

## 4.0 Environmental Impacts of Operation

Environmental issues associated with operation during the renewal term were discussed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437 (NRC 1996; 1999a).<sup>(a)</sup> The GEIS included 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 were 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 characteristics.
- (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal).
- (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

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

This chapter addresses those issues related to operation during the renewal term that are listed in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to the Edwin I. Hatch Nuclear Plant (HNP). Section 4.1 addresses the Category 1 issues applicable to the HNP cooling-tower-based heat dissipation system, while Category 2 issues applicable to the HNP cooling system are discussed at greater length in Sections 4.1.1 and 4.1.2. Section 4.2 addresses Category 1 issues related to transmission lines and land use, while Category 2 issues are discussed in Sections 4.2.1 and 4.2.2. Section 4.3 addresses the radiological impacts of normal operation. There are no Category 2 issues related to radiological impacts of normal operation. Section 4.4 addresses the Category 1 issues related to the socioeconomic impacts of normal operation during the renewal term. Category 2 socioeconomic issues are

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(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.

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discussed in Sections 4.4.1 through 4.4.6. Section 4.5 addresses the Category 1 issues related to groundwater use and quality. Category 2 groundwater use and quality issues are discussed in Sections 4.5.1 and 4.5.2. Section 4.6 discusses the impacts of renewal-term operations on threatened and endangered species, a Category 2 issue. Section 4.7 addresses new information that was raised during the scoping period. The results of the evaluation of environmental issues related to operation during the renewal term are summarized in Section 4.8. Finally, Section 4.9 lists the references for Chapter 4.

### 4.1 Cooling System

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to the HNP cooling system operation during the renewal term are listed in Table 4-1. The Southern Nuclear Operating Company (SNC) stated in its Environmental Report (ER; SNC 2000a) that it is not aware of any new and significant information associated with the renewal of the HNP operating licenses (OLs). No significant new information has been identified by the staff during its review. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For all of the issues, the GEIS concluded 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: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of altered current patterns during the renewal term beyond those discussed in the GEIS.
- Temperature effects on sediment transport capacity: Based on information in the GEIS, the Commission found: "These effects 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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of temperature effects on sediment transport capacity during the renewal term beyond those discussed in the GEIS.

**Table 4-1.** Category 1 Issues Applicable to the Operation of the  
HNP Cooling System During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
<b>SURFACE WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)</b>	
Altered current patterns at intake and discharge structures	4.2.1.2.1; 4.3.2.2; 4.4.2
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 waste water	4.2.1.2.4; 4.3.2.2; 4.4.2.2
<b>AQUATIC ECOLOGY (FOR ALL PLANTS)</b>	
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
<b>AQUATIC ECOLOGY (FOR PLANTS WITH COOLING TOWER-BASED HEAT DISSIPATION SYSTEMS)</b>	
Entrainment of fish and shellfish in early life stages	4.3.3
Impingement of fish and shell fish	4.3.3
Heat shock	4.3.3
<b>TERRESTRIAL RESOURCES</b>	
Cooling tower impacts on crops and ornamental vegetation	4.3.4
Cooling tower impacts on native plants	4.3.5.1
Bird collisions with cooling towers	4.3.5.2
<b>HUMAN HEALTH</b>	
Microbial organisms (occupational health)	4.3.6
Noise	4.3.7

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- 1 • Scouring caused by discharged cooling water: Based on information in the GEIS, the  
2 Commission found: "Scouring has not been found to be a problem at most operating  
3 nuclear power plants and has caused only localized effects at a few plants. It is not  
4 expected to be a problem during the license renewal term." The staff has not identified any  
5 significant new information during its independent review of the SNC ER (SNC 2000a), the  
6 staff's site visit, the scoping process, or its evaluation of other available information.  
7 Therefore, the staff concludes that there are no impacts of scouring during the renewal term  
8 beyond those discussed in the GEIS.  
9
- 10 • Eutrophication: Based on information in the GEIS, the Commission found: "Eutrophication  
11 has not been found to be a problem at operating nuclear power plants and is not expected  
12 to be a problem during the license renewal term." The staff has not identified any significant  
13 new information during its independent review of the SNC ER (SNC 2000a), the staff's site  
14 visit, the scoping process, or its evaluation of other available information, including plant  
15 monitoring data and technical reports. Therefore, the staff concludes that there are no  
16 impacts of eutrophication during the renewal term beyond those discussed in the GEIS.  
17
- 18 • Discharge of chlorine or other biocides: Based on information in the GEIS, the Commission  
19 found: "Effects are not a concern among regulatory and resource agencies, and are not  
20 expected to be a problem during the license renewal term." The staff has not identified any  
21 significant new information during its independent review of the SNC ER (SNC 2000a), the  
22 staff's site visit, the scoping process, or its evaluation of other available information,  
23 including the National Pollutant Discharge Elimination System (NPDES) permit for HNP.  
24 Therefore, the staff concludes that there are no impacts of discharge of chlorine or other  
25 biocides during the renewal term beyond those discussed in the GEIS.  
26
- 27 • Discharge of sanitary wastes and minor chemical spills: Based on information in the GEIS,  
28 the Commission found: "Effects are readily controlled through NPDES permit and periodic  
29 modifications, if needed, and are not expected to be a problem during the license renewal  
30 term." The staff has not identified any significant new information during its independent  
31 review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its  
32 evaluation of other available information, including the NPDES permit for HNP. Therefore,  
33 the staff concludes that there are no impacts of discharges of sanitary wastes and minor  
34 chemical spills during the renewal term beyond those discussed in the GEIS.  
35
- 36 • Discharge of other metals in waste water: Based on information in the GEIS, the  
37 Commission found "These discharges have not been found to be a problem at operating  
38 nuclear power plants with cooling-tower-based heat dissipation systems and have been  
39 satisfactorily mitigated at other plants. They are not expected to be a problem during the  
40 license renewal term." The staff has not identified any significant new information during its

independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information, including the NPDES permit for HNP. Therefore, the staff concludes that there are no impacts of discharges of other metals in waste water during the renewal term beyond those discussed in the GEIS.

- Accumulation of contaminants in sediments or biota: Based on information in the GEIS, the Commission found: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of available 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: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available 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: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available 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: "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." The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available

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1 information. Therefore, the staff concludes that there are no impacts of thermal plumes  
2 during the renewal term beyond those discussed in the GEIS.

- 3  
4 • Distribution of aquatic organisms: Based on information in the GEIS, the Commission  
5 found: "Thermal discharge may have localized effects but is not expected to effect the  
6 larger geographical distribution of aquatic organisms." The staff has not identified any  
7 significant new information during its independent review of the SNC ER (SNC 2000a), the  
8 staff's site visit, the scoping process, or its evaluation of other available information.  
9 Therefore, the staff concludes that there are no impacts on the distribution of aquatic  
10 organisms during the renewal term beyond those discussed in the GEIS.
- 11  
12 • Premature emergence of aquatic insects: Based on information in the GEIS, the  
13 Commission found: "Premature emergence has been found to be a localized effect at some  
14 operating nuclear power plants but has not been a problem and is not expected to be a  
15 problem during the license renewal term." The staff has not identified any significant new  
16 information during its independent review of the SNC ER (SNC 2000a), the staff's site visit,  
17 the scoping process, or its evaluation of other available information. Therefore, the staff  
18 concludes that there are no impacts of premature emergence of aquatic insects during the  
19 renewal term beyond those discussed in the GEIS.
- 20  
21 • Gas supersaturation (gas bubble disease): Based on information in the GEIS, the  
22 Commission found: "Gas supersaturation was a concern at a small number of operating  
23 nuclear power plants with once-through cooling systems but has been satisfactorily  
24 mitigated. It has not been found to be a problem at operating nuclear power plants with  
25 cooling towers or cooling ponds and is not expected to be a problem during the license  
26 renewal term." The staff has not identified any significant new information during its  
27 independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process,  
28 or its evaluation of other available information. Therefore, the staff concludes that there are  
29 no impacts of gas supersaturation during the renewal term beyond those discussed in the  
30 GEIS.
- 31  
32 • Low dissolved oxygen in the discharge: Based on information in the GEIS, the Commission  
33 found: "Low dissolved oxygen has been a concern at one nuclear power plant with a once-  
34 through cooling system but has been effectively mitigated. It has not been found to be a  
35 problem at operating nuclear power plants with cooling towers or cooling ponds and is not  
36 expected to be a problem during the license renewal term." The staff has not identified any  
37 significant new information during its independent review of the SNC ER (SNC 2000a), the  
38 staff's site visit, the scoping process, or its evaluation of other available information. There-  
39 fore, the staff concludes that there are no impacts of low dissolved oxygen during the  
40 renewal term beyond those discussed in the GEIS.

- 1 • Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses: Based on information in the GEIS, the Commission found: “These types of  
2 losses have not been found to be a problem at operating nuclear power plants and are not  
3 expected to be a problem during the license renewal term.” The staff has not identified any  
4 significant new information during its independent review of the SNC ER (SNC 2000a), the  
5 staff’s site visit, the scoping process, or its evaluation of other available information.  
6 Therefore, the staff concludes that there are no impacts of losses from predation,  
7 parasitism, and disease among organisms exposed to sub-lethal stresses during the  
8 renewal term beyond those discussed in the GEIS.  
9
- 10 • Stimulation of nuisance organisms: Based on information in the GEIS, the Commission  
11 found: “Stimulation of nuisance organisms has been satisfactorily mitigated at the single  
12 nuclear power plant with a once-through cooling system where previously it was a problem.  
13 It has not been found to be a problem at operating nuclear power plants with cooling towers  
14 or cooling ponds and is not expected to be a problem during the license renewal term.” The  
15 staff has not identified any significant new information during its independent review of the  
16 SNC ER (SNC 2000a), the staff’s site visit, the scoping process, or its evaluation of other  
17 available information, including the 316(a) demonstration report (Wiltz 1981). Therefore,  
18 the staff concludes that there are no impacts of stimulation of nuisance organisms during  
19 the renewal term beyond those discussed in the GEIS.  
20
- 21 • Entrainment of fish and shellfish in early life stages (cooling-tower-based heat dissipation systems): Based on information in the GEIS, the Commission found: “Entrainment of fish  
22 has not been found to be a problem at operating nuclear power plants with this type of  
23 cooling system and is not expected to be a problem during the license renewal term.” The  
24 staff has not identified any significant new information during its independent review of the  
25 SNC ER (SNC 2000a), the staff’s site visit, the scoping process, or its evaluation of other  
26 available information. Therefore, the staff concludes that there are no impacts of  
27 entrainment of fish and shellfish in early life stages with this type cooling system during the  
28 renewal term beyond those discussed in the GEIS.  
29
- 30 • Impingement of fish and shellfish (cooling-tower-based heat dissipation systems): Based  
31 on information in the GEIS, the Commission found: “The impingement has not been found  
32 to be a problem at operating nuclear power plants with this type of cooling system and is not  
33 expected to be a problem during the license renewal term.” The staff has not identified any  
34 significant new information during its independent review of the SNC ER (SNC 2000a), the  
35 staff’s site visit, the scoping process, or its evaluation of other available information.  
36 Therefore, the staff concludes that there are no impacts of impingement with this type  
37 cooling system during the renewal term beyond those discussed in the GEIS.  
38  
39  
40

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- 1 • Heat shock (cooling-tower-based heat dissipation systems): Based on information in the  
2 GEIS, the Commission found: "Heat shock has not been found to be a problem at  
3 operating nuclear power plants with this type of cooling system and is not expected to be a  
4 problem during the license renewal term." The staff has not identified any significant new  
5 information during its independent review of the SNC ER (SNC 2000a), the staff's site visit,  
6 the scoping process, or its evaluation of other available information. Therefore, the staff  
7 concludes that there are no impacts of heat shock with this type cooling system during the  
8 renewal term beyond those discussed in the GEIS.  
9
- 10 • Cooling tower impacts on crops and ornamental vegetation: Based on information in the  
11 GEIS, the Commission found: "Impacts from salt drift, icing, fogging, or increased humidity  
12 associated with cooling tower operation have not been found to be a problem at operating  
13 nuclear power plants and are not expected to be a problem during the license renewal  
14 term." The staff has not identified any significant new information during its independent  
15 review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its  
16 evaluation of other available information. Therefore, the staff concludes that there are no  
17 impacts of cooling tower operation on crops and ornamental vegetation during the renewal  
18 term beyond those discussed in the GEIS.  
19
- 20 • Cooling tower impacts on native plants: Based on information in the GEIS, the Commission  
21 found: "Impacts from salt drift, icing, fogging, or increased humidity associated with cooling  
22 tower operation have not been found to be a problem at operating nuclear power plants and  
23 are not expected to be a problem during the license renewal term." The staff has not  
24 identified any significant new information during its independent review of the SNC ER  
25 (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available  
26 information. Therefore, the staff concludes that there are no impacts of cooling tower  
27 operation on native plants during the renewal term beyond those discussed in the GEIS.  
28
- 29 • Bird collisions with cooling towers: Based on information in the GEIS, the Commission  
30 found: "These collisions [of birds with cooling towers] have not been found to be a problem  
31 at operating nuclear power plants and are not expected to be a problem during the license  
32 renewal term." The staff has not identified any significant new information during its  
33 independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process,  
34 or its evaluation of other available information. Therefore, the staff concludes that there are  
35 no impacts of bird collisions with cooling towers during the renewal term beyond those  
36 discussed in the GEIS.  
37
- 38 • Microbiological organisms (occupational health): Based on information in the GEIS, the  
39 Commission found: "Occupational health impacts are expected to be controlled by  
40 continued application of accepted industrial hygiene practices to minimize worker



exposures.” The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff’s site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of microbiological organisms during the renewal term beyond those discussed in the GEIS.

- Noise: Based on information in the GEIS, the Commission found: “Noise has not been found to be a problem at operating plants and is not expected to be a problem at any plant during the license renewal term.” The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff’s site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of noise during the renewal term beyond those discussed in the GEIS.

Category 2 issues related to cooling system operation during the renewal term that are applicable to HNP are discussed in the sections that follow. These issues are listed in Table 4-2.

**Table 4-2.** Category 2 Issues Applicable to the Operation of the HNP Cooling System During the Renewal Term

ISSUE -- 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
<b>SURFACE WATER QUALITY, HYDROLOGY AND USE (FOR ALL PLANTS)</b>			
Water-use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	4.3.2.1; 4.4.2.1	A	4.1.1
<b>HUMAN HEALTH</b>			
Microbiological organisms (human health)	4.3.6	G	4.1.2

#### 4.1.1 Water-Use Conflicts

Surface-water withdrawals may impact riparian and instream habitat. Section 2.2.2 describes HNP surface water withdrawals.

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1 The impact of consumptive loss on the downstream riparian communities is associated with the  
2 small difference it causes in the river surface elevation. SNC has calculated the reduction in  
3 surface-water elevation resulting from HNP withdrawals (SNC 2000a, Attachment B). During  
4 periods of average river discharge, consumptive loss amounts to about a 0.01 m (0.03 ft)  
5 decrease in the downstream surface elevation. During periods of minimum river discharge,  
6 consumptive loss results in a lowering of the downstream surface elevation by approximately  
7 0.02 m (0.08 ft).  
8

9 The shoreline of the Altamaha River in the vicinity of HNP and immediately downstream for  
10 several miles is characterized by steep bluffs, floodplain forests, and sandbars. Based on  
11 average daily flows for a 1-month period over the last 22 years, the riparian communities  
12 experience an average annual surface elevation fluctuation of approximately 2.7 m (9 ft). The  
13 consumptive loss incurred by plant operations has the greatest effect on surface elevation  
14 during low-flow periods. The duration of low-flow conditions is approximately 2 to 3 months  
15 during late summer. The shoreline exposed during these periods is under water during the  
16 other 9 to 10 months of the year.  
17

18 Vegetation is found at elevations that are not flooded for most of the year by the river. When  
19 the river stage is high enough to flood the riparian communities, the impact of consumptive loss  
20 from plant operations is negligible.  
21

22 Consumptive loss from plant operations during the low-flow periods would have the greatest  
23 impact on instream biological communities (e.g., mussels and fish) if it occurred during the  
24 spawning season. If, for example, a reduction in flow (or river level) were enough to hinder  
25 upstream or downstream movement of anadromous fish or the movement of resident fish into  
26 shallow sloughs and oxbows to spawn, there could be a reduction in spawning success. The  
27 spawning season for fish in the Altamaha River occurs in the spring and early summer, the  
28 period of highest flows in the Altamaha (SNC 2000a). Since the lowest average daily flow for a  
29 1-month period occurs in September, and the highest average daily flow for a 1-month period  
30 occurs in March, consumptive loss from plant operations is not expected to have any impact on  
31 instream communities.  
32

33 Freshwater mussels vary in their ability to withstand emersion (exposure to air). Some species  
34 have adapted to withstand prolonged periods of emersion, while others are emersion-intolerant.  
35 Mussels move over and through the substrate by means of a protrusible muscular foot. Some  
36 species are known to move several feet per hour in response to stagnant conditions or falling  
37 water levels. Other species respond to falling water levels by burrowing more deeply into the  
38 substrate, seeking moisture. However, most riverine species have evolved under seasonally  
39 fluctuating water-level conditions and are unaffected by small fluctuations in water level. Under

1 worst-case conditions, consumptive losses would result in a 0.02-m (0.08-ft) lowering of water  
2 level downstream of HNP.

3  
4 The staff reviewed the Clean Water Act 316(a) demonstration for HNP and the ER relative to  
5 potential water-use conflicts due to consumptive loss of stream flow. Based on this review, the  
6 staff has concluded that the potential impacts are SMALL, and mitigation is not warranted.

#### 7 8 **4.1.2 Microbiological Organisms (Human Health)**

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10 For plants discharging cooling water to cooling ponds, lakes, canals, or small rivers, the effects  
11 of microbiological organisms on human health are listed as a Category 2 issue and require  
12 plant-specific evaluation before license renewal. The Category 2 designation is based on the  
13 magnitude of the potential public health impacts associated with thermal enhancement of  
14 *Naegleria fowleri* and could not be determined generically (NRC 1996). The Nuclear  
15 Regulatory Commission (NRC) noted that impacts of nuclear plant cooling towers and thermal  
16 discharges are considered to be of small significance if they do not enhance the presence of  
17 microorganisms that are detrimental to water quality and public health (NRC 1996). The  
18 assessment criteria relate to thermal discharge temperature, thermal characteristics, thermal  
19 conditions for the enhancement of *N. fowleri*, and impacts to public health.

20  
21 HNP withdraws water for cooling from the Altamaha River via a shoreline intake and discharges  
22 via offshore discharge structures. The cooling water systems for Units 1 and 2 are identical. A  
23 mixing box for the river discharge receives cooling tower blowdown, demineralized waste,  
24 cooling tower overflow, and excess service water from both units. From the mixing box, two  
25 1.1-m (42-in.) lines run down to the river and extend about 37 m (120 ft) out from the shore.  
26 The point discharge is about 384 m (1260 ft) downriver from the intake structure and about  
27 1.2 m (4 ft) below the surface when the river is at its lowest level.

28  
29 HNP discharge temperatures are monitored weekly by plant personnel and reported to the  
30 Watershed Planning and Monitoring Program of the Environmental Protection Division (EPD) of  
31 the Georgia Department of Natural Resources (GADNR). Discharge temperatures range from  
32 about 17 to 34°C (62 to 94°F) when the plant is operating. During summer months, when  
33 thermophilic organisms are most likely to occur, discharge temperatures have averaged 29 to  
34 32°C (85 to 89°F) over the last 2 years. HNP discharge temperatures are always below those  
35 known to be optimal for growth and reproduction of pathogenic microorganisms but could  
36 theoretically permit limited survival of these organisms in summer months. Temperatures in the  
37 Altamaha River immediately downstream of the HNP discharge structure are several degrees  
38 cooler than the temperatures in the immediate area of the discharge outfall (NRC 1978).  
39

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Another factor limiting concentrations of pathogenic microorganisms in the HNP discharge is the absence of a seed source or inoculant. Waste water is the usual source of pathogens in natural waters. The sewage treatment plant has been upgraded and expanded to accommodate the sewage demand at HNP. HNP sewage treatment consists of two approximately 132 m<sup>3</sup>/d (35,000 gpd) extended aeration-activated sludge-treatment plants. Disinfection in the sewage-treatment plant reduces coliform bacteria and other microorganisms to levels that meet state water quality standards. The circulating water is also chlorinated to control microbial organisms. Additionally, there are no upstream sources of bacterial organisms, because the Altamaha River upstream of HNP flows through a largely rural area and receives no substantial discharges of municipal, industrial, or agricultural wastes.

The staff has reviewed the thermal characteristics of the Altamaha River and the HNP discharge, and does not expect HNP operation to stimulate growth and reproduction of pathogenic microorganisms in the Altamaha River downstream of the plant. Under certain circumstances, the organisms might be present in the immediate area of the discharge outfall but would not be expected in sufficient concentrations to pose a threat to downstream water users. Many of these pathogenic microorganisms are ubiquitous in nature, occurring in the digestive tracts of wild mammals and birds, but are usually only a problem when the host is immunologically compromised. Although there is a potential for deleterious thermophilic microorganisms to be associated with the cooling system, the actual hazard to public health has not been documented or substantiated. The thermal characteristics of the HNP discharge would not promote the growth of microorganisms that are detrimental to water and public health. Thus, the staff concludes that potential impacts of microbial organisms on human health resulting from the operation of the plant's cooling water discharge to the aquatic environment on or in the vicinity of the site are SMALL, and mitigation is not warranted.

## 4.2 Transmission Lines

The final environmental statement (FES; AEC 1972) described four transmission lines that were built to connect HNP with the Georgia Power Company (GPC) transmission system. These transmission corridors cover approximately 1790 ha (4400 acres) over a total corridor length of approximately 299 km (186 mi). Since the start of operation of HNP Unit 2, two additional lines were constructed to connect the GPC transmission system to Florida. These additional lines, which cover an area of approximately 1120 ha (2760 acres) with a total transmission corridor length of approximately 245 km (152 mi), have been included in this evaluation.

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that are applicable to the HNP transmission lines are listed in Table 4-3. SNC stated in its ER (SNC 2000a) that it is not aware of any new and significant information associated with the renewal of the HNP OLs. No significant new information has been identified by the staff during its review. Therefore, the

staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For all of those issues, the GEIS concluded that the impacts are SMALL, and plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

**Table 4-3.** Category 1 Issues Applicable to the HNP Transmission Lines During the Renewal Term

ISSUE -- 10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
<b>TERRESTRIAL RESOURCES</b>	
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
Floodplains and wetland on power line right-of-way	4.5.7
<b>AIR QUALITY</b>	
Air quality effects of transmission lines	4.5.2
<b>LAND USE</b>	
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 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: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, consultation with the U.S. Fish and Wildlife Service (FWS) and GADNR, or its evaluation of other 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.

## Environmental Impacts of Operation

- 1 • Bird collisions with power lines: Based on information in the GEIS, the Commission found:  
2 "Impacts [of bird collisions with power lines] are expected to be of small significance at all  
3 sites." The staff has not identified any significant new information during its independent  
4 review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, consultation  
5 with the FWS and GADNR, or its evaluation of other information. Therefore, the staff  
6 concludes that there are no impacts of bird collisions with power lines during the renewal  
7 term beyond those discussed in the GEIS.  
8
- 9 • Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees,  
10 wildlife, livestock): Based on information in the GEIS, the Commission found: "No signifi-  
11 cant impacts of electromagnetic fields on terrestrial flora and fauna have been identified.  
12 Such effects are not expected to be a problem during the license renewal term." The staff  
13 has not identified any significant new information during its independent review of the SNC  
14 ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other infor-  
15 mation. Therefore, the staff concludes that there are no impacts of electromagnetic fields on  
16 flora and fauna during the renewal term beyond those discussed in the GEIS.  
17
- 18 • Floodplains and wetland on power line right-of-way: Based on information in the GEIS, the  
19 Commission found: "Periodic vegetation control is necessary in forested wetlands under-  
20 neath power lines and can be achieved with minimal damage to the wetland. No significant  
21 impact is expected at any nuclear power plant during the license renewal term." The staff  
22 has not identified any significant new information during its independent review of the SNC  
23 ER (SNC 2000a), the staff's site visit, the scoping process, consultation with the FWS and  
24 GADNR, or its evaluation of other information. Therefore, the staff concludes that there are  
25 no impacts on floodplains and wetlands on the power line right-of-way during the renewal  
26 term beyond those discussed in the GEIS.  
27
- 28 • Air quality effects of transmission lines: Based on the information in the GEIS, the  
29 Commission found: "Production of ozone and oxides of nitrogen is insignificant and does  
30 not contribute measurably to ambient levels of these gases." The staff has not identified any  
31 significant new information during its independent review of the SNC ER (SNC 2000a), the  
32 staff's site visit, the scoping process, or its evaluation of other information. Therefore, the  
33 staff concludes that there are no air quality impacts of transmission lines during the renewal  
34 term beyond those discussed in the GEIS.  
35
- 36 • Onsite land use: Based on the information in the GEIS, the Commission found: "Projected  
37 onsite land use changes required during ... the renewal period would be a small fraction of  
38 any nuclear power plant site and would involve land that is controlled by the applicant." The  
39 staff has not identified any significant new information during its independent review of the  
40 SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other

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: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other information. Therefore, the staff concludes that there are no impacts on use of power line rights-of-way during the renewal term beyond those discussed in the GEIS.

There is one Category 2 issue related to transmission lines, and another issue related to transmission lines is being treated as a Category 2 issue. These issues are listed in Table 4-4. They are discussed in Sections 4.2.1 and 4.2.2.

**Table 4-4.** Category 2 Issues Applicable to the HNP 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 with National Electrical Safety Code criteria (NESC 1997), it is 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 the other plants, some may have chosen to upgrade line voltage, or land use in the vicinity of transmission lines may have been changed. To comply with 10 CFR 51.53(c)(3)(ii)(H), the 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 NESC for preventing electric shock from induced currents.

## Environmental Impacts of Operation

1 In the ER, SNC states:

2  
3 GPC designed and constructed all HNP transmission lines in accordance with the edition of  
4 the National Electrical Safety Code...and industry guidance that was current when the line  
5 was built. Ongoing right-of-way supervision and maintenance of HNP transmission facilities  
6 ensures continued conformance to governing standards and includes routine aerial patrol,  
7 helicopter inspection, and ground inspection. At this time, aerial patrols of all corridors are  
8 conducted every other month and include checks for encroachments, broken conductors,  
9 broken or leaning structures, and signs of trees burning, any of which would be evidence of  
10 clearance problems. Slow helicopter inspections (45 miles per hour or less) are conducted  
11 annually for 500-kV lines to allow more careful checks of facilities and rights-of-way.  
12 Currently all lines are inspected from the ground and measured for clearance at ques-  
13 tionable locations every 6 years. Problems noted during any inspection are brought to the  
14 attention of the appropriate organizations for corrective action.

15  
16 According to the ER, there have been no upgrades in line voltage on the HNP transmission  
17 lines since they were constructed.

18  
19 In 1977, the NESC was revised to include identification of the method for establishing minimum  
20 vertical clearances for electric lines having voltages exceeding 98 kV. The clearance must be  
21 sufficient to limit the induced current due to electrostatic effects to 5 milliamperes (5 mA) if the  
22 largest anticipated truck, vehicle, or equipment parked beneath the line were shorted to ground.  
23 The Duval and Thalmann transmission lines constructed in 1981 were designed to this limit.  
24 However, the four transmission lines initially constructed for HNP were built before this guid-  
25 ance was adopted. Nevertheless, the SNC ER (SNC 2000a) states that the 5-mA limit was  
26 used in the design of the 500-kV North Tifton and Bonaire lines because the limit was in use by  
27 industry for high-voltage lines when the lines were designed.

28  
29 GPC had not modeled the 230-kV Eastman and Douglas lines to evaluate the maximum  
30 induced current in those lines against the 5-mA limit, and computer-modeling capabilities have  
31 improved significantly since the 500-kV lines were designed. SNC stated (SNC 2000a) that  
32 SNC and GPC conducted an evaluation of all lines' adherence to the 5-mA induced current limit  
33 (GPC 1999a; 1999b) using the Electric Power Research Institute (EPRI) EFION computer  
34 program (EPRI High Voltage Transmission Research Center 1991), which is a generally  
35 accepted analytical methodology. The largest vehicle that SNC anticipates being under the  
36 HNP transmission lines is a tractor trailer parked on a public highway. Based on GPC minimum  
37 line vertical clearance design criteria of 10.3 m (33.7 ft) for 230-kV lines and 12.6 m (41.4 ft) for  
38 500-kV lines at a conductor temperature of 48.9°C (120°F), the maximum induced currents  
39 were 1.25 mA for 230-kV lines and 3.84 mA for 500-kV lines for a 16.8-m (55-ft) long tractor  
40 trailer, 2.4 m (8 ft) wide and 4.1 m (13.5 ft) high.



1 The induced currents calculated in this evaluation were reported to be less than the NESC limit  
2 of 5 mA. Therefore, the staff concludes that the impact of the potential for electrical shock is  
3 SMALL, and mitigation is not warranted.  
4

#### 5 **4.2.2 Electromagnetic Fields—Chronic Effects**

6

7 In the GEIS, the chronic effects of electromagnetic fields from power lines were given a finding  
8 of “not applicable” rather than a Category 1 or 2 designation until a scientific consensus is  
9 reached on the health implications of these fields.  
10

11 The potential for chronic effects from these fields continues to be studied and is not known at  
12 this time. The National Institute of Environmental Health Sciences (NIEHS) directs related  
13 research through the U.S. Department of Energy. A recent report (NIEHS 1999) includes the  
14 following paragraph:  
15

16 The NIEHS concludes that ELF-EMF [extremely low frequency-electromagnetic field]  
17 exposure cannot be recognized as entirely safe because of weak scientific evidence that  
18 exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant  
19 aggressive regulatory concern. However, because virtually everyone in the United States  
20 uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is  
21 warranted such as a continued emphasis on educating both the public and the regulated  
22 community on means aimed at reducing exposures. The NIEHS does not believe that other  
23 cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently  
24 warrant concern.  
25

26 This statement is not sufficient to cause the staff to change its position with respect to the  
27 chronic effects of electromagnetic fields. The staff considers the GEIS finding of “not  
28 applicable” still appropriate and will continue to follow developments on this issue.  
29

### 30 **4.3 Radiological Impacts of Normal Operations**

31

32 Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to  
33 HNP in regard to radiological impacts are listed in Table 4-5. SNC stated in its ER (SNC  
34 2000a) that it is not aware of any new and significant information associated with the renewal of  
35 the HNP OLs. No significant new information has been identified by the staff during its review.  
36 Therefore, the staff concludes that there are no impacts related to these issues beyond those  
37 discussed in the GEIS. For all of those issues, the GEIS concluded that the impacts are  
38 SMALL, and plant-specific mitigation measures are not likely to be sufficiently beneficial to be  
39 warranted.

**Table 4-5.** 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
<b>HUMAN HEALTH</b>	
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 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: "Radiation doses to the public will continue at current levels associated with normal operations." The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available 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: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of occupational radiation exposures during the renewal term beyond those discussed in the GEIS.

## 4.4 Socioeconomic Impacts of Plant Operations During the License Renewal Period

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 4-6. SNC stated in its ER (SNC 2000a) that it is not aware of any new and significant information associated with the renewal of the HNP OLs. No significant new information has been identified by the staff during its review. Therefore, the staff concludes that there are no impacts related to these issues

**Table 4-6.** Category 1 Issues Applicable to Socioeconomics During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
SOCIOECONOMICS	
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

beyond those discussed in the GEIS. For all of those issues, the GEIS concluded 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:

- Public services: public safety, social services, and tourism and recreation: Based on information in the GEIS, the Commission found: "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 significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available 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.
- Public services: education (license renewal term): Based on information in the GEIS, the Commission found: "Only impacts of small significance are expected." The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts on education during the renewal term beyond those discussed in the GEIS.
- Aesthetic impacts (license renewal term): Based on information in the GEIS, the Commission found: "No significant impacts are expected during the license renewal term."

## Environmental Impacts of Operation

The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no aesthetic impacts during the renewal term beyond those discussed in the GEIS.

- Aesthetic impacts of transmission lines (license renewal term): Based on information in the GEIS, the Commission found: "No significant impacts are expected during the license renewal term." The staff has not identified any significant new information during its independent review of the SNC ER (SNC 2000a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no aesthetic impacts of transmission lines during the renewal term beyond those discussed in the GEIS.

Table 4-7 lists the Category 2 socioeconomic issues that require plant-specific analysis and environmental justice, which was not evaluated in the GEIS.

**Table 4-7.** Category 2 Issues Applicable to Socioeconomics and Environmental Justice 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
SOCIOECONOMICS			
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			
Environmental Justice	Not evaluated		4.4.6

### 4.4.1 Housing Impacts During Operations

While 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" (GEIS, Section C.1.4). 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

1 is used to rank the population category as "low," "medium," or "high" (GEIS, Figure C.1). The  
2 population in the HNP area was categorized by the NRC as "low" (GEIS, Table C.2).  
3 Table 2-12 provides the population distribution for the area surrounding HNP Units 1 and 2  
4 based on 1990 census data. The population density within a 32-km (20-mi) radius of HNP is  
5 approximately 17 persons/km<sup>2</sup> (43 persons/mi<sup>2</sup>) and there is no city with a population of 25,000  
6 within 32 km (20 mi), giving the site a sparseness Category 2. The population density within an  
7 80-km (50-mi) radius is approximately 17 persons/km<sup>2</sup> (43 persons/mi<sup>2</sup>), and there is no city  
8 with a population of 100,000 within 80 km (50 mi), giving the site a proximity Category 1. These  
9 values combine to give the surrounding HNP population a category measure of 2.1; a "low"  
10 category as defined by GEIS Figure C.1.  
11

12 In 10 CFR Part 51, Subpart A, Appendix B, Table B-1, the NRC concluded that impacts on  
13 housing availability are expected to be MODERATE to LARGE at plants located in a "low"  
14 population area or in areas where growth control measures are in effect. SMALL impacts result  
15 when no discernable change in housing availability occurs, changes in rental rates and housing  
16 values are similar to those occurring statewide, and no housing construction or conversions are  
17 needed to meet the demand.  
18

19 During the license renewal period, SNC does not anticipate the need to increase onsite or  
20 offsite personnel, and expects the outage workforce to be within the range supporting current  
21 operations. Strategic planning by SNC projects a constant or slightly reduced workforce in the  
22 future based on industry benchmarks for boiling-water reactors similar to those employed at  
23 HNP. SNC determined that no refurbishment was necessary at HNP. Thus, SNC concludes  
24 that there would be no refurbishment-related impacts to area housing (SNC 2000a). Even  
25 establishing an upper bound on employment, applying an analysis used by the NRC in the  
26 GEIS,<sup>(a)</sup> of 60 permanent workers during the license renewal period (plus 185 indirect jobs)  
27 would result in an increased demand for housing in Toombs and Appling counties of 174 units  
28 or 9 percent of available housing (see Table 2-6). In its ER, SNC concluded that even with the  
29 resulting decrease in housing availability for the bounding case scenario of 60 additional  
30 workers, there would not be a discernable change in housing availability, rental rates, and  
31 housing values. Nor would such hires spur housing construction or conversion. In addition,  
32 staff reviews found no Federal projects or other activities that would add to housing impacts.

---

(a) NRC applies a bounding workforce estimate of 60 license renewal workers per nuclear unit to estimate potential housing impacts. These workers are required to conduct increased inspections, surveillance, testing, and maintenance. The NRC uses this estimate as a conservative value to represent the upper bound of potential socioeconomic impacts. SNC anticipates that the increased inspection and maintenance would be performed mostly during the outages that are staggered so they do not coincide, thus making it unreasonable that each unit would require 60 additional workers. Instead, as a reasonably conservative estimate, SNC assumed that only 60 workers (not 120) would at most be required at HNP.

## Environmental Impacts of Operation

As such, SNC concluded that license renewal impacts to housing would be SMALL, and would not warrant mitigation (SNC 2000a). The staff has reviewed the available information relative to housing impacts. Although HNP is located in a low-population area, there are no growth-control measures that limit housing development in effect and little or no change in the size of the plant workforce is anticipated. Based on its review, therefore, the staff concludes that the impact on housing during the license renewal period would be SMALL, and mitigation is not 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, and thus there is no need to add capital facilities. Impacts are considered MODERATE if overtaking 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 significant information to the contrary, the only impacts on public utilities that could be significant are impacts on public water supplies.

As described in the SNC ER, a municipal water supply is not used at the plant site; therefore, the plant operations do not directly affect any public water supply system. The ER states that operations at the plant site do not have a noticeable impact on offsite wells drawing from the Floridan Aquifer. Because plant demand is not expected to alter offsite groundwater use in the Floridan Aquifer, operations at HNP will not indirectly impact public water supply systems located in the vicinity of the plant (SNC 2000a).

Another concern is the potential indirect impact resulting from additional workers moving to the area and placing additional demands on public water supply systems. As described in the ER, SNC does not anticipate the need to increase the onsite workforce during the license renewal period, and therefore, anticipates no impacts to the public water systems as a result of license renewal. However, to demonstrate potential population-related impacts to area public water services, SNC used the upper bound license renewal workforce of 60 additional full-time workers generating an additional indirect workforce of 185 jobs in the surrounding communities (described in Section 4.4.1 of this report). If each new worker represents one new family, the population in the area could increase by approximately 785, based on a family size of 3.2. SNC assumes that the residential distribution of the workers would be similar to the current worker distribution of 71 percent in Appling and Toombs counties. Thus, 560 of the new residents (out of the 785), would live in Appling and Toombs counties (SNC 2000a).

Section 2.2.8.2 describes the water supply system utilities in Appling and Toombs counties. For Appling and Toombs counties combined, the total available, reserved water service

capacity is approximately 36,000 m<sup>3</sup>/d (9.4 million gpd). Continuing with the “upper bound” analysis, SNC estimated the plant-related population increase would generate a demand on public water supply systems of 170 m<sup>3</sup>/d (45,000 gpd), assuming that 100 percent of the growth attributable to license renewal are served by these municipal systems. This represents approximately 0.5 percent of the available reserved capacity in the two counties. Based on the level of demand that would be placed on the public water systems serving Appling and Toombs counties, SNC concludes that plant-related population growth (even given the upper bound analysis) would require no additional increase in municipal water supply capacity (SNC 2000a). No other projects were identified that would add significantly to water demand in the two counties.

The NRC staff concludes that impacts on groundwater during the license renewal period would be SMALL, either not detectable or so minor that they would not destabilize nor noticeably alter any important attribute of the resource, and that mitigation is not necessary. This conclusion is based on the fact that HNP’s use of groundwater does not have a noticeable impact on offsite wells drawing from the Floridan Aquifer, SNC does not anticipate an increase in the workforce should the license be renewed, and the “upper bound analysis” of 560 new residents represents approximately 0.5 percent of the available water-use capacity in the two counties.

#### 4.4.3 Offsite Land Use During Operations

Offsite land use during the license renewal term is a Category 2 issue (10 CFR 51, Subpart A, Appendix. B, Table B-1). Table B-1 of 10 CFR 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, where there is very little new development and minimal changes to an area's land-use pattern

MODERATE, where there is considerable new development and some changes to the land-use pattern

LARGE, where there is large-scale new development and major changes in the land-use pattern.

SNC has not identified any increases in plant staffing related to the license renewal application; consequently, there are no population related land-use impacts during the license renewal term.

## Environmental Impacts of Operation

1 Tax revenue can affect land use because it enables local jurisdictions to be able to provide the  
2 public services (e.g., transportation and utilities) necessary to support development.  
3 Section 4.7.4.1 of the GEIS states that the assessment of tax-driven land-use impacts during  
4 the license renewal term should consider (1) the size of the plant's payments relative to the  
5 community's total revenues, (2) the nature of the community's existing land-use pattern, and  
6 (3) the extent to which the community already has public services in place to support and guide  
7 development. If the plant's tax payments are projected to be small relative to the community's  
8 total revenue, tax-driven land-use changes during the plant's license renewal term would be  
9 small, especially where the community has preestablished patterns of development and has  
10 provided adequate public services to support and guide development. If the plant's tax  
11 payments are projected to be medium to large relative to the community's total revenue, new  
12 tax driven land-use changes would be moderate. This is most likely to be true where the  
13 community has no preestablished patterns of development (i.e., land-use plans or controls) or  
14 has not provided adequate public services to support and guide development in the past,  
15 especially infrastructure that would allow industrial development. If the plant's tax payments are  
16 projected to be a dominant source of the community's total revenue, new tax-driven land-use  
17 changes would be large. This would be especially true where the community has no preestab-  
18 lished pattern of development or has not provided adequate public services to support and  
19 guide development in the past.

20  
21 Appling County is the only jurisdiction that taxes HNP directly, and it is the principal jurisdiction  
22 that receives direct tax revenue as a result of HNP's presence. Because there are no major  
23 refurbishment activities and no new construction as a result of the license renewal, no new  
24 sources of plant-related tax payments are expected that could significantly influence land use in  
25 Appling County. However, during the license renewal term, new land-use impacts could result  
26 from the use by Appling County of the tax revenue paid by SNC for HNP. As discussed in  
27 Section 2.2.8.6 and as shown in Table 2-15, SNC paid Appling County \$8.5 million in 1998 for  
28 HNP. This amount represented approximately 68 percent of the Appling County tax revenue,  
29 which for the purpose of this analysis is considered large relative to the County's total tax  
30 revenue.

31  
32 Notwithstanding the high proportion of Appling County tax revenue paid by SNC, Appling  
33 County has experienced a minor population increase of 5.9 percent over the last decade.  
34 Toombs County has experienced a growth of 8 percent over this period (Table 2-8). Appling  
35 and Toombs counties do not have growth-control measures that limit housing. Land-use  
36 projections for Appling County show that new commercial and industrial developments are  
37 expected to concentrate in Baxley and along the U.S. Highway 341 corridor, which runs parallel  
38 to the Norfolk Southern rail line. New residential development is being encouraged near the  
39 cities of the county, particularly Baxley. The remainder of Appling County is expected to remain  
40 in agricultural and forest use.



Continuation of Appling County's tax receipts from HNP keeps tax rates below what they otherwise would have to be to fund the County's government and also provides for a higher level of public infrastructure and services than otherwise would be possible. Both Appling and Toombs counties' property tax rates are among the lowest 10 percent in Georgia. Appling County directly benefits from the location of the HNP site in the county while Toombs County benefits from having a greater percentage of the HNP workforce living in the county (see Table 2-7). Continued operation of HNP provides significant economic stability to the two counties and is likely to encourage new business development in the counties. Overall, this effect is positive because Appling and Toombs counties have higher unemployment rates and lower per capita income levels than the statewide averages (see Section 2.2.8.6).

Based on review of the issues related to land use and the criteria in the GEIS, the staff concludes that the net impact of plant-related population increases is likely to be SMALL. The staff also concludes that tax-related land-use impacts are likely to be SMALL. There are several reasons for these conclusions. First, SNC does not intend to refurbish Units 1 and 2 in conjunction with license renewal. Thus, there will be no increase in employment at the HNP site as a result of license renewal activities. Second, SNC has stated that the permanent workforce at HNP will remain stable during the renewed license operating period of 20 years (SNC 2000a). Third, the population increase in Appling County, not related to HNP employment, between 1990 and 1999 was only 5.9 percent (see Table 2-8). Finally, visual inspection by the staff and discussions with real estate agents in Baxley did not reveal any significant housing development in Appling County. Approximately 150 new housing units (or two percent of the available housing stock in 1990 [Table 2-6]) are being developed in Appling County (30 stick-built and 120 manufactured homes) each year. Most of these units are being located in rural parts of the County.<sup>(a)</sup> Additional mitigation for land-use impacts during the license renewal term does not appear to be warranted.

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

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

Moderate population growth (less than 12 percent) is expected in Toombs and Appling counties between 1999 and 2010 (see Table 2-8). Even if there were an increase in plant employment of 60 workers (the upper bound), there would only be an approximate 1.4 percent increase in

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(a) Based on an interview with a group of real estate agents in Baxley, May 9, 2000.

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1 traffic volume on U.S. Highway 1 north of the HNP site and approximately 1.1 percent increase  
2 in traffic volume south of the plant. However, none of the expected growth identified in  
3 Table 2-8 will be due directly to increases in employment at HNP. Future general population  
4 increases may increase highway congestion at specific locations.

5  
6 There are plans to widen U.S. Highway 1 to four lanes from Baxley to Interstate 16 within  
7 5 years (SNC 2000a). Given these facts, the NRC staff concludes that any impact of HNP on  
8 transportation service degradation is likely to be SMALL and not require mitigation.

### 4.4.5 Historic and Archaeological Resources

11  
12 Since the SNC license renewal application covering an additional 20 years of operation of the  
13 HNP does not include plans for future land disturbances or structural modifications beyond  
14 routine maintenance activities at the plant, there would be no identifiable adverse effects to  
15 known historic and archaeological resources. Consultation between the license renewal  
16 applicant and the Georgia State Historic Preservation Office resulted in a determination by the  
17 State office that no known historic properties included in or eligible for inclusion in the National  
18 Register of Historic Places would be affected by the proposed action (Southern Company  
19 1999a; GADNR 1999a).

20  
21 Continued operation of the power plant and protection of the natural landscape and vegetation  
22 within the site boundaries would have a beneficial effect in that known or undiscovered  
23 resources would receive *de facto* protection for the term of the license renewal period, being  
24 located in an undisturbed area with secured access. HNP's commitment to continue conserva-  
25 tion and security of the historic Bell Cemetery will continue to enhance long-term preservation  
26 of that property.

27  
28 Given the possibility that undiscovered and/or unrecorded prehistoric and historic era  
29 archaeological sites could exist in the 906-ha (2240-acre) plant site, care should be taken  
30 during normal operational or maintenance conditions to ensure that cultural resources are not  
31 inadvertently impacted by such activities. Such activities may include not only operation of the  
32 plant itself but also land management-related actions such as ground disturbance. Since the  
33 plant site has not been subjected to an intensive cultural resources field survey to identify and  
34 record all cultural resources, any landscape modification or ground disturbance of previously  
35 undisturbed areas should be preceded by a cultural resource evaluation to fulfill obligations  
36 under the National Historic Preservation Act of 1966 and implementing regulations.

37  
38 Based on the cultural resource analysis and consultation, the staff has concluded that the  
39 impact of continued operation of HNP during the license renewal period is SMALL, and  
40 mitigation is not necessary.

#### 4.4.6 Environmental Justice

Environmental justice refers to a Federal policy in which Federal actions should not result in disproportionately high and adverse impacts on minority or low-income populations. A minority population is defined to exist if the percentage of minorities within the census blocks exceeds the percentage of minorities in the entire State of Georgia by 20 percent, or if the percentage of minorities within the census block is at least 50 percent. For census blocks within the State of Georgia, the percentage of minorities is compared to the percentage of minorities in the State.

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 it is not subject to the Executive Order, the Commission has voluntarily committed to undertake environmental justice reviews. Specific guidance is provided in an Office of Nuclear Reactor Regulation office letter (NRC 1999b).

The scope of the review should include an analysis of impacts on minority and low-income populations, the location and significance of any environmental impacts during operations on populations that are particularly sensitive and any additional information pertaining to mitigation (NRC 1999b). The descriptions to be provided by this review should be of sufficient detail to permit subsequent staff assessment of whether these impacts are likely to be disproportionately high and adverse, and to evaluate the significance of such impacts.

Based on staff guidance (NRC 1999b), air, land, and water resources within about 80 km (50 mi) of HNP were examined. Within that area, a few potential environmental impacts could affect human populations; all of these were considered SMALL. These include:

- groundwater-use conflicts
- electric shock
- microbial organisms
- postulated accidents
- surface water-use conflicts

To decide whether any of these impacts could be disproportionate, the staff examined the geographic distribution of minority and low-income populations recorded during the 1990 Census (U.S. Census Bureau [USCB] 1991) within 80 km (50 mi), supplemented by field inquiries to the local planning departments, and social service agencies in Toombs and Appling counties.

Generally speaking, minority populations are small and dispersed in the 80-km (50-mi) radius around the HNP site (see cross-hatched areas in Figure 4-1). Minority populations are located

1 primarily in the small towns in the area including Vidalia, Baxley, Douglas, and Waycross.  
2 When individual minority populations were present, they are always Black (SNC 2000a). Other  
3 minorities were present, including substantial numbers of Hispanics in Long and Liberty  
4 counties, but they did not meet the criterion of "minority populations" in the staff guidance (NRC  
5 1999b).

6  
7 Figure 4-2, also taken from the 1990 Census (USCB 1991), shows the geographic distribution  
8 of low-income populations within the 80-km (50-mi) radius of the plant. The cross-hatched  
9 census blocks show areas where the percentage of households below the poverty level is  
10 20 percentage points or more than the percentage of households below the poverty level in the  
11 entire State of Georgia. The largest concentrations of low-income populations within the 80-km  
12 (50-mi) radius are located in the counties of Wheller, Montgomery, Bulloch, and Wayne and the  
13 towns of Vidalia, Baxley, Douglas, and Waycross. Some small groups are scattered throughout  
14 the rural areas of Emanuel, Chandler, Tattnall, and Bacon counties.

15  
16 Examination of the various environmental pathways by which minority and low-income popula-  
17 tions could be disproportionately affected reveals no unusual resource dependencies or  
18 practices through which the populations could be disproportionately affected. Specifically, no  
19 pathways were found through which subsistence agriculture, hunting, or fishing were signifi-  
20 cantly affected. The staff concludes that HNP offsite impacts would be SMALL, and no special  
21 mitigation actions are warranted.

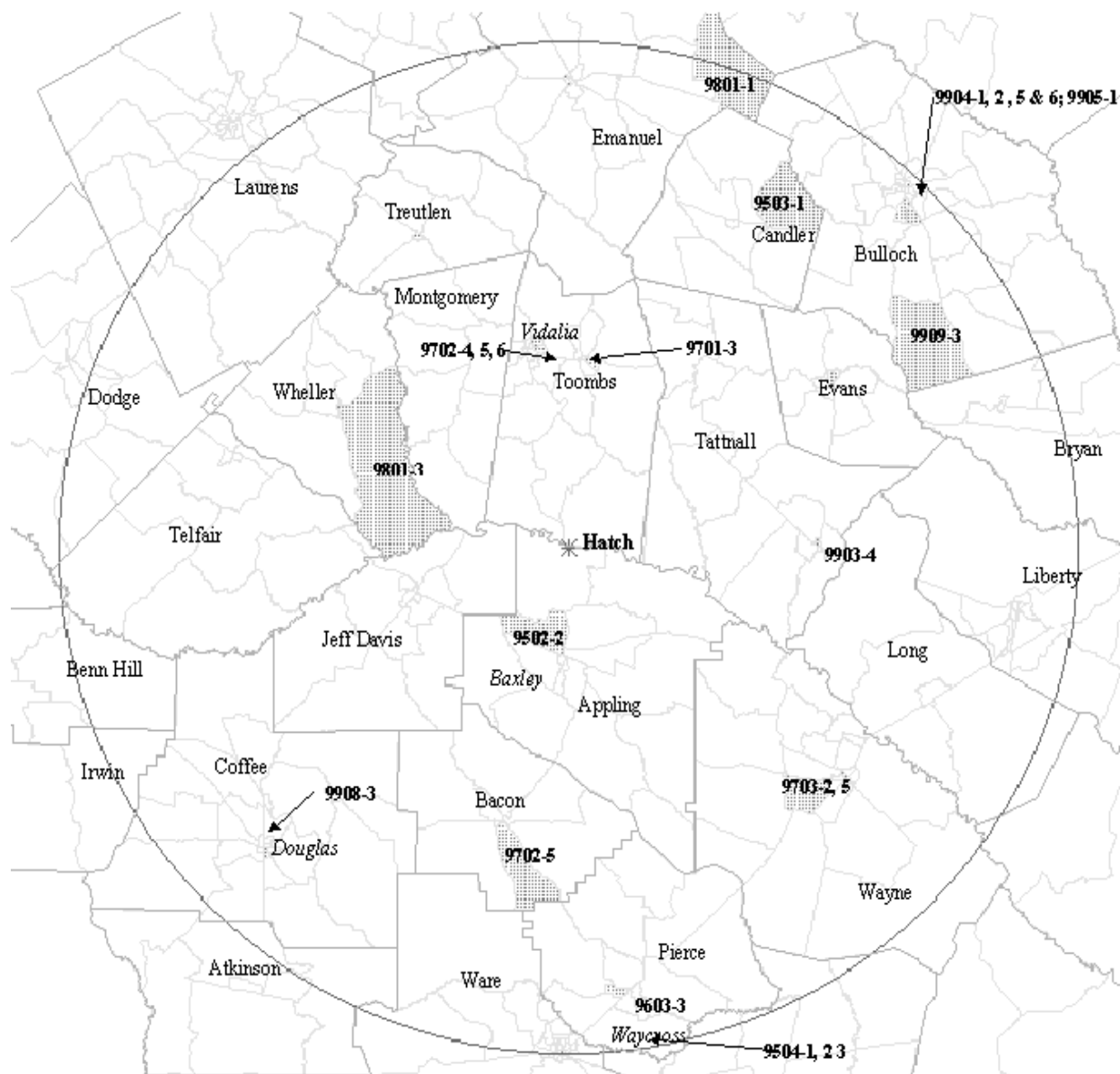
## 22 23 **4.5 Groundwater Use and Quality**

24  
25 There are no Category 1 issues applicable to HNP groundwater use and quality during the  
26 renewal term. Category 2 issues related to groundwater use and quality during the renewal  
27 term that are applicable to HNP are discussed in the sections that follow. These issues, listed  
28 in Table 4-8, require plant-specific analysis.

### 29 30 **4.5.1 Groundwater-Use Conflicts (Potable and Service Water)**

31  
32 Site Wells 1 and 2, described in Section 2.2.2, are screened in the principal artesian (Floridan)  
33 aquifer. During HNP construction, pump tests were conducted to determine the groundwater  
34 characteristics for this unit. The wells pumped for 9 hours at rates of approximately 2850 L/min  
35 (752 gpm) (Well 1) and approximately 3020 L/min (797 gpm) (Well 2). Drawdown in the wells  
36 stabilized at 1.5 m (5 ft) in Well 1 and 2.4 m (8 ft) in Well 2. Based on published literature, the  
37 transmissivity in the vicinity of the site is approximately 0.019 m<sup>3</sup>/s/m (130,000 gpd/ft) and the  
38 effective permeability is 0.03 and 0.06 m/min (0.1 and 0.2 ft/min). Data gathered during

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**Figure 4-2.** Geographic Distribution of Populations Classified as Low-Income Populations (Shown in Shaded Areas)—80-km (50-mi) Radius

**Table 4-8.** Category 2 Issues Applicable to Groundwater Use and Quality 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
GROUNDWATER USE AND QUALITY			
Groundwater-use conflicts (potable and service water; plants that use >379 L/min [>100 gpm]).	4.8.1.1 4.8.2.1	C	4.5.1
Groundwater-use conflicts (plants using cooling towers withdrawing make-up water from a small river)	4.8.1.3 4.4.2.1	A	4.5.2

pumping tests and existing data for this aquifer indicate that a properly designed well installed within this aquifer unit can safely yield over approximately 4200 L/min (1100 gpm). A third site well, Well 3, was added to supply domestic water to the recreation facility. The well yield for Well 3 (less than 3800 L/d [1000 gpd]) will not significantly impact the water usage of the aquifer.

Within the immediate vicinity of the site, the primary use of groundwater is for domestic needs, with a limited amount for livestock. Most domestic wells are screened within the unconfined aquifer. The closest offsite well that is screened to the principal aquifer is located approximately 300 m (1000 ft) southwest of the site (Figure 2-3). Currently, there is no industrial demand for groundwater within the vicinity of the site, and no groundwater is used for irrigation. The nearest appreciable demand is 16 km (10 mi) south of the site, where the town of Baxley has applied for a permit modification dated September 1, 1997. The permit modification request is for four wells withdrawing approximately 3.2 million L/d (850,000 gpd) from the principal aquifer.

As described above, each of the onsite production wells is capable of producing approximately 2800 L/min (750 gpm). The pump test conducted during construction demonstrated that at this rate of pumping there was no interference between site Wells 1 and 2. These two wells are located approximately 542 m (1780 ft) apart, therefore, the effective radius is conservatively assumed to be approximately 600 m (2000 ft). The onsite well closest to the facility boundary is Well 1 at approximately 1000 m (3400 ft). Based on the conservative pumping rate of 2800 L/min (750 gpm) and a conservative effective radius of 600 m (2000 ft), the resulting drawdown in Well 1 would not extend to the facility boundary. Given that the actual plant groundwater requirements, approximately 477 L/min (126 gpm), are about one fifth of that used to determine the effective radius, the drawdown of the groundwater potentiometric surface attributable to

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plant operations would be substantially less than that demonstrated by the original site pump test data, creating no interference with offsite wells.

The site production wells are located in the Floridan Aquifer. This aquifer unit is isolated geologically from the minor confined aquifer by a confining unit that is approximately 30 m (100 ft) thick. Since monitoring began at the facility in 1969, there has been little to no fluctuation of the water level in the minor confined aquifer. Water levels in the unconfined aquifers have been observed to vary according to normal seasonal fluctuations. There have been no observed effects in the monitoring wells installed in the shallow onsite aquifers from the pumping of groundwater from the Floridan onsite wells.

Due to the high potential yields of the Floridan Aquifer and the low production yields required by HNP, HNP will have little effect on the regional water table. There is some limited domestic and agricultural use of groundwater in rural areas surrounding the site, but no groundwater-use conflicts have been identified as a result of current withdrawals. Therefore, the continued operation of HNP is considered to have a SMALL impact on regional groundwater use and does not require mitigation.

### **4.5.2 Groundwater-Use Conflicts (Make-Up Water)**

The alluvial aquifer at the site is primarily south of the Altamaha River within the facility boundary, and consists of approximately 16.7 m (55 ft) of poorly sorted sand, gravel, and clay. The alluvial aquifer contains groundwater under water table conditions. Clayey soils dominate in the upper portion of the aquifer. Recharge to the aquifer is mainly through the infiltration of local precipitation. Recharge is also provided in a limited amount by discharge from the Altamaha River during high stages and by the minor confined aquifer of the Hawthorn Formation, to which the alluvium is hydraulically connected. Groundwater typically discharges to the Altamaha River. Although no aquifer data exist for the unit, the alluvium in the region is considered to be a large potential source of water.

Based on the information provided in Section 4.1.1, the consumptive use of HNP is estimated to lower the river elevation by 0.02 c (0.08 ft) during low-flow conditions. Such a small change would not appreciably alter the potentiometric gradient in the alluvial aquifer. Therefore, the impact to the groundwater resource from the reduced streamflow is SMALL and does not require mitigation.

## **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, as shown in Table 4-9. This issue requires consultation with



appropriate agencies (FWS or National Marine Fisheries Service [NMFS]) to determine if threatened or endangered species are present and whether they would be adversely affected during the license renewal term.

**Table 4-9.** 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

Assessment of the potential occurrence of endangered or threatened species in the vicinity of HNP was initiated in December 1997 when SNC requested database information from GADNR concerning known occurrences of State- or Federally-listed species in the vicinity of HNP (GPC 1997). SNC commissioned a field survey of the HNP site and all of the transmission lines associated with HNP, as well as a freshwater mussel survey in a 19-km (12-mi) reach of the Altamaha River up and downstream of HNP (Law 1998). The draft of the terrestrial survey was completed in September 1999 (Tetra Tech, Inc. 1999). These surveys detected the presence of several Federally-listed species and a number of State species of concern (Table 2-5). Most of the documented occurrences were within transmission corridors well away from the HNP site, but a few species were documented at or near the HNP site. SNC determined that its operation and maintenance procedures would remain unchanged during the license renewal term, and did not threaten the existence of the listed species at HNP or in associated transmission corridors.

The results of the terrestrial and freshwater mussel surveys were forwarded to FWS and GADNR, along with a request for concurrence with a "no effect" determination regarding license renewal in September 1999 (SNC 1999b; 1999c). This initiated an informal consultation under Section 7 of the Endangered Species Act of 1973 (ESA).

GADNR concurred with the SNC conclusions (GADNR 1999), but FWS did not (FWS 1999). FWS indicated that it could not concur with a "no effect" determination, and requested additional information about the plant operations, and how these operations may affect the shortnose sturgeon. FWS also requested that SNC investigate further the potential occurrence of the flatwoods salamander in the vicinity of HNP or associated transmission lines.

SNC representatives met with FWS during November 1999 and provided a biological information update concerning the flatwoods salamander and shortnose sturgeon in December 1999 (SNC 1999d). Based on the information provided by the applicant, FWS concurred with a

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1 no adverse affect determination regarding endangered or threatened species under the purview  
2 of FWS in January 2000 (FWS 2000).

3  
4 The staff has reviewed the terrestrial and freshwater mussel surveys, and the additional  
5 information provided by the applicant to FWS and GADNR. These agencies concurred with the  
6 applicant's "no adverse affects" determinations. Based on this review, the staff has concluded  
7 that the impact on threatened or endangered terrestrial or freshwater mussel species of an  
8 additional 20 years of operation and maintenance of HNP and its associated transmission lines  
9 would be SMALL, and further mitigation is not warranted.

10  
11 SNC contacted NMFS during September 1999 requesting concurrence with a "no effect"  
12 determination concerning the shortnose sturgeon in the Altamaha River (SNC 1999e). NMFS  
13 determined that, based on the information provided, it was unable to concur with a "no effect"  
14 determination concerning the potential effects of license renewal on the shortnose sturgeon  
15 (NMFS 1999). SNC representatives met with NMFS and provided additional information  
16 concerning shortnose sturgeon near HNP and operational effects of HNP on the Altamaha  
17 River in October 1999 (GPC 1999c) and February 2000 (SNC 2000b). On August 31, 2000, the  
18 NRC staff submitted a biological assessment of the impact on shortnose sturgeon of HNP  
19 license renewal to NMFS's Southeast Regional Office, in St. Petersburg, Florida (NRC 2000).  
20 The NRC staff requested an informal consultation under Section 7 of the ESA.

21  
22 During its preparation of the biological assessment, the staff collected and evaluated  
23 information related to the shortnose sturgeon's life cycle, range, migration patterns, and  
24 spawning. The staff also evaluated potential impacts related to (1) entrainment and  
25 impingement of shortnose sturgeon at the HNP intake structure and (2) thermal effects.

26  
27 The staff found no evidence that the water-intake operations and thermal effects of the HNP  
28 license renewal will adversely impact the shortnose sturgeon. There is no evidence that HNP  
29 operations have influenced the migration of shortnose sturgeon to and from spawning grounds  
30 upstream of the plant. Monitoring of entrainment and impingement at HNP indicate that few, if  
31 any, sturgeon are impinged at the intake screens or entrained in the water pumped to the  
32 cooling towers. Thus, an additional 20 years of operation of HNP should not affect the viability  
33 of the Altamaha River shortnose sturgeon or result in any population decline.

34  
35 Based on the biological assessment, it is the staff's preliminary conclusion that the impact to  
36 the shortnose sturgeon is SMALL and that mitigation is not needed.

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

The staff has not identified new and significant information on environmental issues listed in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 related to operation during the renewal term. The staff reviewed the discussion of environmental impacts associated with operation during the renewal term in the GEIS and has conducted its own independent review, including public scoping meetings, to identify issues with significant new information. Processes for identification and evaluation of new information are described in Chapter 1 under License Renewal Evaluation Process.

## **4.8 Summary of Impacts of Operations During the Renewal Term**

Neither SNC nor the staff is aware of significant new information related to any of the applicable Category 1 issues associated with the HNP operation during the renewal term. Consequently, the staff concludes that the environmental impacts associated with these issues are bounded by the impacts described in the GEIS. For each of these issues, the GEIS concluded that the impacts would be SMALL and that "plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation."

Plant-specific environmental evaluations were conducted for 12 Category 2 issues applicable to HNP operation during the renewal term and for environmental justice. For 11 issues and environmental justice, the staff concluded that the potential environmental impact of renewal term operations of HNP would be of SMALL significance in the context of the standards set forth in the GEIS and that mitigation would not be warranted. Relative to the threatened and endangered species, the staff's preliminary conclusion is that the impact resulting from license renewal would be SMALL and further mitigation is not warranted.

In addition, the staff concluded that a consensus has not been reached by appropriate Federal health agencies that there are adverse effects from electromagnetic fields. Therefore, no evaluation of this issue is required.

## 4.9 References

10 CFR 51.53, "Postconstruction environmental reports."

10 CFR Part 51, Subpart A, Appendix B, "Environmental effect of renewing the operating license of a nuclear power plant."

Council on Environmental Quality (CEQ). 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act*. Council on Environmental Quality, Executive Office of the President, Washington, D.C.

Endangered Species Act of 1973, as amended, 16 USC 1531, et seq.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." 59 *Federal Register* 7629-7633 (1994).

Federal Water Pollution Control Act (FWPCA) of 1977, as amended, 33 USC 1251 et seq. (Also known as the Clean Water Act).

Georgia Department of Natural Resources (GADNR). 1999a. Letter from W. Ray Luce, GADNR to Mr. C.R. Pierce, Southern Nuclear Operating Company. October 29, 1999.

Georgia Department of Natural Resources (GADNR). 1999b. Letter from David Waller, Director, GADNR, to Mr. C. R. Pierce, Southern Nuclear Operating Company. October 13, 1999.

Georgia Power Company (GPC). 1997. Letter from William J. Chandler, GPC, to Mr. Greg Krakow, Data Manager, Georgia Department of Natural Resources. December 16, 1997.

Georgia Power Company (GPC). 1999a. *Engineering Study on Induced Short Circuit Currents*.

Georgia Power Company (GPC). 1999b. *Short Circuit Study on 230-kV Lines from Plant Hatch*.

Georgia Power Company (GPC). 1999c. Letter from Mr. M. C. Nichols, GPC, to Mr. David Bernhart, National Marine Fisheries Service. October 18, 1999.

1 Law Engineering and Environmental Services. 1998. *Freshwater Mussel Survey, Altamaha*  
2 *River, Appling and Toombs Counties, Georgia*. Prepared for Southern Nuclear Operating  
3 Company. December 2, 1998.

4  
5 National Electrical Safety Code (NESC). 1997. Institute of Electrical and Electric Engineers,  
6 Inc., New York.

7  
8 National Environmental Policy Act (NEPA) of 1969, as amended, 42 USC 4321, et seq.

9  
10 National Historic Preservation Act of 1966, as amended, 16 USC 470, et seq.

11  
12 National Institute of Environmental Health Sciences (NIEHS). 1999. *NIESH Report on Health*  
13 *Effects from Exposure to Power Line Frequency and Electric and Magnetic Fields*. NIH  
14 Publication No. 99-4493, National Institutes of Health, Research Triangle Park, North Carolina.

15  
16 National Marine Fisheries Service (NMFS). 1999. Letter from William Hogarth, Regional  
17 Administrator, NMFS, to Mr. C. R. Pierce, Southern Nuclear Operating Company.  
18 October 8, 1999.

19  
20 Southern Nuclear Operating Company (SNC). 1999a. Letter from C. R. Pierce, SNC, to  
21 Mr. Ray Luce, State Historical Preservation Officer. Historic Preservation Division, Georgia  
22 Department of Natural Resources. September 15, 1999.

23  
24 Southern Nuclear Operating Company (SNC). 1999b. Letter from C. R. Pierce, SNC, to  
25 Ms. Sandra Tucker, Field Supervisor, U.S. Fish and Wildlife Service. September 15, 1999.

26  
27 Southern Nuclear Operating Company (SNC). 1999c. Letter from C. R. Pierce, SNC, to  
28 Mr. David Waller, Director, Wildlife Resources Division, Georgia Department of Natural  
29 Resources. September 15, 1999.

30  
31 Southern Nuclear Operating Company (SNC). 1999d. Letter from C. R. Pierce, SNC, to  
32 Sandra Tucker, Field Supervisor, U.S. Fish and Wildlife Service. December 7, 1999.

33  
34 Southern Nuclear Operating Company (SNC). 1999e. Letter from C. R. Pierce, SNC, to  
35 Mr. Charles Oravetz, Protected Species Division, National Marine Fisheries Service.  
36 September 15, 1999.

37  
38 Southern Nuclear Operating Company (SNC). 2000a. *Application for License Renewal for the*  
39 *Edwin I. Hatch Nuclear Plants, Units 1 and 2. Appendix D, Applicant's Environmental*  
40 *Report—Operating License Renewal Stage Edwin I. Hatch Nuclear Plant.*

## Environmental Impacts of Operation

1 Southern Nuclear Operating Company (SNC). 2000b. Letter from Mr. C. R. Pierce (SNC) to  
2 Mr. Charles Oravetz, Chief, Protected Species Branch, National Marine Fisheries Service.  
3 February 2, 2000.

4  
5 Tetra Tech, Inc. 1999. *Threatened & Endangered Species Surveys, E. I. Hatch Nuclear Plant*  
6 *& Associated Transmission line Corridors (1998 - 1999)*. December 3, 1999.

7  
8 U.S. Atomic Energy Commission (AEC). 1972. *Final Environmental Statement for the Edwin I.*  
9 *Hatch Nuclear Plant Unit 1 and Unit 2*. Washington, D.C.

10  
11 U.S. Census Bureau (USCB). 1991. *1990 Census*.

12  
13 U.S. Fish and Wildlife Service (FWS). 1999. Letter from Sandra Tucker, Field Supervisor,  
14 FWS, to C. R. Pierce, Southern Nuclear Operating Company. November 8, 1999.

15  
16 U.S. Fish and Wildlife Service (FWS). 2000. Letter from Sandra Tucker, Field Supervisor,  
17 FWS, to C. R. Pierce, Southern Nuclear Operating Company. January 23, 2000.

18  
19 U.S. Nuclear Regulatory Commission (NRC). 1978. *Final Environmental Statement for the*  
20 *Edwin I. Hatch Nuclear Plant Unit 2*. Washington, D.C.

21  
22 U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement*  
23 *for License Renewal of Nuclear Plants*. NUREG-1437, Washington, D.C.

24  
25 U.S. Nuclear Regulatory Commission (NRC). 1999a. *Generic Environmental Impact*  
26 *Statement for License Renewal of Nuclear Plants, Main Report, Section 6.3—Transportation,*  
27 *Table 9.1, Summary of findings in NEPA issues for license renewal of nuclear power plants.*  
28 NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

29  
30 U.S. Nuclear Regulatory Commission (NRC). 1999b. *Procedural Guidance for Preparing*  
31 *Environmental Assessments and Considering Environmental Issues*. Attachment 4 to Office of  
32 Nuclear Reactor Regulations, Office Letter No. 906, Revision 2, Washington, D.C.

33  
34 U.S. Nuclear Regulatory Commission (NRC). 2000. Letter from Cynthia A. Carpenter, NRC, to  
35 Mr. Charles Oravetz, Chief, Protected Species Branch, National Marine Fisheries Services.  
36 August 31, 2000.

37  
38 Wiltz, J. W. 1981. *Plant Edwin I. Hatch 316(b) Demonstration on the Altamaha River in*  
39 *Appling County, Georgia*. Georgia Power Company, Environmental Affairs Center.