. Category 1 Issues Applicable to the Operation of R.E. Ginna Nuclear Power Plant Cooling System During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
SURFACE-WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)	
Altered current patterns at intake and discharge structures	4.2.1.2.1; 4.3.2.2; 4.4.2
Altered thermal stratification of lakes	4.2.1.2.2; 4.4.2.2
Temperature effects on sediment transport capacity	4.2.1.2.3; 4.4.2.2
Scouring caused by discharged cooling water	4.2.1.2.3; 4.4.2.2
Eutrophication	4.2.1.2.3; 4.4.2.2
Discharge of chlorine or other biocides	4.2.1.2.4; 4.4.2.2
Discharge of sanitary wastes and minor chemical spills	4.2.1.2.4; 4.4.2.2
Discharge of other metals in wastewater	4.2.1.2.4; 4.3.2.2; 4.4.2.2
Water use conflicts (plants with once-through cooling systems)	4.2.1.3
AQUATIC ECOLOGY (FOR ALL PLANTS)	
Accumulation of contaminants in sediments or biota	4.2.1.2.4; 4.3.3; 4.4.3; 4.4.2.2
Entrainment of phytoplankton and zooplankton	4.2.2.1.1; 4.3.3; 4.4.3
Cold shock	4.2.2.1.5; 4.3.3; 4.4.3
Thermal plume barrier to migrating fish	4.2.2.1.6; 4.4.3
Distribution of aquatic organisms	4.2.2.1.6; 4.4.3
Premature emergence of aquatic insects	4.2.2.1.7; 4.4.3
Gas supersaturation (gas bubble disease)	4.2.2.1.8; 4.4.3
Low dissolved oxygen in the discharge	4.2.2.1.9; 4.3.3; 4.4.3
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	4.2.2.1.10; 4.4.3
Stimulation of nuisance organisms	4.2.2.1.11; 4.4.3
HUMAN HEALTH	
Noise	4.3.7

- Altered thermal stratification of lakes. Based on information in the GEIS, the Commission found that

Generally, lake stratification has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.

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1 The staff has not identified any new and significant information. Therefore, the staff
2 concludes that there are no impacts of lake stratification during the renewal term beyond
3 those discussed in the GEIS.

- 4
5 • Temperature effects on sediment transport capacity. Based on information in the GEIS,
6 the Commission found that

7
8 These effects have not been found to be a problem at operating nuclear power
9 plants and are not expected to be a problem during the license renewal term.

10
11 The staff has not identified any new and significant information. Therefore, the staff
12 concludes that there are no impacts of temperature on sediment transport during the
13 renewal term beyond those discussed in the GEIS.

- 14
15 • Scouring caused by discharged cooling water. Based on information in the GEIS, the
16 Commission found that

17
18 Scouring has not been found to be a problem at most operating nuclear power
19 plants and has caused only localized effects at a few plants. It is not expected to
20 be a problem during the license renewal term.

21
22 The staff has not identified any new and significant information. Therefore, the staff
23 concludes that there are no impacts of scouring during the renewal term beyond those
24 discussed in the GEIS.

- 25
26 • Eutrophication. Based on information in the GEIS, the Commission found that

27
28 Eutrophication has not been found to be a problem at operating nuclear power
29 plants and is not expected to be a problem during the license renewal term.

30
31 The staff has not identified any new and significant information. Therefore, the staff
32 concludes that there are no impacts of eutrophication during the renewal term beyond those
33 discussed in the GEIS.

- 34
35 • Discharge of chlorine or other biocides. Based on information in the GEIS, the
36 Commission found that

37
38 Effects are not a concern among regulatory and resource agencies, and are not
39 expected to be a problem during the license renewal term.
40

1 The staff has not identified any new and significant information. Therefore, the staff
2 concludes that there are no impacts of discharge of chlorine or other biocides during the
3 renewal term beyond those discussed in the GEIS.

- 4
5 • Discharge of sanitary wastes and minor chemical spills. Based on information in the
6 GEIS, the Commission found that

7
8 Effects are readily controlled through NPDES permit and periodic modifications,
9 if needed, and are not expected to be a problem during the license renewal term.

10
11 The staff has not identified any new and significant information. Therefore, the staff
12 concludes that there are no impacts of discharges of sanitary wastes and minor chemical
13 spills during the renewal term beyond those discussed in the GEIS.

- 14
15 • Discharge of other metals in wastewater. Based on information in the GEIS, the
16 Commission found that

17
18 These discharges have not been found to be a problem at operating nuclear
19 power plants with cooling-tower-based heat dissipation systems and have been
20 satisfactorily mitigated at other plants. They are not expected to be a problem
21 during the license renewal term.

22
23 The staff has not identified any new and significant information. Therefore, the staff
24 concludes that there are no impacts of discharges of other metals in wastewater during the
25 renewal term beyond those discussed in the GEIS.

- 26
27 • Water-use conflicts (plants with once-through cooling systems). Based on information
28 in the GEIS, the Commission found that

29
30 These conflicts have not been found to be a problem at operating nuclear power
31 plants with once-through heat dissipation systems.

32
33 The staff has not identified any new and significant information. Therefore, the staff
34 concludes that there are no impacts of water-use conflicts during the renewal term beyond
35 those discussed in the GEIS.

- 36
37 • Accumulation of contaminants in sediments or biota. Based on information in the GEIS,
38 the Commission found that

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Accumulation of contaminants has been a concern at a few nuclear power plants but has been satisfactorily mitigated by replacing copper alloy condenser tubes with those of another metal. It is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of accumulation of contaminants in sediments or biota during the renewal term beyond those discussed in the GEIS.

- Entrainment of phytoplankton and zooplankton. Based on information in the GEIS, the Commission found that

Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of entrainment of phytoplankton and zooplankton during the renewal term beyond those discussed in the GEIS.

- Cold shock. Based on information in the GEIS, the Commission found that

Cold shock has been satisfactorily mitigated at operating nuclear plants with once-through cooling systems, has not endangered fish populations or been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds, and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of cold shock during the renewal term beyond those discussed in the GEIS.

- Thermal plume barrier to migrating fish. Based on information in the GEIS, the Commission found that

Thermal plumes have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

1 The staff has not identified any new and significant information. Therefore, the staff
2 concludes that there are no impacts of thermal plumes during the renewal term beyond
3 those discussed in the GEIS.

- 4
5 • Distribution of aquatic organisms. Based on information in the GEIS, the Commission
6 found that

7
8 Thermal discharge may have localized effects but is not expected to effect the
9 larger geographical distribution of aquatic organisms.

10
11 The staff has not identified any new and significant information. Therefore, the staff
12 concludes that there are no impacts of distribution of aquatic organisms during the renewal
13 term beyond those discussed in the GEIS.

- 14
15 • Premature emergence of aquatic insects. Based on information in the GEIS, the
16 Commission found that

17
18 Premature emergence has been found to be a localized effect at some operating
19 nuclear power plants but has not been a problem and is not expected to be a
20 problem during the license renewal term.

21
22 The staff has not identified any new and significant information. Therefore, the staff
23 concludes that there are no impacts of premature emergence of aquatic insects during the
24 renewal term beyond those discussed in the GEIS.

- 25
26 • Gas supersaturation (gas bubble disease). Based on information in the GEIS, the
27 Commission found that

28
29 Gas supersaturation was a concern at a small number of operating nuclear
30 power plants with once-through cooling systems but has been satisfactorily
31 mitigated. It has not been found to be a problem at operating nuclear power
32 plants with cooling towers or cooling ponds and is not expected to be a problem
33 during the license renewal term.

34
35 The staff has not identified any new and significant information. Therefore, the staff
36 concludes that there are no impacts of gas supersaturation during the renewal term beyond
37 those discussed in the GEIS.

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- 1 • Low dissolved oxygen in the discharge. Based on information in the GEIS, the
2 Commission found that

3
4 Low dissolved oxygen has been a concern at one nuclear power plant with a
5 once-through cooling system but has been effectively mitigated. It has not been
6 found to be a problem at operating nuclear power plants with cooling towers or
7 cooling ponds and is not expected to be a problem during the license renewal
8 term.

9
10 The staff has not identified any new and significant information. Therefore, the staff
11 concludes that there are no impacts of low dissolved oxygen in the discharge during the
12 renewal term beyond those discussed in the GEIS.

- 13
14 • Losses from predation, parasitism, and disease among organisms exposed to sublethal
15 stresses. Based on information in the GEIS, the Commission found that

16
17 These types of losses have not been found to be a problem at operating nuclear
18 power plants and are not expected to be a problem during the license renewal
19 term.

20
21 The staff has not identified any new and significant information. Therefore, the staff
22 concludes that there are no impacts of losses from predation, parasitism, and disease
23 among organisms exposed to sublethal stresses during the renewal term beyond those
24 discussed in the GEIS.

- 25
26 • Stimulation of nuisance organisms. Based on information in the GEIS, the Commission
27 found that

28
29 Stimulation of nuisance organisms has been satisfactorily mitigated at the single
30 nuclear power plant with a once-through cooling system where previously it was
31 a problem. It has not been found to be a problem at operating nuclear power
32 plants with cooling towers or cooling ponds and is not expected to be a problem
33 during the license renewal term.

34
35 The staff has not identified any new and significant information. Therefore, the staff
36 concludes that there are no impacts of stimulation of nuisance organisms during the
37 renewal term beyond those discussed in the GEIS.

- 38
39 • Noise. Based on information in the GEIS, the Commission found that

40
41 Noise has not been found to be a problem at operating plants and is not
42 expected to be a problem at any plant during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of noise during the renewal term beyond those discussed in the GEIS.

The Category 2 issues related to cooling system operation during the renewal term that are applicable to Ginna are listed in Table 4-2 and are discussed in Sections 4.1.1, 4.1.2, and 4.1.3.

Table 4-2. Category 2 Issues Applicable to the Operation of R.E. Ginna Nuclear Power Plant Cooling System During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
AQUATIC ECOLOGY (FOR PLANTS WITH ONCE-THROUGH HEAT-DISSIPATION SYSTEMS)			
Entrainment of fish and shellfish in early life stages	4.2.2.1.2; 4.3.3	B	4.1.1
Impingement of fish and shellfish	4.2.2.1.3; 4.3.3	B	4.1.2
Heat shock	4.2.2.1.4; 4.3.3	B	4.1.3

4.1.1 Entrainment of Fish and Shellfish in Early Life Stages

Entrainment of fish and shellfish in early life stages at Ginna has been investigated as part of the NYSDEC SPDES Permit (RG&E 2002a) and compared to studies conducted in a similar region of Lake Ontario. Review of impacts due to entrainment continues to be conducted by NYSDEC.

Entrainment sampling of Ginna intake waters for ichthyoplankton (fish eggs and larvae) took place between 1976 and 1981. Over the 6-year sampling program, an estimated annual average of 89 million fish eggs (range of 14 to 168 million eggs) and 17 million fish larvae (range of 7 to 37 million larvae) were entrained. The principal larval species were alewives (*Alosa pseudoharengus*), smelt (*Osmerus mordax*), and darters (*Etheostoma* spp.), with alewives the predominant species (RG&E 2002a).

During 1977 and 1978, RG&E conducted additional studies of the ichthyoplankton community in Lake Ontario in the vicinity of Ginna. The fish species found in the lake studies were similar to the entrainment studies conducted at the same time. Alewives were the dominant species in both studies, followed by smelt and johnny darters (*E. nigrum*) (RG&E 2002a).

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1 Cornell University conducted ichthyoplankton studies of Lake Ontario during 1997 and 1998
2 (Klumb et al. 2003). The results of these studies showed a similar community structure to that
3 found by RG&E during 1977 and 1978. In addition, the studies showed that the community
4 structure along the entire southern shoreline of Lake Ontario was similar to that identified by
5 RG&E in its study. RG&E concluded that entrainment impacts due to the plant's operations
6 during the license renewal period will not be substantially different from those previously
7 evaluated (RG&E 2002a).

8
9 Information from these studies has been incorporated into the SPDES permit, and NYSDEC
10 has regularly reviewed and approved the results. NYSDEC has determined that further
11 mitigative efforts are not warranted at this time (RG&E 2002a). Further evaluation of
12 entrainment of the ichthyoplankton community by Ginna is required as part of the NYSDEC
13 SPDES permit program. SPDES permits are renewed every 5 years. The most recent SPDES
14 permit, (Appendix E), which expires in February 2008, requires that RG&E conduct an
15 entrainment study of the aquatic organisms in the station's cooling-water flow in 2003
16 (NYSDEC 2003a).

17
18 The studies by RG&E and others confirm that any impact of operational water withdrawal by
19 Ginna will be on a nearshore fish community that is typical for the southern shoreline of Lake
20 Ontario. Ginna operations only affect a small region of the southern shoreline of the lake.
21 Thus, RG&E concluded in the ER that Ginna operations will have a negligible impact on the
22 identified species.

23
24 The staff has reviewed the available information, including that provided by the applicant, the
25 staff's site visit, the NYSDEC, the scoping process, and other public sources. Using this
26 information, the staff evaluated the potential impacts due to entrainment of early life stages of
27 fish and shellfish by continued operation and maintenance of Ginna. It is the staff's preliminary
28 conclusion that the potential impacts due to entrainment of fish and shellfish in early life stages
29 during the renewal term are SMALL.

30
31 During the course of the SEIS preparation, the staff considered mitigation measures for the
32 continued operation of Ginna. When continued operation for an additional 20 years is
33 considered as a whole, all of the specific effects on the environment (whether or not
34 "significant") were considered. Based on the assessment to date, the staff expects that the
35 measures in place at Ginna (e.g., placement of the intake structure) provide mitigation for
36 impacts related to entrainment, and no new mitigation measures are warranted.

4.1.2 Impingement of Fish and Shellfish

Impingement has been extensively monitored and impingement impacts evaluated at Ginna each year since 1973. NYSDEC has required submittal of annual reports on impingement monitoring as part of Ginna's SPDES permit. From 1997 through 2001, on average, over 625 fish per billion liters (165 fish per billion gallons) of water were impinged at Ginna. Table 4-3 lists the principal species collected in the impingement program. The three most common species impinged are all introduced species to Lake Ontario.

Table 4-3. List of the Fish from Lake Ontario Impinged at the R.E. Ginna Nuclear Power Plant from 1997 Through 2001 (RG&E 2002b)

Scientific Name	Common Name	Average Fish Impingement Rate		Percent of Individuals Collected
		(Fish per Billion Liters)	(Fish per Billion Gallons)	(Average over 5 years)
<i>Gasterosteus aculeatus</i>	threespine stickleback	281.04	(74.25)	44.93
<i>Osmerus mordax</i>	rainbow smelt	132.93	(35.12)	21.25
<i>Alosa pseudoharengus</i>	alewife	118.85	(31.40)	19.00
<i>Notropis hudsonius</i>	spottail shiner	29.90	(7.90)	4.78
<i>Cottus bairdi</i>	mottled sculpin	11.58	(3.06)	1.85
<i>Micropterus dolomieu</i>	smallmouth bass	10.79	(2.85)	1.72
<i>Cottus cognatus</i>	slimy sculpin	9.27	(2.45)	1.48
<i>Salvelinus namaycush</i>	lake trout	7.87	(2.08)	1.26
<i>Dorosoma cepedianum</i>	gizzard shad	6.62	(1.75)	1.06
<i>Noturus flavus</i>	stonecat	3.75	(0.99)	0.60
	All other species	13.02	(3.44)	2.07

Impingement impact assessments for Ginna have been developed over the years in consultation with NYSDEC. For alewife and smelt, the total annual projected number impinged is compared to the Lake Ontario (New York state waters) population for that species and year as reported by NYSDEC and the U.S. Fish and Wildlife Service (FWS). RG&E then calculates the percentage of the lake population impinged and makes a determination of impact, which is reported to NYSDEC. Because lake population information is not available for other species, a qualitative approach must be used, primarily using information provided by NYSDEC.

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1 Based on information collected from 1983 through 2001, Ginna has impinged an estimated
2 0.001 percent of the alewife population and 0.0008 percent of the smelt population in Lake
3 Ontario. These impingement losses are considered negligible in relation to the lake populations
4 for both species. Using the maximum values, these findings show that only about three
5 alewives for every 100,000 in the New York state waters of Lake Ontario, and three smelt for
6 every 100,000 in the New York state waters, would be impinged. The most recent RG&E
7 Impingement Program Report concluded that the impingement impact per year for alewife and
8 smelt is very low and must be considered negligible (RG&E 2002b).

9
10 Impingement impact determinations regarding other species are limited to qualitative
11 evaluations because there are no estimates of their populations within Lake Ontario.
12 Section 2.2.5 discusses the overall lakewide reductions in fish populations as reported by
13 NYSDEC through their annual assessments within the Eastern Basin of Lake Ontario.
14 Correspondingly, Ginna impingement numbers have declined substantially throughout the past
15 29 years.

16
17 The alewife and smelt impingement data indicate that the percentage of the lake population
18 impinged is fairly constant and correlates with abundance in the lake. NYSDEC studies since
19 1976 have shown that the alewife and smelt populations in Lake Ontario have declined. This is
20 consistent with the impingement data, which show generally decreasing numbers, similar to
21 what is being reported for the lake overall.

22
23 Impingement studies have consistently demonstrated that Ginna intake system operations have
24 an extremely limited and minimal impact upon alewife and smelt populations. Likewise,
25 impingement of other species has been consistent with lakewide trends and indicates no
26 localized impacts. Based on these facts, RG&E concluded in the ER that impingement impacts
27 from Ginna operations during the license renewal period will not be substantially different from
28 those previously evaluated and approved within the SPDES permit process (RG&E 2002a).
29 The current SPDES permit includes similar requirements on assessing impingement, including
30 annual reports on the impingement monitoring reports, and does not call for mitigative efforts at
31 this time (NYSDEC 2003a).

32
33 The staff has reviewed the available information, including that provided by the applicant, the
34 staff's site visit, the NYSDEC, the scoping process, and other public sources. Using this
35 information, the staff evaluated the potential impacts due to impingement of fish and shellfish by
36 continued operation and maintenance of Ginna. It is the staff's preliminary conclusion that the
37 potential impacts due to impingement of fish and shellfish during the renewal term are SMALL.

38
39 During the course of the SEIS preparation, the staff considered mitigation measures for the
40 continued operation of Ginna. When continued operation for an additional 20 years is

considered as a whole, all of the specific effects on the environment (whether or not “significant”) were considered. Based on the assessment to date, the staff expects that the measures in place at Ginna (e.g., the offshore, underwater intake) provide mitigation for all impacts related to impingement, and no new mitigation measures are warranted.

4.1.3 Heat Shock

The issue of heat shock to fish and shellfish resources from thermal discharges into Lake Ontario has been investigated by RG&E in support of the Clean Water Act Section 316(a) variance for Ginna (RG&E 1977) and in compliance with subsequent NYSDEC SPDES permits (RG&E 2002a). Of primary concern is the impact of heat shock on impinged fish that are returned to the discharge canal and subsequently into Lake Ontario. In addition to heat shock, fish impinged at Ginna are subjected to the stress of being impinged on the intake screen and passage through the fish return system.

Heat shock to fish is a function of the temperature increase that the fish are subjected to in the discharge canal and the residence time of the fish in the elevated temperatures of the discharge flow (Fry 1971; Dean 1973). Residence time at Ginna is determined by the discharge velocity and the distance that the fish have to travel before reaching cooler temperatures. Discharge velocities in the area where the impinged fish are returned range from 0.6 to 1.5 m/s (2.0 to 5.0 fps). The distance that the fish have to travel before reaching the point of entry into the lake, and ambient water temperatures, is about 30 m (100 ft). Thus, the residence time the fish would be in elevated temperatures is approximately 20 to 50 seconds. RG&E concluded that a fish subjected to discharge temperatures for less than a minute would not be adversely affected. There are areas within the discharge canal that can reach upper lethal threshold temperatures for representative fish. However, the residence time for even a fish that becomes disoriented from the heat would be less than would be expected to cause death (RG&E 2002a). This conclusion is further supported in a recent review by Beitinger et al. (Beitinger 2000) concerning temperature tolerances of North American freshwater fishes that includes many of the representative important species identified for Ginna.

The Ginna 316(a) Demonstration Supplement (RG&E 1977) discussed the potential of heat shock to impinged fish and concluded:

This supplement demonstrates that the shoreline surface discharge of the Ginna Nuclear Power Plant assures the protection and propagation of a balanced indigenous aquatic community as exemplified by the Representative Important Species at the Ginna Site.

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1 Since 1985, NYSDEC has approved the conclusion in the Ginna 316(a) Demonstration
2 Supplement in the SPDES permit for the operation of Ginna. The current SPDES permit states:

3
4 The water temperature at the surface of Lake Ontario shall not be raised more than three
5 Fahrenheit degrees over the temperature that existed before the addition of heat of artificial
6 origin except that in a mixing zone consisting of an area of 320 acres from the point of
7 discharge, this temperature may be exceeded.

8
9 Further evaluation of heat shock on impinged fish returned to the discharge canal may be
10 required as part of the NYSDEC SPDES permit program. NYSDEC issued a proposed
11 modification to the SPDES permit for review and comment that would require RG&E to conduct
12 an assessment of the potential for increased mortality to impinged fish returned to the
13 discharge canal due to thermal stress (NYSDEC 2003c). This study, if incorporated into the
14 SPDES permit, would be required to be completed in 2004, at which time NYSDEC would
15 determine whether additional mitigation is required.

16
17 The staff has reviewed the available information, including that provided by the applicant, the
18 staff's site visit, the NYSDEC, the scoping process, and other public sources. Using this
19 information, the staff evaluated the potential impacts to aquatic resources due to heat shock
20 during continued operation and maintenance of Ginna. It is the staff's preliminary conclusion
21 that the potential impacts to aquatic resources due to heat shock during the renewal term are
22 SMALL.

23
24 During the course of the SEIS preparation, the staff considered mitigation measures for the
25 continued operation of Ginna. When continued operation for an additional 20 years is
26 considered as a whole, all of the specific effects on the environment (whether or not
27 "significant") were considered. Based on the assessment to date, the staff expects that the
28 measures in place at Ginna (e.g., design and placement of the discharge) provide mitigation for
29 all impacts related to heat shock, and no new mitigation measures are warranted.

30 31 **4.2 Transmission Lines**

32
33 The *Final Environmental Statement Related to Operation of Ginna Nuclear Power Plant Unit 1,*
34 *Rochester Gas and Electric Corporation* (AEC 1973) describes four transmission lines running
35 in the same right-of way that connect Ginna with the transmission system. This transmission
36 line right-of-way covers approximately 85 ha (210 ac) over a total length of approximately 5.6
37 km (3.5 mi). Tree trimming is normally only required at mid-span. Herbicides are used
38 occasionally, primarily applied to individual trees or shrubs to prevent re-sprouting. Mowing is
39 used only to provide access to individual towers when needed. The applicant uses only non-
40 restricted-use herbicides, and these are applied under the supervision of licensed pesticide

applicators. Buffer strips are left adjacent to wetlands and stream crossings. RG&E has a New York State Public Service Commission-approved long-range vegetation management plan for its transmission line rights-of-way (RG&E 1995).

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that are applicable to transmission lines from Ginna are listed in Table 4-4. In the Ginna ER, RG&E stated that it is not aware of any new and significant information concerning the transmission lines or right-of-way maintenance for the Category 1 issues associated with the renewal of the Ginna OL. The staff conducted an independent review of the Ginna ER, a site visit, the scoping process, consultation with the FWS and NYSDEC, and an evaluation of other available information. The staff concludes that there are no impacts related to the Category 1 issues discussed in the GEIS or for the new issue identified during scoping. For all of these issues, the staff's preliminary conclusions are that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-4. Category 1 Issues Applicable to R.E. Ginna Nuclear Power Plant Transmission Lines During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
TERRESTRIAL RESOURCES	
Power line right-of-way management (cutting and herbicide application)	4.5.6.1
Bird collisions with power lines	4.5.6.2
Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	4.5.6.3
Flood plains and wetland on power line right-of-way	4.5.7
AIR QUALITY	
Air-quality effects of transmission lines	4.5.2
LAND USE	
Onsite land use	4.5.3
Power line right-of-way	4.5.3

A brief description of the staff's review and GEIS conclusions, as codified in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, for each of these issues follows.

- Power line right-of-way management (cutting and herbicide application). Based on information in the GEIS, the Commission found that

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The impacts of right-of-way maintenance on wildlife are expected to be of small significance at all sites.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of power line right-of-way maintenance during the renewal term beyond those discussed in the GEIS.

- Bird collisions with power lines. Based on information in the GEIS, the Commission found that

Impacts are expected to be of small significance at all sites.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of bird collisions with power lines during the renewal term beyond those discussed in the GEIS.

- Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock). Based on information in the GEIS, the Commission found that

No significant impacts of electromagnetic fields on terrestrial flora and fauna have been identified. Such effects are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of electromagnetic fields on flora and fauna during the renewal term beyond those discussed in the GEIS.

- Flood plains and wetlands on power line right-of-way. Based on information in the GEIS, the Commission found that

Periodic vegetation control is necessary in forested wetlands underneath power lines and can be achieved with minimal damage to the wetland. No significant impact is expected at any nuclear power plant during the license renewal term.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of power line rights-of-way on flood plains and wetlands during the renewal term beyond those discussed in the GEIS.

- Air-quality effects of transmission lines. Based on the information in the GEIS, the Commission found that

Production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no air quality impacts of transmission lines during the renewal term beyond those discussed in the GEIS.

- Onsite land use. Based on the information in the GEIS, the Commission found that

Projected onsite land use changes required during ... the renewal period would be a small fraction of any nuclear power plant site and would involve land that is controlled by the applicant.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no onsite land-use impacts during the renewal term beyond those discussed in the GEIS.

- Power line right-of-way (land use). Based on information in the GEIS, the Commission found that

Ongoing use of power line right of ways would continue with no change in restrictions. The effects of these restrictions are of small significance.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of power line rights-of-way during the renewal term beyond those discussed in the GEIS.

Category 2 and uncategorized issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that are applicable to transmission lines from Ginna are listed in Table 4-5, and are discussed in Sections 4.2.1 and 4.2.2.

Table 4-5. Category 2 and Uncategorized Issues Applicable to the R.E. Ginna Nuclear Power Plant Transmission Lines During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
HUMAN HEALTH			
Electromagnetic fields, acute effects (electric shock)	4.5.4.1	H	4.2.1
Electromagnetic fields, chronic effects	4.5.4.2	NA	4.2.2

4.2.1 Electromagnetic Fields—Acute Effects

In the GEIS, the Commission found that without a review of the conformance of each nuclear plant transmission line to the criteria established in the National Electrical Safety Code (NESC) (IEEE 1997), it was not possible to determine the significance of the electric shock potential. Evaluation of individual plant transmission lines is necessary because the issue of electric shock safety was not addressed in the licensing process for some plants. For other plants, land use in the vicinity of transmission lines may have changed, or power distribution companies may have chosen to upgrade line voltage. To comply with 10 CFR 51.53(c)(3)(ii)(H), an applicant must provide an assessment of the potential shock hazard if the transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the NESC for preventing electric shock from induced currents.

To support its conclusion that the four 115-kV transmission lines at Ginna are in compliance with the NESC 5-mA, electric-field-induced current limit, RG&E performed field measurements. These measurements demonstrated compliance. The Ginna transmission lines are within the scope of the U.S. Nuclear Regulatory Commission (NRC) license renewal environmental review, and are below the size of concern for induced shock. Field measurements demonstrate the electric-field-induced currents from these transmission lines are well below the NESC recommendations for preventing electric shock from induced currents (RG&E 2002a).

The staff has reviewed the available information, including that provided by the applicant, the staff's site visit, the scoping process, and other public sources. Using this information, the staff evaluated the potential impacts for electric shock resulting from operation of Ginna and associated transmission lines. It is the staff's preliminary conclusion that the potential impacts for electric shock during the renewal term are SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Ginna. When continued operation for an additional 20 years is

considered as a whole, all of the specific effects on the environment (whether or not “significant”) were considered. Based on the assessment to date, the staff expects that the measures in place at Ginna (e.g., transmission lines in compliance with the NESC) provide mitigation for all impacts related to acute effects of electromagnetic fields, and no new mitigation measures are warranted.

4.2.2 Electromagnetic Fields—Chronic Effects

In the GEIS, the chronic effects of 60-hz electromagnetic fields from power lines were not designated as Category 1 or 2, and will not be categorized until a scientific consensus is reached on the health implications of these fields.

The potential for chronic effects from these fields is not known at this time and continues to be studied. The National Institute of Environmental Health Sciences (NIEHS) directs related research through the U.S. Department of Energy. A NIEHS report (NIEHS 1999) contains the following conclusion:

The NIEHS concludes that ELF-EMF [extremely low frequency-electromagnetic field] exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

This statement is not sufficient to cause the staff to change its position with respect to the chronic effects of electromagnetic fields. The staff considers the GEIS finding of “not applicable” still appropriate and will continue to follow developments on this issue.

4.3 Radiological Impacts of Normal Operations

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that are applicable to Ginna in regard to radiological impacts are listed in Table 4-6. RG&E stated in the Ginna ER that it is not aware of any new and significant information associated with the renewal of the Ginna OL. No new and significant information on these issues has been identified by the staff during its independent review of the Ginna ER, the staff’s site visit, the scoping process, discussions with other agencies, or its evaluation of other information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the

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GEIS. For these issues, the staff concluded in the GEIS that the impacts are SMALL, and plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-6. Category 1 Issues Applicable to Radiological Impacts of Normal Operations During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
HUMAN HEALTH	
Radiation exposures to public (license renewal term)	4.6.2
Occupational radiation exposures (license renewal term)	4.6.3

A brief description of the staff's review and the GEIS conclusions, as codified in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, for each of these issues follows.

- Radiation exposures to public (license renewal term). Based on information in the GEIS, the Commission found that

Radiation doses to the public will continue at current levels associated with normal operations.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of radiation exposures to the public during the renewal term beyond those discussed in the GEIS.

- Occupational radiation exposures (license renewal term). Based on information in the GEIS, the Commission found that

Projected maximum occupational doses during the license renewal term are within the range of doses experienced during normal operations and normal maintenance outages, and would be well below regulatory limits.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts of occupational radiation exposures during the renewal term beyond those discussed in the GEIS.

There are no Category 2 issues related to radiological impacts of routine operations.

4.4 Socioeconomic Impacts of Plant Operations During the License Renewal Term

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that are applicable to socioeconomic impacts during the renewal term are listed in Table 4-7. RG&E stated in the Ginna ER that it is not aware of any new and significant information associated with the renewal of the Ginna OL. The staff has not identified any new and significant information during its independent review of the RG&E ER, the staff's site visit, the scoping process, discussions with other agencies, or its evaluation of other information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the staff concluded in the GEIS that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-7. Category 1 Issues Applicable to Socioeconomics During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
SOCIOECONOMIC	
Public services: public safety, social services, and tourism and recreation	4.7.3; 4.7.3.3; 4.7.3.4; 4.7.3.6
Public services: education (license renewal term)	4.7.3.1
Aesthetic impacts (license renewal term)	4.7.6
Aesthetic impacts of transmission lines (license renewal term)	4.5.8

A brief description of the staff's review and the GEIS conclusions, as codified in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, for each of these issues follows.

- Public services – public safety, social services, and tourism and recreation. Based on information in the GEIS, the Commission found that

Impacts to public safety, social services, and tourism and recreation are expected to be of small significance at all sites.

The staff has not identified any new and significant information. Therefore, the staff concludes that there are no impacts on public safety, social services, and tourism and recreation during the renewal term beyond those discussed in the GEIS.

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- 1 • Public services – education (license renewal term). Based on information in the GEIS,
2 the Commission found that

3
4 Only impacts of small significance are expected.

5
6 The staff has not identified any new and significant information. Therefore, the staff
7 concludes that there are no impacts on education during the renewal term beyond those
8 discussed in the GEIS.

- 9
10 • Aesthetic impacts (license renewal term). Based on information in the GEIS, the
11 Commission found that

12
13 No significant impacts are expected during the license renewal term.

14
15 The staff has not identified any new and significant information. Therefore, the staff
16 concludes that there are no aesthetic impacts during the renewal term beyond those
17 discussed in the GEIS.

- 18
19 • Aesthetic impacts of transmission lines (license renewal term). Based on information in
20 the GEIS, the Commission found that

21
22 No significant impacts are expected during the license renewal term.

23
24 The staff has not identified any new and significant information. Therefore, the staff
25 concludes that there are no aesthetic impacts of transmission lines during the renewal term
26 beyond those discussed in the GEIS.

27
28 Table 4-8 lists the Category 2 socioeconomic issues that require plant-specific analysis and
29 environmental justice, which was not addressed in the GEIS. These issues are discussed in
30 Sections 4.4.1 through 4.4.6.

Table 4-8. Environmental Justice and GEIS Category 2 Issues Applicable to Socioeconomics During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
SOCIOECONOMIC			
Housing impacts	4.7.1	I	4.4.1
Public services: public utilities	4.7.3.5	I	4.4.2
Offsite land use (license renewal term)	4.7.4	I	4.4.3
Public services, transportation	4.7.3.2	J	4.4.4
Historic and archaeological resources	4.7.7	K	4.4.5
Environmental justice	Not addressed ^(a)	Not addressed ^(a)	4.4.6
(a) Guidance related to environmental justice was not in place at the time the GEIS and the associated revision to 10 CFR Part 51 were prepared. Therefore, environmental justice must be addressed in the licensee's ER and the staff's environmental impact statement.			

4.4.1 Housing Impacts During Operations

Impacts on housing are considered SMALL when a small or not easily discernible change in housing availability occurs. Impacts are considered MODERATE when there is discernible but short-lived reduction in available housing units because of project-induced migration. Impacts are considered LARGE when project-related housing demands result in very limited housing availability and would increase rental rates and housing values well above normal inflation (NRC 1996).

In determining housing impacts, the applicant chose to follow Appendix C of the GEIS (NRC 1996), which presents a population characterization method that is based on two factors, "sparseness" and "proximity." Sparseness measures population density within 32 km (20 mi) of the site, and proximity measures population density and city size within 80 km (50 mi). Each factor has categories of density and size (GEIS Table C.1), and a matrix is used to rank the population category as low, medium, or high (GEIS Figure C.1).

During 2000, the population living within 32 km (20 mi) of Ginna was estimated to be approximately 581,745 (USCB 2000). This total converts to a population density of about 357 persons/km² (926 persons/mi²) living on the land area within a 32-km (20-mi) radius of

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1 Ginna.^(a) This concentration falls into the GEIS sparseness Category 4 (i.e., having greater than
2 or equal to 46 persons/km² [120 persons/mi²]) (USCB 2000).

3
4 An estimated 1.25 million people live within 80 km (50 mi) of the Ginna site (USCB 2000),
5 equating to a population density of around 124 persons/km² (318 persons/mi²) on the available
6 land area.^(b) Applying the GEIS proximity measures (NRC 1996), Ginna is classified as
7 Category 4 (i.e., having greater than or equal to 73 persons/km² [190 persons/mi²] within 80 km
8 [50 mi] of the site). According to the GEIS criteria, these sparseness and proximity scores place
9 Ginna in a high-population area.

10
11 10 CFR Part 51, Subpart A, Appendix B, Table B-1, states that impacts on housing availability
12 are expected to be of SMALL significance at plants located in a high-population area where
13 growth-control measures are not in effect. The Ginna site is located in a high-population area.
14 Monroe and Wayne Counties are not subject to growth-control measures that would limit
15 housing development.

16
17 SMALL impacts result when no discernible change in housing availability occurs, changes in
18 rental rates and housing values are similar to those occurring statewide, and no housing
19 construction or conversion is required to meet new demand (NRC 1996). The GEIS assumes
20 that an additional staff of 60 permanent per-unit workers might be needed during the license
21 renewal period to perform routine maintenance and other activities. RG&E does not plan any
22 new refurbishment activity as part of the license renewal process; therefore, employment will not
23 change in the area as result of license renewal. Thus, RG&E concludes that there are no
24 impacts to housing from license renewal activities (RG&E 2002a). However, to establish an
25 upper bound on possible increased employment during the license renewal term, RG&E
26 assumes the hiring of 60 additional permanent workers. It is assumed that the hiring of these
27 additional 60 employees would result in 40 indirect jobs, or an increased demand for a total of
28 100 housing units. Using the fact that 92 percent of its employees live in Monroe and Wayne
29 Counties (Table 2-5), RG&E concludes that a demand for 92 housing units would be created in
30 the two counties. The demand for the housing units could be met with the construction of new
31 houses or the use of existing, unoccupied houses. In 2000, Wayne and Monroe Counties had a
32 total of 343,000 housing units (Table 2-6), and vacancy rates in both counties were more than
33 5 percent. The increase in projected housing units would not create a discernible change in

(a) These numbers differ from those presented in the Ginna ER. In their calculations, RG&E took the surface area in the 32-km (20-mi) and 80-km (50-mi) radii and distributed the population evenly within the circles. However, the circles encompass a large area of Lake Ontario. It was assumed that the lake encompasses half the area for the 32-km (20-mi) and 80-km (50-mi) circles. As such, the population concentrations were adjusted, resulting in higher population concentrations than those reported in the Ginna ER.

(b) Note that these conclusions differ from the Ginna ER for the reasons stated in footnote (a).

housing availability, a change in rental rates or housing values, or spur new construction or conversion. As a result, RG&E concludes that the impacts would be SMALL, and mitigation measures would not be necessary or effective (RG&E 2002a).^(a)

The staff has reviewed the available information, including that provided by the applicant, the staff's site visit, the scoping process, discussions with other agencies, and other public sources. Using this information, the staff evaluated the potential housing impacts resulting from operation of Ginna during the license renewal term. It is the staff's preliminary conclusion that the potential housing impacts during the renewal term are SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Ginna. When continued operation for an additional 20 years is considered as a whole, all of the specific effects on the environment (whether or not "significant") were considered. Based on this assessment, the staff expects that the measures in place at Ginna provide mitigation for all impacts related to housing, and no new mitigation measures are warranted.

4.4.2 Public Services: Public Utility Impacts During Operations

Impacts on public utility services are considered SMALL if there is little or no change in the ability of the system to respond to the level of demand, so there is no need to add capital facilities. Impacts are considered MODERATE if overtaxing of service capabilities occurs during periods of peak demand. Impacts are considered LARGE if existing levels of service (e.g., water or sewer services) are substantially degraded and additional capacity is needed to meet ongoing demands for services. The GEIS indicates that, in the absence of new and significant information to the contrary, the only impacts on public utilities that could be significant are impacts on public water supplies (NRC 1996).

Analysis of impacts on the public water supply system considered both plant demand and plant-related population growth. Section 2.2.2 describes the Ginna-permitted withdrawal rate and actual use of water. RG&E plans no refurbishment at Ginna, so plant demand would not change beyond current demands (RG&E 2002a).

In the ER, RG&E assumed, for the purposes of impact analysis only, an increase of 60 employees to perform license renewal activities. RG&E also assumed the generation of 100 new jobs and a net overall population increase of approximately 308 as a result of those

(a) The RG&E estimate of 100 housing units (92 units for Monroe and Wayne Counties) is likely to be an extreme "upper bound" estimate. Most of the potentially new jobs would likely be filled by existing area residents, thus creating no, or little, net demand for housing.

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jobs.^(a) The plant-related population increase would increase demand for water by an additional 60 to 90 m³/d (1.6×10^{-2} to 2.3×10^{-2} MGD) (RG&E 2002a). This amount is within the total residual capacity of the water treatment plants serving Monroe and Wayne Counties (Table 2-8).

The staff has reviewed the available information, including that provided by the applicant, the staff's site visit, the scoping process, discussions with other agencies, and other public sources. Using this information, the staff evaluated the potential impacts of increased water use resulting from the potential increase in employment. It is the staff's preliminary conclusion that the potential impacts of increased water use resulting from the potential increase in employment during the renewal term are SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Ginna. When continued operation for an additional 20 years is considered as a whole, all of the specific effects on the environment (whether or not "significant") were considered. Based on this assessment, the staff expects that the measures in place at Ginna provide mitigation for all impacts related to public services, and no new mitigation measures are warranted.

4.4.3 Offsite Land Use During Operations

Offsite land use during the license renewal term is a Category 2 issue (10 CFR Part 51, Subpart A, Appendix B, Table B-1). Table B-1 of 10 CFR Part 51 Subpart A, Appendix B, notes that "significant changes in land use may be associated with population and tax revenue changes resulting from license renewal."

Section 4.7.4 of the GEIS defines the magnitude of land-use changes as a result of plant operation during the license renewal term as follows:

SMALL – Little new development and minimal changes to an area's land-use pattern.

MODERATE – Considerable new development and some changes to the land-use pattern.

LARGE – Large-scale new development and major changes in the land-use pattern.

For the purposes of impact analysis, RG&E has identified the need for a maximum of 60 additional employees to perform license renewal activities during the license renewal term plus an additional 40 indirect jobs (total 100) in the community (RG&E 2002a). Section 3.7.5 of the

(a) Calculated by assuming that the average number of persons per household is 3.08 in the State of New York ($100 \text{ jobs} \times 3.08 = 308$) (USCB 2000).

1 GEIS (NRC 1996) states that if plant-related population growth is less than 5 percent of the
2 study area's total population, offsite land-use changes would be small, especially if the study
3 area has established patterns of residential and commercial development, a population density
4 of at least 23 persons/km² (60 persons/mi²), and at least one urban area with a population of
5 100,000 or more within 80 km (50 mi). In this case, population growth will be less than 5 percent
6 of the area's total population, the area has established patterns of residential and commercial
7 development (Table 2-9), a population density of well over 23 persons/km² (60 persons/mi²), and
8 an urban area with a population of 100,000 or more within 80 km (50 mi). Consequently, the
9 staff concludes that population changes resulting from license renewal are likely to result in
10 SMALL offsite land-use impacts.

11
12 Tax revenue can affect land use because it enables local jurisdictions to provide the public
13 services (e.g., transportation and utilities) necessary to support development. Section 4.7.4.1 of
14 the GEIS states that the assessment of tax-driven land-use impacts during the license renewal
15 term should consider (1) the size of the plant's payments relative to the community's total
16 revenues, (2) the nature of the community's existing land-use pattern, and (3) the extent to
17 which the community already has public services in place to support and guide development. If
18 the plant's tax payments are projected to be small relative to the community's total revenue,
19 tax-driven, land-use changes during the plant's license renewal term would be small, especially
20 where the community has pre-established patterns of development and has provided adequate
21 public services to support and guide development. Section 4.7.2.1 of the GEIS states that if tax
22 payments by the plant owner are less than 10 percent of the taxing jurisdiction's revenue, the
23 significance level would be SMALL (NRC 1996). If a plant's tax payments are projected to be
24 medium-to-large relative to the community's total revenue, the impact of new tax-driven, land-
25 use changes would be MODERATE. The average percentage of the total revenue for
26 Wayne County, the town of Ontario, and the Wayne Central School District derived from
27 property taxes paid by RG&E for Ginna are 2 percent (1995 to 2001), 13.2 percent (1995 to
28 2001), and 12.4 percent (1995 to 1999), respectively.

29
30 The staff has reviewed the available information, including that provided by the applicant, the
31 staff's site visit, the scoping process, discussions with other agencies, and other public sources.
32 Using this information, the staff evaluated the potential impacts on offsite land use resulting from
33 operation of Ginna. While the tax receipts are large enough to potentially result in moderate
34 impacts on land use, these receipts are expected to decrease in the future. Tax receipts from
35 past operation of Ginna have not resulted in significant changes in land use in Wayne County.
36 Development has been focused on the west side of the county, and appears to be driven by
37 residential demand within a short commute distance from Rochester. There has also been little
38 retail or commercial development in the county. The criteria in the GEIS (Section C.4.1.5.2)
39 results in the assignment of an impact level of MODERATE when tax levels are greater than
40 10%. However, the case study assumed a certain level of refurbishment. As no major

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1 refurbishment activities are planned at Ginna to support license renewal, no new sources of
2 plant-related tax payments are expected that could significantly affect land use in Wayne
3 County. Based on these considerations, it is the staff's preliminary conclusion that the tax-
4 related land-use impacts are likely to be SMALL.

5
6 During the course of the SEIS preparation, the staff considered mitigation measures for the
7 continued operation of Ginna. When continued operation for an additional 20 years is
8 considered as a whole, all of the specific effects on the environment (whether or not "significant")
9 were considered. Based on this assessment, the staff expects that the measures in place at
10 Ginna provide mitigation for all impacts related to offsite land use, and no new mitigation
11 measures are warranted.

12 **4.4.4 Public Services: Transportation Impacts During Operations**

13
14 On October 4, 1999, 10 CFR 51.53(c)(3)(ii)(J) and 10 CFR Part 51, Subpart A, Appendix B,
15 Table B-1, were revised to clearly state that "Public Services: Transportation Impacts During
16 Operations" is a Category 2 issue (see NRC 1999 for more discussion of this clarification). The
17 issue is treated as such in this draft SEIS.

18
19 As noted in Section 2.2.8.2, NYS Route 104 serves as the primary east-west corridor in this
20 area, as indicated by volume of traffic. Traffic volume ranges from 20,000 to 40,000 vehicles
21 with the higher volumes existing near the entrance to Monroe County. Traffic volume on much
22 of NYS Route 104 in the vicinity of Ginna is well below capacity, while some of the two-lane
23 portions east of the town of Ontario are characterized as near capacity. Traffic volumes,
24 however, drop off dramatically on north-south routes crossing NYS Route 104 that access
25 County Route 101 and, subsequently, Ginna (RG&E 2002a).

26
27 The bounding scenario of 60 additional license renewal staff represents less than 3 percent of
28 the traffic volume on County Route 101, and if it is assumed that all employees would use
29 Ontario Center Road (Figure 2-4) to access the site from NYS Route 104, an increase of
30 60 additional vehicles represents less than 1 percent of the volume. The north-south routes for
31 which capacity information is available indicate that these roads are well below capacity (less
32 than 50 percent). Based on these facts, RG&E concluded that the impacts on transportation
33 during the license renewal term would be SMALL, and no mitigative measures would be
34 warranted (RG&E 2002a).

35
36 The staff has reviewed the available information, including that provided by the applicant, the
37 staff's site visit, the scoping process, discussions with other agencies, and other public sources.
38 Using this information, the staff evaluated the potential impacts to transportation service
39

resulting from operation of Ginna. It is the staff's preliminary conclusion that the potential impacts to transportation service degradation during the renewal term are SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Ginna. When continued operation for an additional 20 years is considered as a whole, all of the specific effects on the environment (whether or not "significant") were considered. Based on this assessment, the staff expects that the measures in place at Ginna provide mitigation for all impacts related to transportation, and no new mitigation measures are warranted.

4.4.5 Historic and Archaeological Resources

The National Historic Preservation Act (NHPA) requires that Federal agencies take into account the effects of their undertakings on historic properties, including significant archaeological sites. The historic preservation review process mandated by Section 106 of the NHPA is outlined in regulations issued by the Advisory Council on Historic Preservation at 36 CFR Part 800. Renewal of an OL is an undertaking that could potentially affect historic properties. Therefore, according to the NHPA, the NRC is required to make a good faith effort to identify historic properties in the areas of potential effects. The NRC is required to notify the State Historic Preservation Officer (SHPO) of the results of those efforts and of any properties that might be adversely affected by the undertaking before proceeding. If it is determined that historic properties are present, the NRC is required to assess and resolve possible adverse effects of the undertaking in consultation with the SHPO.

The Ginna site includes one structure eligible for inclusion in the National Register of Historic Places (NRHP). The transmission line that leads south from the plant is in proximity to an historic district listed on the NRHP. The 197-ha (488-ac) Ginna site lies in an area considered archaeologically sensitive by the SHPO^(a) and culturally highly sensitive by the Seneca Nation of New York (Mitchell and Maybee 2002).

The Brookwood Estate Manor House is considered historically significant and eligible for inclusion in the NRHP by the SHPO^(a). RG&E initially used the home for meetings and gatherings, but later it fell into disuse. The structure has been restored and is now once again used by Ginna staff for meetings and social events. It is also used by the Wayne Central High School for an alternative special education program. Current RG&E management of the

(a) Personal communication (e-mail) with Nancy Todd, New York State Office of Parks, Recreation and Historic Preservation, Waterford, New York (December 27, 2002).

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1 Brookwood Estate Manor House appears to be an effective adaptive reuse of the structure that
2 preserves the historic qualities of the building.

3
4 While the transmission line right-of-way passes directly west of the Brick Church Corners historic
5 district, it does not adversely affect the historical setting of the district. The transmission lines
6 are hung from wooden supports, and the edges of the right-of-way are tree-lined. When the
7 trees are in leaf, the transmission lines are mostly obscured from sight. Renewal of the OL
8 should not affect any of the other historic properties near Ginna.

9
10 Since no archaeological surveys have been conducted at the Ginna site, it is not known whether
11 archaeological sites eligible for inclusion in the NRHP exist there. Archaeological sites have
12 been recorded in proximity to Ginna. The proximity of Ginna to Lake Ontario, the two streams
13 that run through the property and empty into the lake, and the existence of archeological sites
14 along other reaches of those streams have led the SHPO to determine that the undeveloped and
15 agriculturally developed portions of the Ginna site are archaeologically sensitive^(a).

16
17 It is likely that the Ginna site was used in prehistoric times for hunting and fishing. Lake Ontario
18 also provided a trade route used in both prehistoric and proto-historic times. The area lies within
19 the traditional range of the Seneca. The Seneca Nation of New York has determined that the
20 area has a high probability of including traditional Native American cultural properties, and finds
21 the area culturally highly sensitive (Mitchell and Maybee 2002).

22
23 The proposed action includes no new construction or refurbishment. Thus, any historic or
24 archaeological resources at Ginna should not be adversely impacted by renewal of the OL. If
25 there is future development at the Ginna site, the development could adversely affect historic or
26 archaeological resources. Development actions that could impact resources include ground-
27 disturbing activities beyond current practices and any actions that would damage or significantly
28 change the Brookwood Manor House. The impacts of such actions could be mitigated through
29 appropriate measures, including regular maintenance of the estate, timely consultation,
30 avoidance, and data recovery.

31
32 The staff reviewed information provided by the applicant, the staff's site visit, the SHPO, the
33 Seneca Nation of New York, the scoping process, and other public sources. Using this
34 information, the staff evaluated the potential impacts on historic and archaeological resources
35 resulting from continued operation of Ginna for an additional 20 years. It is the staff's
36 preliminary conclusion that the potential impacts to known historic and archaeological resources
37 during the renewal term are SMALL.

38
39 During the course of the SEIS preparation, the staff considered mitigation measures for the
40 continued operation of Ginna. When continued operation for an additional 20 years is

considered as a whole, all of the specific effects on the environment (whether or not “significant”) were considered and no additional mitigation is required.

4.4.6 Environmental Justice

Environmental justice refers to a Federal policy that requires Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its actions on minority^(a) or low-income populations. The memorandum accompanying Executive Order 12898 (59 FR 7629) directs Federal executive agencies to consider environmental justice under the National Environmental Policy Act of 1969 (NEPA). The Council on Environmental Quality (CEQ) has provided guidance for addressing environmental justice (CEQ 1997). Although the Executive Order is not mandatory for independent agencies, the NRC has voluntarily committed to undertake environmental justice reviews. Specific guidance is provided in NRC Office of Nuclear Reactor Regulation Office Instruction LIC-203, “Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues” (NRC 2001).

The staff examined the geographic distribution of minority and low-income populations within 80 km (50 mi) of the Ginna site, employing the 2000 census for low-income and minority populations (USCB 2000). The populations within an 80-km (50-mi) radius of Ginna encompassed parts of 13 counties. The staff supplemented its analysis by field inquiries to county planning departments, social service agencies, personnel in Wayne and Monroe Counties, and a private social service agency in Wayne County.

For the purpose of the staff’s review, a minority population is defined to exist if the percentage of each minority, or aggregated minority category within the census block groups^(b) potentially affected by the license renewal of Ginna, exceeds the corresponding percentage of minorities in the entire State of New York by 20 percent, or if the corresponding percentage of minorities

(a) The NRC Guidance for performing environmental justice reviews defines “minority” as American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic Origin, or Hispanic (NRC 2001).

(b) A census block group is a combination of census blocks, which are statistical subdivisions of a census tract. A census block is the smallest geographic entity for which the U.S. Census Bureau (USCB) collects and tabulates decennial census information. A census tract is a small, relatively permanent statistical subdivision of counties delineated by local committees of census data users in accordance with USCB guidelines for the purpose of collecting and presenting decennial census data. Census block groups are subsets of census tracts (USCB 2001).

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1 within the census block group is at least 50 percent. A low-income population is defined to exist
2 if the percentage of low-income population within a census block group exceeds the
3 corresponding percentage of low-income population in the entire State of New York by
4 20 percent, or if the corresponding percentage of low-income population within a census block
5 group is at least 50 percent.

6
7 The staff followed the convention of employing 2000 census block group data to identify minority
8 and low-income block groups within the 80-km (50-mi) radius of Ginna. Using this convention,
9 the 80-km (50-mi) radius includes 143 census block groups for minority populations and 173
10 census block groups for low-income populations (Figures 4-1 and 4-2) (USCB 2000). The “more
11 than 20 percentage points” above the comparison area criterion was used to determine whether
12 a census block group should be counted as containing minority or low-income populations.
13 Because the 20 percentage points criterion is a lower threshold, the 50 percent criterion was not
14 used (RG&E 2002a).

15
16 The staff followed the convention of employing census block groups and counts of individuals in
17 minority or low-income status. Figure 4-1 shows the distribution of minority populations (shaded
18 areas) within the 80-km (50-mi) radius. Minority populations are present in all counties within the
19 80-km (50-mi) radius of the Ginna site. Minority populations are primarily concentrated in the
20 urban center of Rochester. Monroe County contains 142 of the 143 block groups containing
21 significant minority populations.

22
23 Data from the 2000 census characterize low-income populations within the 80-km (50-mi) radius
24 of the Ginna site. Applying the NRC criterion of “more than 20 percent greater,” the census
25 block groups containing low-income populations were identified. Figure 4-2 shows the locations
26 of the low-income populations within 80 km (50 mi) of the Ginna site. The lower income
27 populations are concentrated around the urban center of Rochester, where 137 of the 173 low-
28 income block groups are found. Wayne County has 34 low-income block groups (USCB 2000).

29
30 With the locations of minority and low-income populations identified, the staff evaluated whether
31 any of the environmental impacts of the proposed action could affect these populations in a
32 disproportionately high and adverse manner. Based on staff guidance (NRC 2001), air, land,
33 and water resources within about 80 km (50 mi) of the Ginna site were examined. Within that
34 area, a few potential environmental impacts could affect human populations, but all of these
35 impacts were considered SMALL for the general population.

36
37 The pathways through which the environmental impacts associated with Ginna license renewal
38 can affect human populations are discussed in each associated section. During its review of the
39 information, including that provided by the applicant, the staff’s site visit, the scoping process,
40 discussions with other agencies, and other public sources, the staff found no unusual resource
41 dependencies or practices such as subsistence agriculture, hunting, or fishing through which



Figure 4-1. Geographic Distribution of Minority Populations (shown in shaded areas) Within 80 km (50 mi) of the R.E. Ginna Nuclear Power Plant Site Based on Census Block Group Data

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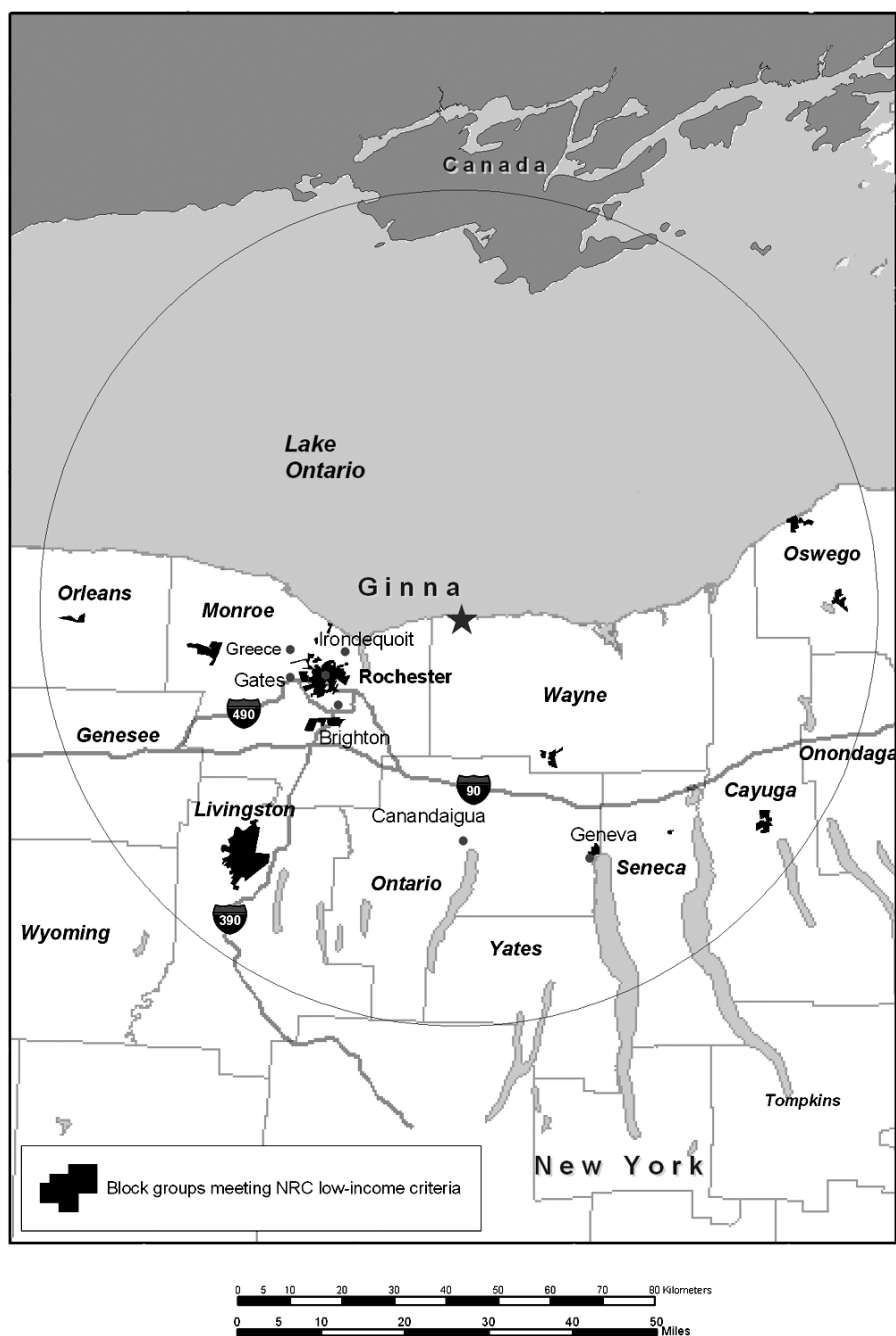


Figure 4-2. Geographic Distribution of Low-Income Populations (shown in shaded areas) Within 80 km (50 mi) of the R.E. Ginna Nuclear Power Plant Site Based on Census Block Group Data

minority and/or low-income populations could be disproportionately highly and adversely affected. In addition, the staff did not identify any location-dependent disproportionately high and adverse impacts that would affect these minority and low-income populations. The staff's preliminary conclusion is that potential offsite impacts from Ginna to minority and low-income populations during the renewal term are SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Ginna. When continued operation for an additional 20 years is considered as a whole, all of the specific effects on the environment (whether or not "significant") were considered. Based on the assessment to date, the staff expects that the measures in place at Ginna provide mitigation for all impacts related to environmental justice, and no new mitigation measures are warranted.

4.5 Groundwater Use and Quality

There are no groundwater withdrawals at Ginna, and RG&E imports less than 4 m³/min (100 gpm) for plant use. Therefore, the Category 1 issue, groundwater use and quality, in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, is applicable to Ginna. This issue is listed in Table 4-9. RG&E stated in the Ginna ER that it is not aware of any new and significant information associated with the renewal of the Ginna OL. The staff has not identified any new and significant information on this issue during its independent review of the ER, the staff's site visit, the scoping process, discussions with other agencies, or its evaluation of other information. Therefore, the staff concludes that there are no impacts related to this issue beyond those discussed in the GEIS. For this issue, the staff concludes that the impacts are SMALL, and plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-9. Category 1 Issue Applicable to Groundwater Use and Quality During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
GROUNDWATER USE AND QUALITY	
Groundwater-use conflicts (potable and service water; plants that use <100 gpm).	4.8.1.1

A brief description of the staff's review and the GEIS conclusions, as codified in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, 10 CFR Part 51, follows.

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- Groundwater-use conflicts (potable and service water; plants that use <100 gpm).

Based on information in the GEIS, the Commission found that

Plants using less than 100 gpm are not expected to cause any ground-water use conflicts.

Ginna groundwater use is less than 4 m³/min (100 gpm). The staff has not identified any new and significant information on this issue. Therefore, the staff concludes that there are no groundwater-use conflicts during the renewal term beyond those discussed in the GEIS.

There are no Category 2 issues related to groundwater use and quality for Ginna.

4.6 Threatened or Endangered Species

Threatened or endangered species are listed as a Category 2 issue in 10 CFR Part 51, Subpart A, Appendix B, Table B-1. This issue is listed in Table 4-10.

Table 4-10. Category 2 Issue Applicable to Threatened or Endangered Species During the Renewal Term

ISSUE – 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
THREATENED OR ENDANGERED SPECIES (FOR ALL PLANTS)			
Threatened or endangered species	4.1	E	4.6

This issue requires consultation with appropriate agencies to determine whether threatened or endangered species listed under the Endangered Species Act are present and whether they would be adversely affected by continued operation of the nuclear plant during the license renewal term. The presence of threatened or endangered species in the vicinity of the Ginna site is discussed in Sections 2.2.5 and 2.2.6 of this draft SEIS.

Consultation with the FWS was initiated by RG&E in January 2002 with a letter requesting information about the presence of threatened or endangered species in the vicinity of the Ginna (RG&E 2002d). The FWS responded on February 25, 2002, stating that except for occasional transient individuals, no listed, proposed, or candidate species were likely to occur in the site vicinity and that no biological assessment or further consultation under Section 7 was required (FWS 2002; ESA 1972). Staff analysis of data provided by the applicant and/or obtained from the NYSDEC (NYSDEC 2003b), and surveys of the Ginna site and surrounding environments confirmed the FWS conclusions.

The staff has reviewed the available information including that provided by the applicant, FWS, NYSDEC, the scoping process, and other public information sources. Based on this review and its independent analysis, the staff's preliminary conclusion is that continued operation of the plant and continued operation and maintenance of the transmission lines and right-of-way under license renewal is likely to have no effect on any Federally listed, threatened, or endangered species within the terrestrial or aquatic environs in the immediate vicinity of the Ginna site or the associated transmission lines. Further, the staff's preliminary conclusion is that continued operation of Ginna will not affect any New York State-listed terrestrial or aquatic species. Therefore, it is the staff's preliminary determination that the impact on threatened or endangered species of an additional 20 years of operation of the Ginna and of continued maintenance activities of the transmission right-of-way would be SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Ginna. When continued operation for an additional 20 years is considered as a whole, all of the specific effects on the environment (whether or not "significant") were considered. Based on this assessment, the staff expects that the measures in place at Ginna provide mitigation for all impacts related to threatened or endangered species, and no new mitigation measures are warranted.

4.7 Evaluation of Potential New and Significant Information on Impacts of Operations During the Renewal Term

During the scoping period, comments were received from the State of New York and the FWS related to shoreline erosion at the Ginna site. The issues raised are discussed in the following section.

4.7.1 Shoreline Erosion

During the Ginna site audit, on November 5, 2002, the NRC staff met with representatives from the NYSDEC. NYSDEC staff expressed a concern over the shoreline erosion rates occurring at the Ginna site. In a December 11, 2002, letter providing the NRC staff with scoping comments, NYSDEC again expressed its concern over shoreline erosion. In a January 6, 2003, letter the FWS also commented on the issue of shoreline erosion at the site.

To protect the shoreline immediately in front of the Ginna site, a revetment composed of riprap or large stones was installed during plant construction. The length of the protected shoreline has been extended during the plant operating period. Shoreline erosion is occurring both east and west of the portion of the shoreline not protected by the revetment. A revetment may redirect a portion of the erosional forces onto adjacent unprotected portions of the shoreline,

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thereby increasing erosion on the shoreline unprotected by the revetment. Shoreline erosion is a natural phenomenon, an endless redistribution process that continually alters the shoreline. Shorelines have always been areas of continuous and sometimes dramatic change. The force of waves, seiches, and ice movement on the shoreline of Lake Ontario all contribute to shoreline erosion. A variety of options are available to protect against continued shoreline erosion, including: bulkheads, revetments, breakwaters, groins, vegetation, and drainage controls. The NYSDEC has estimated the average annual erosion rate of the unprotected bluffs in the vicinity of Ginna to be between 0.3 and 0.5 m (1.0 and 1.5 ft) per year. Based on these estimates of shoreline erosion rates, the additional 20 years to the end of the proposed renewal period an additional 6 to 10 m (20 to 35 ft) of shoreline loss can be expected. Some portion of this erosion may be attributable to enhanced erosion resulting from presence of the revetment. This flank erosion, that is, erosion at the edges of the revetment, is localized and not quantitatively significant. The staff believes that any additional shoreline erosion that might occur at the east and west terminus of the revetment will not result in significant additional shoreline erosion a short distance from the riprap due to the localized nature of the flank erosion.

NYSDEC also expressed concern that the shoreline erosion could adversely affect Lake Ontario water quality in the vicinity of the site. Again, the erosion is an incremental quantity and is not expected to be detectable or destabilizing. Any erosion at the flanks of the revetment is expected to quickly be redistributed within the lake by natural processes. The staff believes that the amount of material that could be resuspended due to the increased erosion at the east and west terminus of the revetment would be inconsequential relative to the volume of water and would have no measurable impact on local water quality.

At the request of NYSDEC, RG&E has recently performed a survey of the shoreline in the vicinity of the Ginna site. This survey will help to understand the degree to which the revetment that RG&E has constructed has altered the natural erosion process. If additional surveys indicate that the natural erosion rate has been significantly altered, the State of New York may require that some mitigation measures be taken and other permits or permit modifications may be required. Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act of 1977, as amended, provides the authority to the U.S. Army Corps of Engineers to permit construction lakeward of the high-water mark on the banks of Lake Ontario. Such a permit would be required for most mitigation options, such as changes to the revetment.

The staff has reviewed the information about shoreline erosion and the design of the revetment at Ginna. The staff preliminarily concludes that the comments made by the NYSDEC do not represent information that would call into question the Commission's conclusions regarding GEIS Category 1 issues that impacts on aquatic and terrestrial resources and land use from continued operation of Ginna are SMALL and that additional plant-specific mitigation measures are not warranted at this time.

4.8 Cumulative Impacts of Operations During the Renewal Term

The staff considered potential cumulative impacts during the evaluation of information applicable to each of the potential impacts of operations during the renewal term identified within the GEIS. For the purposes of this analysis past actions were those related to the resources at the time of the plant licensing and construction, present actions are those related to the resources at the time of current operation of the power plant, and future actions are considered to be those that are reasonably foreseeable through the end of plant operation. Therefore, the analysis considers potential impacts through the end of the current license term, as well as the 20-year renewal license term. The geographical area over which past, present, and future actions that could contribute to cumulative impacts is dependent on the type of action considered, and is described below for each impact area.

The impacts of the proposed action, as described in Section 4.0, are combined with other past, present, and reasonably foreseeable future actions at Ginna regardless of what agency (Federal or non-Federal) or person undertakes such other actions. These combined impacts are defined as “cumulative” in 40 CFR 1508.7 and include individually minor but collectively significant actions taking place over a period of time. It is possible that an impact that may be SMALL by itself could result in a MODERATE or LARGE impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline.

4.8.1 Cumulative Impacts Resulting from Operation of the Plant Cooling System

For the purposes of this analysis, the geographic area considered is Lake Ontario. As described in Section 4.1, the staff found no new and significant information indicating that the conclusions regarding any of the cooling system-related Category 1 issues as related to Ginna are inconsistent with the conclusions in the GEIS. Additionally, the staff determined that none of the cooling system-related Category 2 issues were likely to have greater than a SMALL impact on local water quality or aquatic resources.

In general, the overall water quality of Lake Ontario and the status of the fishery and other aquatic resources have greatly improved since Ginna started operations. Therefore, there is no basis to conclude that the SMALL impacts of Ginna operations, including entrainment of fish and shellfish, impingement of fish and shellfish, heat shock, or any of the cooling system-related Category 1 issues are contributing to an overall decline in water quality or in the status of the fishery or other aquatic resources.

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During 1987, the governments of Canada and the United States made a commitment, as part of the Great Lakes Water Quality Agreement, to develop a Lakewide Management Plan for each of the five Great Lakes. According to the 1987 Agreement, the plans embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses in the lakes. The plans address sources of lake-wide critical pollutants. The plans are coordinated with other efforts that are best suited to address issues of local concern. In addition, the plans utilize linkages to other natural resource management activities, such as the development of Lake Ontario fish community objectives by the Great Lakes Fishery Commission and the Lake Ontario Committee of fisheries managers. The plans address impairments found in open waters of the lake and nearshore areas. Tributaries, including the Niagara River, are treated as inputs to the lake. The St. Lawrence River is treated as an output from the lake.^(a) Given the lake-wide management plans in place to protect Lake Ontario and its environs, the staff concludes that potential cumulative effects will be carefully assessed and managed over time.

As described in Section 2.2.8.2, local water utilities withdraw potable water primarily from five surface water sources, including Lake Ontario. The average daily water demand by the communities in the area is about 378 million liters (100 million gallons). To meet current demand and anticipated future growth, the Ontario Water District plans to increase the size of its intake pipes. This expansion will represent a minor increase over current surface water withdrawals, and will be regulated and controlled by New York State and other governmental agencies.

The staff, while preparing this assessment, assumed that other industrial, commercial, or public installations will be located in the general vicinity of Ginna prior to the end of Ginna operation. The intake of water from, and the discharge of water to Lake Ontario for these facilities would be regulated by the NYSDEC and other agencies, just as the Ginna plant is presently regulated. The intake and discharge limits for each installation are set considering the overall or cumulative impact of all of the other regulated activities in the area. Therefore, the staff concludes that the potential cumulative impacts of continued operation of Ginna will be SMALL, and that no additional mitigation measures are warranted.

4.8.2 Cumulative Impacts Resulting from Continued Operation of the Transmission Lines

The continued operation of the Ginna electrical transmission facilities was evaluated to determine if there is the potential for interactions with other past, present, and future actions that could result in adverse cumulative impacts to terrestrial resources such as wildlife populations, and the size and distribution of habitat areas; aquatic resources such as wetlands and

(a) <http://www.epa.gov/glnpo/lakeont/summary.html>, accessed on June 4, 2002.

1 floodplains; and both the acute and chronic effects of electromagnetic fields. For the purposes
2 of this analysis, the geographic area that encompasses the past, present and foreseeable future
3 actions that could contribute to adverse cumulative effects is the area within 80 km (50 mi) of the
4 Ginna site, as depicted in Figure 2-1.

5
6 As described in Section 4.2, the staff found no new and significant information indicating that the
7 conclusions regarding any of the transmission line-related Category 1 issues as related to Ginna
8 are inconsistent with the conclusions within the GEIS. The applicant follows right-of-way
9 management procedures (RG&E 1995) over all of its rights-of-way that are protective of wildlife
10 and habitat resources, including floodplains and wetlands. There are no State or Federally
11 regulated wetlands at the Ginna site or within the transmission line right-of-way connecting
12 Ginna to the power grid. Therefore, continued operation and maintenance of this right-of-way is
13 not likely to contribute to a regional decline in wetland or floodplain resources. The maintenance
14 procedures ensure minimal disturbance to wildlife and in many ways improve the habitat within
15 the rights-of-way relative to many of the surrounding land-uses.

16
17 The staff determined that the electric-field-induced currents from the Ginna transmission lines
18 are well below the National Electrical Safety Code (NESC) recommendations for preventing
19 electric shock from induced currents. Therefore, the Ginna transmission lines do not detectably
20 affect the overall potential for electric shock from induced currents within the analysis area. With
21 respect to chronic effects of electromagnetic fields, although the staff considers the GEIS finding
22 of "not applicable" to be appropriate in regard to Ginna, the Ginna transmission lines are not
23 likely to detectably contribute to the regional exposure to extremely low frequency-
24 electromagnetic fields (ELF-EMF). The Ginna transmission lines pass through a sparsely
25 populated, rural area with very few residences or business close enough to the lines to have
26 detectable ELF-EMF.

27
28 Therefore, the staff has determined that the cumulative impacts of the continued operation of the
29 Ginna transmission lines will be SMALL, and that no additional mitigation is warranted.

30 31 **4.8.3 Cumulative Radiological Impacts**

32
33 The radiological exposure limits for protection of the public and for occupational exposures have
34 been developed assuming long-term exposures, and therefore incorporate cumulative impacts.
35 As described in Section 2.2.7, the public and occupational doses resulting from Ginna are well
36 below regulatory limits, and as described in Section 4.3, the impacts of these exposures are
37 SMALL. For the purposes of this analysis, the geographical area is the area included within a
38 80-km (50-mi) radius of the Ginna Site (Figure 2-1). The NRC would regulate any reasonably
39 foreseeable future actions in the vicinity of Ginna that could contribute to cumulative radiological
40 impacts.

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Therefore, the staff determined that the cumulative radiological impacts of continued operation of Ginna will be SMALL, and that additional mitigation is not warranted.

4.8.4 Cumulative Socioeconomic Impacts

Much of the analyses of socioeconomic impacts presented in Section 4.4 of this SEIS already incorporate cumulative impact analysis because the metrics used for quantification only make sense when placed in the total or cumulative context. For instance, the impact of the total number of additional housing units that may be needed can only be evaluated with respect to the total number that will be available in the impacted area. Therefore, the geographical area of the cumulative analysis varies depending on the particular impact considered, and may depend on specific boundaries, such as taxation jurisdictions or may be distance related, as in the case of Environmental Justice.

The continued operation of Ginna is not likely to add to any cumulative socioeconomic impacts beyond those already evaluated in Sections 4.4. In other words, the impacts of issues such as transportation or offsite land-use are likely to be non-detectable beyond the regions previously evaluated and will quickly decrease with increasing distance from the site. The staff determined that the impacts on housing, public utilities, public services, and environmental justice would all be SMALL. The staff determined that the impact on off-site land-use is SMALL because, even though Ginna provides greater than 10% of the property tax revenue for the Town of Ontario and the Wayne Central School District there are no refurbishment actions planned at Ginna. There are no reasonably foreseeable scenarios that would alter these conclusions in regard to cumulative impacts.

Related to historic resources, there is one structure eligible for the inclusion in the NRHP on the Ginna site, and the transmission line is located near a historic district that is included on the NRHP. The current management of the Ginna site has functioned to protect these properties and the staff concluded that the impacts of license renewal would be SMALL. There is no reason to believe that the continued operation and maintenance of the Ginna site and transmission right-of-way would impact any properties beyond the site or right-of-way boundaries, and therefore the contribution to a cumulative impact on historic resources would be negligible.

The Seneca Nation has determined that it is likely that the Ginna site was used in prehistoric times, that it is culturally highly sensitive, and that the site has a high potential of including traditional Native American cultural properties (Section 4.4.5). These findings probably also apply to much of the Lake Ontario shoreline to the east and west of the Ginna site and it is reasonable to expect that these activities could impact shoreline areas (e.g., a Toronto company, Lake Ontario Fast Ferry Corp., is proposing daily passenger- and car-ferry service

1 between Rochester, New York and Toronto, Ontario.). Therefore, the increased development of
2 the shoreline along the southern shore of Lake Ontario may have a cumulative adverse effect on
3 these Native American cultural properties. However, because there are no plans for
4 refurbishment or other major changes at the Ginna site, the land and shoreline within the Ginna
5 boundaries is protected from further development or adverse impacts, at least through the
6 period of decommissioning.

7
8 Based on these considerations, the staff concludes that continued operation of Ginna is not
9 likely to make a detectable contribution to the cumulative effects associated with any of the
10 socioeconomic issues discussed in Section 4.4, and therefore, the cumulative impacts will be
11 SMALL and no additional mitigation measures are warranted.

12 13 **4.8.5 Cumulative Impacts on Groundwater Use and Quality**

14
15 There are no groundwater withdrawals at Ginna, and RG&E imports less than 4 m³/min
16 (100 gpm) of potable water from local utilities for plant use. As noted previously, surface water
17 is the primary source of potable water for local water utilities. The impact of current water usage
18 has been determined in Section 4.5 to be SMALL. Because there are no groundwater
19 withdrawals at Ginna and there are none anticipated in the future, the Ginna site is not causing a
20 detectable change in the regional groundwater usage, and therefore the cumulative impact is
21 SMALL and no mitigation measures are warranted.

22 23 **4.8.6 Cumulative Impacts on Threatened or Endangered Species**

24
25 The geographic area considered in the analysis of potential cumulative impacts to threatened or
26 endangered species includes Wayne County and the waters of Lake Ontario near Wayne
27 County. As discussed in Sections 2.2.5 and 2.2.6, there are several threatened or endangered
28 species that occur within this area. However, the staff determined in Section 4.6, that continued
29 operation of Ginna would have no effect on any of these species, primarily because none are
30 known to occur near the Ginna site or its transmission line right-of-way. Therefore, the
31 continued operation of Ginna will not contribute to a regional cumulative impact on these
32 species, regardless of whether or not other actions occur that could have adverse impacts.
33 There are no species currently considered to be candidates or proposed for listing as threatened
34 or endangered known to occur in the vicinity of Ginna. Also, it is unlikely that any listed species
35 will increase its known range to an extent that it would become adversely affected by continued
36 plant operation.

37
38 Therefore, the staff has determined that the cumulative impacts to threatened or endangered
39 species due to continued operation of the Ginna site and associated transmission line will be
40 SMALL, and that additional mitigation measures would not be warranted.

4.9 Summary of Impacts of Operations During the Renewal Term

RG&E and the staff discovered no new and significant information related to any of the applicable Category 1 issues associated with Ginna operation during the renewal term. Therefore, the staff concludes that the environmental impacts associated with the Category 1 issues are bounded by the impacts described in the GEIS. For each of the issues, the GEIS concluded that the impacts would be SMALL and that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

Plant-specific environmental evaluations were conducted for 11 Category 2 issues applicable to Ginna operation during the renewal term and for environmental justice and chronic effects of electromagnetic fields. For all 11 issues and environmental justice, the staff's preliminary conclusion is that the potential environmental impact of renewal-term operations of Ginna would be of SMALL significance in the context of the standards set forth in the GEIS and that further mitigation is not warranted. In addition, the staff determined that a consensus has not been reached by appropriate Federal health agencies regarding chronic adverse effects from electromagnetic fields. Therefore, no evaluation of this issue is required.

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

4.10 References

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