

8.0 Environmental Impacts of Alternatives to Operating License Renewal

This chapter examines the potential environmental impacts associated with denying the renewal of the operating licenses (OLs) (i.e., the no-action alternative); the potential environmental impacts from electric generating sources other than Catawba Nuclear Station, Units 1 and 2 (Catawba); the possibility of purchasing electric power from other sources to replace power generated by Units 1 and 2 and the associated environmental impacts; the potential environmental impacts from a combination of generating and conservation measures; and other generation alternatives that were deemed unsuitable for replacement of power generated by Units 1 and 2. The environmental impacts are evaluated using the U.S. Nuclear Regulatory Commission's (NRC's) three-level standard of significance (i.e., SMALL, MODERATE, or LARGE) developed using the Council on Environmental Quality guidelines and set forth in the footnotes to Table B-1 of 10 CFR 51, Subpart A, Appendix B:

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

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

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

The impact categories evaluated in this chapter are the same as those used in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996, 1999)^(a) with the additional impact category of environmental justice.

8.1 No-Action Alternative

NRC's regulations implementing the National Environmental Policy Act (NEPA) specify that the no-action alternative be discussed in an NRC environmental impact statement (EIS) (40 CFR Part 51, Subpart A, Appendix A[4]). For license renewal, the no-action alternative refers to a scenario in which the NRC would not renew the Catawba OLs, and Duke Energy Corporation (Duke) would then decommission both units when plant operations cease. Replacement of

(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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1 Catawba's electricity generation capacity would be met by (1) demand-side management and
2 energy conservation, (2) power purchased from other electricity providers, (3) generating
3 alternatives other than Catawba, Units 1 and 2, or (4) some combination of these options.
4

5 Duke will be required to comply with NRC decommissioning requirements whether or not the
6 OLS are renewed. If the Catawba OLS are renewed, decommissioning activities may be
7 postponed for up to an additional 20 years. If the OLS are not renewed, Duke would conduct
8 decommissioning activities according to the requirements in 10 CFR 50.82.
9

10 The environmental impacts associated with decommissioning under both license renewal and
11 the no-action alternative would be bounded by the discussion of impacts in Chapter 7 of the
12 GEIS, Chapter 7 of this draft Supplemental Environmental Impact Statement (SEIS), and the
13 *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*,
14 NUREG-0586 dated August 1988^(a). The impacts of decommissioning after 60 years of
15 operation are not expected to be significantly different from those occurring after 40 years of
16 operation.
17

18 The environmental impacts for the socioeconomic, historic and archaeological resources, and
19 environmental justice impact categories are summarized in Table 8-1 and discussed in the
20 following paragraphs. In some cases, impacts associated with the no-action alternative would
21 be positive. For example, closure of Units 1 and 2 would eliminate any impingement and
22 entrainment of fish and shellfish and any negative impacts resulting from thermal discharges to
23 Lake Wylie.
24

25 **Table 8-1. Summary of Environmental Impacts of the No-Action Alternative**
26

27	Impact Category	Impact	Comment
28	Socioeconomic	SMALL to MODERATE	Decrease in employment, higher-paying jobs, and tax revenues
29	Historic and	SMALL	Land occupied by Units 1 and 2 would likely
30	Archaeological Resources		be retained by Duke
31	Environmental Justice	SMALL to MODERATE	Loss of employment opportunities and social programs

(a) The NRC staff is currently supplementing NUREG-0586 for reactor decommissioning. In October 2001, the staff issued draft supplement 1 to NUREG-0586 dealing with Decommissioning of Nuclear Power Reactors (NRC 2001a) for public comment. The staff is currently finalizing the draft supplement for publication as a final document.

- 1 • Socioeconomic: When Catawba ceases operation, there will be a decrease in employ-
2 ment and tax revenues associated with the closure. Impacts on employment (primary
3 and secondary) and population would occur over a wide area. Employees at Catawba
4 reside in a number of Counties in South and North Carolina. The majority live in York
5 County, South Carolina (55 percent) and Gaston and Mecklenburg Counties, North
6 Carolina (15 and 14 percent, respectively; Duke 2001).

7
8 Tax-related impacts would occur in York County and the town of Clover, which is within York
9 County. In 2000, Duke paid property taxes for Catawba to York County in the amount of
10 \$35,861,194, or 21.9 percent of the real and personal property taxes paid in the county (see
11 Table 2-16). Approximately 75 percent of the property taxes paid by Catawba are allocated
12 in support of the Clover School District in York County.

13
14 The no-action alternative would result in the loss of the taxes attributable to Catawba as well
15 as the loss of plant payrolls 20 years earlier than if the OLS were renewed. Given the
16 relatively large percentage of revenue in York County and the Clover School District derived
17 from Catawba, the decline in property tax revenue would have a LARGE impact on the
18 school district and SMALL to MODERATE impact on the county depending on future
19 economic growth in the county. The ability of the two jurisdictions to provide public services
20 and road maintenance (York County) and school services (Clover School District and to a
21 lesser extent the remaining three school districts) would be adversely impacted.

22
23 There would also be an adverse impact on housing values (probably concentrated in upper
24 scale homes due to the higher salaries and wages paid by Catawba) and the York County
25 economy if Catawba were to cease operations.

26
27 Duke employees working at Catawba currently contribute time and money to community
28 activities, including schools, churches, charities, and other civic activities. It is likely that
29 with a reduced presence in the community following decommissioning, community
30 involvement by Duke and its employees in the region would be less.

- 31
32 • Historic and Archaeological Resources: The potential for future adverse impacts to
33 known or unrecorded cultural resources at Catawba following decommissioning will
34 depend on the future use of the land occupied by the existing plant. Following
35 decommissioning, the land occupied by Catawba probably would be retained by Duke
36 for other corporate purposes. Eventual sale or transfer of the land occupied by
37 Catawba, however, could result in adverse impacts to cultural resources if the land-use
38 pattern were changed too dramatically. Catawba is located on Lake Wylie and is sur-
39 rounded by upscale housing developments. Land use at the site could change to
40 residential-housing use should Duke sell or transfer the site. However, given the site's
41 small size of approximately 158 ha (391 ac), of which 106 ha (262 ac) is nonforested

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1 and contains the generation and maintenance facilities, parking lots, open water, and
2 roads and the fact that the site is free of significant archaeological and historical sites,
3 the impacts of this alternative on historic and archaeological resources are considered
4 SMALL.

- 5
- 6 • Environmental Justice: Current operations at Catawba have no disproportionate
7 impacts on the minority and low-income populations of York County and the other
8 counties surrounding the plant, and no environmental pathways have been identified
9 that would cause disproportionate impacts on these populations. Closure of Catawba
10 would result in decreased employment opportunities in York County and surrounding
11 counties, thus tax revenues would decrease possibly leading to negative and
12 disproportionate impacts on minority or low-income populations. Because Catawba is
13 located in a relatively urban area with extensive employment opportunities, the environ-
14 mental justice impacts under the no-action alternative are considered SMALL to
15 MODERATE.
- 16

17 8.2 Alternative Energy Sources

18
19 This section discusses the environmental impacts associated with alternative sources of electric
20 power to replace the power generated by Catawba, assuming that the OLS for Units 1 and 2 are
21 not renewed. The order of presentation of alternative energy sources in Section 8.2 does not
22 imply which alternative would be most likely to occur or to have the least environmental
23 impacts. The following generation alternatives are considered in detail:

- 24
- 25 • coal-fired generation at the Catawba site and at an alternate greenfield site
26 (Section 8.2.1)
 - 27
 - 28 • natural-gas-fired generation at the Catawba site and at an alternate greenfield site
29 (Section 8.2.2)
 - 30
 - 31 • nuclear generation at the Catawba site and at an alternate greenfield site
32 (Section 8.2.3).
- 33

34 The alternative of purchasing power from other sources to replace power generated at Catawba
35 is discussed in Section 8.2.4. Other power generation and conservation alternatives considered
36 by the staff and found not to be reasonable replacements for Catawba are discussed in
37 Section 8.2.5. Section 8.2.6 discusses the environmental impacts of a combination of
38 generation and conservation alternatives.

39
40 Each year the Energy Information Administration (EIA), a component of the U.S. Department
41 of Energy (DOE), issues an annual energy outlook. The latest report, *Annual Energy Outlook*

1 2002 with Projections to 2020, was issued in December 2001 (DOE/EIA 2001a). In this report,
 2 EIA projects that combined-cycle^(a) or combustion turbine technology fueled by natural gas is
 3 likely to account for approximately 88 percent of new electric generating capacity between the
 4 years 2000 and 2020. Both technologies are designed primarily to supply peak and intermedi-
 5 ate capacity, but combined-cycle technology can also be used to meet baseload^(b) require-
 6 ments. Coal-fired plants are projected by EIA to account for approximately 9 percent of new
 7 capacity during this period. Coal-fired plants are generally used to meet baseload require-
 8 ments. Renewable energy sources, primarily wind, geothermal, and municipal solid waste
 9 units, are projected by EIA to account for the remaining 3 percent of capacity additions. EIA's
 10 projections are based on the assumption that providers of new generating capacity will seek to
 11 minimize cost while meeting applicable environmental requirements. Combined-cycle plants
 12 are projected by EIA to have the lowest generation cost in 2005 through 2020, followed by coal-
 13 fired plants and then wind generation (DOE/EIA 2001a).

14
 15 EIA projects that oil-fired plants will account for very little of new generation capacity in the
 16 United States during the 2000 to 2020 time period because of higher fuel costs and lower
 17 efficiencies (DOE/EIA 2001a). However, oil as a back-up fuel to natural-gas-fired generation
 18 (combined cycle) is considered.

19
 20 EIA also projects that new nuclear power plants will not account for any new generation
 21 capacity in the United States during the 2000 to 2020 time period because natural gas and
 22 coal-fired plants are projected to be more economical (DOE/EIA 2001a). In spite of this
 23 projection, a new nuclear plant alternative for replacing power generated by Catawba is
 24 considered in Section 8.2.3. Since 1997, the NRC has certified three new standard designs for
 25 nuclear power plants under the procedures in 10 CFR Part 52, Subpart B. These designs are
 26 the U.S. Advanced Boiling Water Reactor (10 CFR Part 52, Appendix A), the System 80+
 27 Design (10 CFR Part 52, Appendix B), and the AP600 Design (10 CFR Part 52, Appendix C).
 28 The submission to the NRC of these three applications for certification indicates continuing
 29 interest in the possibility of licensing new nuclear power plants. NRC has established a New
 30 Reactor Licensing Project Office to prepare for and manage future reactor and site licensing
 31 applications (NRC 2001b).
 32

(a) In a combined-cycle unit, hot combustion gases in a combustion turbine rotates the turbine to generate electricity. Waste combustion heat from the combustion turbine is routed through a heat-recovery boiler to make steam to generate additional electricity.

(b) A baseload plant normally operates to supply all or part of the minimum continuous load of a system and consequently produces electricity at an essentially constant rate. Nuclear power plants are commonly used for baseload generation (i.e., these units generally run near full load).

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8.2.1 Coal-Fired Generation

The coal-fired alternative is analyzed for both the Catawba site and an alternate greenfield site. The staff assumed the construction of four 600 megawatt electric (MW[e]) units, which is consistent with the Catawba Environmental Report (ER; Duke 2001). This assumption will slightly overstate the impacts of replacing the 2258 MW(e) generated by Catawba.

Coal and lime or limestone for a coal-fired plant sited at Catawba most likely would be delivered by railroad via the existing rail line. Lime^(a) or limestone is used in the scrubbing process for control of sulfur dioxide (SO₂) emissions. Rail delivery also would be the most likely option for delivering coal and lime/limestone to an alternate greenfield site for the coal-fired plant. A coal slurry pipeline is also a technically feasible delivery option; however, the associated cost and environmental impacts make a slurry pipeline an unlikely transportation alternative. Construction at an alternate site could necessitate the construction of a new transmission line to connect to existing lines and a rail spur to the plant site.

The coal-fired plant is assumed to utilize tangentially fired, dry-bottom boilers and consume bituminous, pulverized coal with an ash content of approximately 10 percent by weight (Duke 2001). Annual coal consumption would be approximately 5.76 million MT/yr (6.35 million tons/yr) (Duke 2001). The Catawba ER (Duke 2001) assumes a heat rate^(b) of 2.7 J fuel/J electricity (9364 Btu/kWh) and a capacity factor^(c) of 0.8. After combustion, 99.9 percent of the ash (approximately 572,000 MT/yr [630,000 tons/yr]) would be collected and disposed of at the plant site. In addition, approximately 304,000 MT/yr (335,000 tons/yr) of scrubber sludge would be disposed of at the plant site (Duke 2001).

Unless otherwise indicated, the assumptions and numerical values used in Section 8.2.1 are from the Catawba ER (Duke 2001). The staff reviewed this information and compared it to environmental impact information in the GEIS. Although the OL renewal period is only 20 years, the impact of operating the coal-fired alternative for 40 years is considered (as a reasonable projection of the operating life of a coal-fired plant).

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- (a) In a typical wet scrubber, lime (calcium hydroxide) or limestone (calcium carbonate) is injected as a slurry into the hot effluent combustion gases to remove entrained sulfur dioxide. The lime-based scrubbing solution reacts with sulfur dioxide to form calcium sulfite which precipitates and is removed in sludge form.
- (b) Heat rate is a measure of generating station thermal efficiency. In English units, it is generally expressed in British thermal units (Btu) per net kilowatt-hour (kWh). It is computed by dividing the total Btu content of fuel burned for electric generation by the resulting net kWh generation.
- (c) The capacity factor is the ratio of electricity generated, for the period of time considered, to the energy that could have been generated at continuous full-power operation during the same period.

1 **8.2.1.1 Closed-Cycle Cooling System**

2
3 For purposes of this SEIS, the staff assumed that a coal-fired plant located at Catawba would
4 use the existing closed-cycle cooling system. The staff also assumed that an alternate
5 greenfield site would use a closed-cycle cooling system.

6
7 The overall impacts of the coal-fired generating system are discussed in the following sections
8 and summarized in Table 8-2. The extent of impacts at an alternate greenfield site would
9 depend on the location of the particular site selected.

10
11 **Table 8-2. Summary of Environmental Impacts of Coal-Fired Generation at Catawba**
12 **Nuclear Station and an Alternate Greenfield Site Using Closed-Cycle Cooling**

13

Catawba Nuclear Station Site			Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments
14 Land Use	15 MODERATE to 16 LARGE	17 Use of unused portion of Catawba site plus additional offsite, undisturbed land would be needed. Additional offsite land impacts for coal and limestone mining. Degree of impact depends on characteristics of land being converted: MODERATE for a previously disturbed site; LARGE for an undisturbed site.	SMALL to LARGE	Uses up to 700 ha (1700 ac) for plant infrastructure and waste disposal; additional land impacts for coal and limestone mining; possible impacts for transmission line and rail spur. Degree of impact dependent on whether alternate site is previously disturbed: SMALL to MODERATE for a previously disturbed site; LARGE for a greenfield site.
18 Ecology	MODERATE to LARGE	Uses undeveloped areas at Catawba plus significant amount of previously undisturbed offsite land. Potential for habitat loss and fragmentation and reduced productivity and biological diversity.	SMALL to LARGE	Impact depends on whether site is previously developed (SMALL) or greenfield (MODERATE to LARGE). Factors to consider include location and ecology of the site, surface water body used for intake and discharge, and transmission line route; potential habitat loss and fragmentation; reduced productivity and biological diversity.
19 Surface Water 20 Use and Quality	SMALL	Closed-cycle cooling would use existing intake structures; surface water use should remain the same as current uses for Catawba.	SMALL to MODERATE	Impact will depend on the volume of water withdrawn and discharged and the characteristics of the surface water body; new intake structures required.

21

Alternatives

Table 8.2. (contd)

	Catawba Nuclear Station Site			Alternate Greenfield Site	
	Impact Category	Impact	Comments	Impact	Comments
1 2 3 4 5 6 7	Groundwater Use and Quality	SMALL	Less groundwater withdrawn for potable use because of smaller workforce.	SMALL to LARGE	Impacts SMALL if groundwater used only for potable water; MODERATE to LARGE if groundwater used as makeup cooling water (impacts would be site/aquifer specific).
8	Air Quality	MODERATE	Sulfur oxides • 5757 MT (6346 tons/yr) Nitrogen oxides • 7196 MT/yr (7932 tons/yr) Particulates • 288 MT/yr (317 tons/yr) of total suspended particulates which would include 192 MT/yr (212 tons/yr) of PM ₁₀ Carbon monoxide • 1439 MT/yr (1586 tons/yr) Small amounts of mercury and other hazardous air pollutants and naturally occurring radioactive materials – mainly uranium and thorium.	MODERATE	Potentially same impacts as the Catawba site, although pollution control standards may vary.
9	Waste	MODERATE	Total waste volume would be approximately 907,300 MT/yr (1 million tons/yr) of ash, spent catalyst, and scrubber sludge requiring approximately 227 ha (560 ac) for disposal during the 40-year life of the plant.	MODERATE	Same impacts as Catawba site; waste disposal constraints may vary.
10	Human Health	SMALL	Impacts are uncertain, but considered SMALL in the absence of more quantitative data.	SMALL	Same impact as Catawba site.

Table 8-2. (contd)

		Catawba Nuclear Station Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments	
Socio-economics	SMALL to LARGE	During construction, impacts would be SMALL to MODERATE. Up to 2500 workers during the peak of the 5-year construction period, followed by reduction from current Catawba workforce of 1218 to 250. Tax base preserved. Impacts during operation would be SMALL.	SMALL to LARGE	Construction impacts depend on location, but could be SMALL to LARGE. If plant is located in a rural area impacts could be LARGE. Tax impacts on receiving county could be SMALL to LARGE. York County would experience loss of Catawba tax base and employment with potentially MODERATE to LARGE impacts. Impact to Clover School District (York County) would be LARGE. Impacts during operation would be SMALL.	
		Transportation impacts of commuting operating personnel would be SMALL due to a smaller workforce. Transportation impacts associated with construction workers could be MODERATE to LARGE. Transportation impacts associated with train trips to and from the plant would be MODERATE to LARGE.		Transportation impacts during operation would be SMALL to MODERATE. Transportation impacts associated with construction workers could be MODERATE to LARGE. For rail transportation of coal and lime/limestone, the impact is considered SMALL to MODERATE. For barge transportation, the impact is considered SMALL.	
Aesthetics	MODERATE	MODERATE aesthetic impact. Exhaust stacks and stack emissions visible from offsite, would impact residential developments around Lake Wylie. Rail transportation of coal and lime/limestone would have a MODERATE aesthetic impact. Noise impact from plant operations would be MODERATE. Mechanical noise associated with coal handling and plant operation would be audible offsite.	SMALL to LARGE	Impact would depend on the site selected and the surrounding land features and could be LARGE if a greenfield site was selected. If needed, a new transmission line or rail spur would add to the aesthetic impact. Rail transportation impact of coal and lime/limestone would be SMALL to MODERATE, again depending on the characteristics of the alternate site. Barge transportation of coal and lime/limestone would have a SMALL aesthetic impact. Noise impact from plant operations would be MODERATE.	

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Alternatives

Table 8-2. (contd)

Catawba Nuclear Station Site			Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments
Historic and Archaeological Resources	SMALL	Some construction would affect previously developed parts of the Catawba site; cultural resource inventory should minimize any impacts on undeveloped lands. Studies would likely be needed to identify, evaluate, and address mitigation of the potential impacts of new plant construction on undeveloped land for cultural resources at the existing site.	SMALL	Alternate location would necessitate cultural resource studies. Studies would likely be needed to identify, evaluate, and address mitigation of the potential impacts of new plant construction on undeveloped sites for cultural resources.
Environmental Justice	SMALL to MODERATE	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction; loss of 968 operating jobs at Catawba could reduce employment prospects for minority and low-income populations. Impacts dependent on the economic vitality and expansion of Charlotte and surrounding area, including York County.	SMALL to LARGE	Impacts at alternate site vary depending on population distribution and makeup at site. Could be SMALL to LARGE. York County would lose tax revenue and 673 jobs with SMALL to MODERATE impacts. Clover School District (York County) would be significantly impacted, which may have a MODERATE to LARGE impact on minority and low-income populations.

• Land Use

The existing facilities and infrastructure at the Catawba site would be used to the extent practicable. Specifically, the staff assumed that the coal-fired replacement plant alternative would use the existing closed-cycle cooling system, switchyard, offices, and transmission line rights-of-way. Additional land beyond the current Catawba site of 158 ha (391 ac) would be needed to construct a new coal-fired plant while the existing nuclear Units 1 and 2 continue to operate. In the GEIS (NRC 1996), the staff estimates that approximately 700 ha (1700 ac) would be needed to construct a 1000-MW(e) coal plant at a greenfield site. If a coal-fired station with a capacity of more than 2200 MW(e) was built while Catawba was still in operation, the use/conversion of more land than is available at the Catawba site would be required.

1 The coal-fired generation alternative would require converting a significant quantity of land
2 to industrial use for the plant, coal storage, and landfill disposal of ash, spent selective
3 catalytic reduction catalyst (used for control of nitrogen oxide emissions), and scrubber
4 sludge. It is unlikely that there would be enough land within the present boundary of the
5 existing Catawba site for landfill disposal of all waste products. Disposal of scrubber sludge
6 alone over a 40-year plant life would require approximately 227 ha (560 ac) (Duke 2001).
7 Additional land-use changes would occur offsite in an undetermined coal-mining area to
8 supply fuel for the plant. In the GEIS, the staff estimates that approximately 8900 ha
9 (22,000 ac) would be affected for mining the coal and disposing of the waste to support a
10 1000-MW(e) coal plant during its operational life (NRC 1996).

11
12 A replacement coal-fired plant for Catawba would have a total generating capacity of
13 2400 MW(e) and would affect proportionately more land. Partially offsetting this offsite land
14 use would be the elimination of the need for uranium mining to supply fuel for Catawba. In
15 the GEIS, the staff estimates that approximately 405 ha (1000 ac) would be affected for
16 mining the uranium and processing it during the operating life of a 1000-MW(e) nuclear
17 power plant (NRC 1996).

18
19 Assume that 700 ha (1700 ac) may be enough to accommodate the expansion and addition
20 of four 600-MW(e) coal fired units at the Catawba site while Units 1 and 2 are still in opera-
21 tion and then decommissioned. Under this scenario, an impact on previously undisturbed
22 lands could occur (Duke 2001). The degree of impact would be dependent on the
23 characteristics of the land being converted. The impact of a coal-fired generating unit on
24 land use at the Catawba site is best characterized as MODERATE to LARGE. The impact
25 would definitely be greater than the OL-renewal alternative.

26
27 In the GEIS, the staff estimates that a 1000-MW(e) coal-fired plant would require approxi-
28 mately 700 ha (1700 ac) (NRC 1996). For an alternate greenfield site, Duke believes that
29 700 ha (1700 ac) is a sufficient size to accommodate a 2400-MW(e), coal-fired generation
30 plant at an alternate site (Duke 2001). Land at the site would be used for an ash and
31 sludge waste area. Additional land could be needed for a transmission line and for a rail
32 spur to the plant site, depending on the infrastructure in existence at the alternate site. This
33 alternative would result in SMALL to LARGE land-use impacts, depending on whether the
34 alternate site had been developed previously or not and what new infrastructure might be
35 required.

36
37 • **Ecology**

38
39 Locating a coal-fired plant at the Catawba site would alter ecological resources because of
40 the need to convert most of the currently unused land to industrial use for the plant, coal
41 storage, and ash and scrubber sludge disposal. However, some of this land would have

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1 been previously disturbed. Additional offsite, undisturbed land amounting to 405 ha
2 (1000 ac) would need to be converted to industrial use for the plant, coal storage, and ash
3 and scrubber sludge disposal (Duke 2001). Use of the existing closed-cycle cooling and
4 intake/ discharge system would limit operational impacts on the aquatic ecosystem. There
5 could be potential habitat loss and fragmentation, and reduced productivity and biological
6 diversity could result from disturbing previously undisturbed land.
7

8 Siting a coal-fired plant at Catawba would have a MODERATE to LARGE ecological impact
9 that would be greater than renewal of the OLs for Units 1 and 2.
10

11 At an alternate greenfield site, the coal-fired generation alternative would introduce
12 construction impacts and new incremental operational impacts. Even assuming siting at a
13 previously disturbed area, the impacts may alter the ecology. Impacts could include wildlife
14 habitat loss, reduced productivity, habitat fragmentation, and a local reduction in biological
15 diversity. Use of makeup cooling water from a nearby surface water body could have
16 adverse aquatic resource impacts. If needed, construction and maintenance of a
17 transmission line and a rail spur would have ecological impacts. Overall, the ecological
18 impacts are dependent on whether a site had been previously developed (SMALL) or an
19 undeveloped greenfield site (MODERATE to LARGE impact).
20

21 • **Water Use and Quality**

22
23 Surface water. The coal-fired generation alternative at the Catawba site is assumed to use
24 a closed-cycle cooling system, which would minimize incremental water use and quality
25 impacts (Duke 2001). Surface water impacts are expected to remain SMALL; the impacts
26 would be sufficiently minor that they would not noticeably alter any important attribute of the
27 resource.
28

29 For a coal-fired plant located at an alternate site, the staff assumed that a closed-cycle
30 cooling system would be employed (Duke 2001). New intake structures to provide water
31 needs for the facility would have to be constructed. Impacts would be dependent on the
32 volume of water withdrawn for makeup relative to the amount of water available from the
33 intake source and the characteristics of the surface water. Plant discharges would comply
34 with all appropriate permits (Duke 2001). Some erosion and sedimentation would likely
35 occur during construction (NRC 1996). The overall impacts are characterized as SMALL to
36 MODERATE.
37

38 Groundwater. The staff assumed that a coal-fired plant located at Catawba would follow the
39 current practice of obtaining cooling and service water from Lake Wylie and potable water

1 from the Rock Hill Utilities Department (Duke 2001). The three groundwater wells that
 2 supply limited special uses at the Catawba site probably would continue to be used. The
 3 overall impacts are characterized as SMALL.

4
 5 Use of groundwater for cooling at a coal-fired plant located at an alternate site is a possi-
 6 bility. Consumptive use is estimated by Duke to be less than 1.5 m³/s (52.2 cfs), which is
 7 based on the evaporation rates at Catawba's existing once through cooling system
 8 (Duke 2001). Groundwater withdrawal at an alternate site may require a permit from the
 9 appropriate State agency^(a). The impacts of withdrawal for the coal-fired plant on the aquifer
 10 would be site specific and dependent on aquifer recharge and other withdrawals. The
 11 overall impacts could be SMALL to LARGE.

12
 13 • **Air Quality**

14
 15 The air-quality impacts of coal-fired generation vary considerably from those of nuclear
 16 generation due to emissions of sulfur oxides (SO_x), nitrogen oxides (NO_x), particulates,
 17 carbon monoxide, and hazardous air pollutants such as mercury, and naturally occurring
 18 radioactive materials.

19
 20 The Catawba site is located in the Metropolitan Charlotte Interstate Air Quality Control
 21 Region (40 CFR 81.75). This region is designated as in attainment or unclassified for all
 22 criteria pollutants in 40 CFR 81.334^(b). However, the county is at risk as being classified as
 23 nonattainment regarding ozone in the future, pending implementation of a new 8-hour
 24 standard.

25
 26 A new coal-fired generating plant located at Catawba would likely need a prevention of
 27 significant deterioration (PSD) permit and an operating permit under the Clean Air Act. The
 28 plant would need to comply with the new source performance standards for such plants set
 29 forth in 40 CFR Part 60, Subpart D. The standards establish limits for particulate matter
 30 and opacity (40 CFR 60.42a), SO₂ (40 CFR 60.43a), and NO_x (40 CFR 60.44a). Obtaining
 31 air permits for construction of a conventional coal-fired plant potentially could require
 32 emission offsets from other Duke generating facilities.
 33

(a) Any withdrawal of water in South Carolina that exceeds approximately 0.004 m³/sec (0.007 cfs) must be reported to South Carolina Department of Health and Environmental Control (SCDHEC). If the well is located in Beaufort, Jasper, Georgetown, Horry, or Colleton counties, it must be permitted. (Personal communication with Charles Williams, Geologist, Bureau of Water (SCDHEC), December 19, 2001.)
 (b) Existing criteria pollutants under the Clean Air Act are ozone, carbon monoxide, particulates, sulfur dioxide, lead, and nitrogen oxide.

Alternatives

1 The U.S. Environmental Protection Agency (EPA) has various regulatory requirements for
2 visibility protection in 40 CFR Part 51 Subpart P, including a specific requirement for review
3 of any new major stationary source in an area designated as attainment or unclassified
4 under the Clean Air Act. As previously mentioned, York County is classified as attainment
5 or unclassified for criteria pollutants, except ozone.
6

7 Section 169A of the Clean Air Act (42 USC 7491) establishes a national goal of preventing
8 future and remedying existing impairment of visibility in mandatory Class I Federal areas
9 when impairment results from man-made air pollution. EPA issued a new regional haze rule
10 in 1999 (64 FR 35714; July 1, 1999 [EPA 1999]). The rule specifies that for each mandatory
11 Class I Federal area located within a state, the state must establish goals that provide for
12 reasonable progress toward achieving natural visibility conditions. The reasonable progress
13 goals must provide for an improvement in visibility for the most-impaired days over the
14 period of the implementation plan and ensure no degradation in visibility for the least
15 impaired days over the same period [40 CFR 51.308(d)(1)].
16

17 South Carolina has only one area (Cape Romaine Wildlife Area) designated in 40 CFR
18 81.426 as a mandatory Class I Federal area in which visibility is an important value. There
19 are more Class I areas in the region of the North Carolina-Tennessee border in the Smoky
20 Mountains. None of these Class I areas are within 80 km (50 mi) of the Catawba site.
21

22 In 1998, EPA issued a rule requiring 22 eastern states, including South Carolina, to revise
23 their state implementation plans to reduce NO_x emissions. Nitrogen oxide emissions
24 contribute to violations of the national ambient air quality standard for ozone. The total
25 amount of NO_x that can be emitted by each of the 22 states in the year 2007 ozone season
26 (May 1 to September 30) is specified in 40 CFR 51.121(e). For South Carolina, the amount
27 is 111,680 MT (123,105 tons). Any new coal-fired plant sited in South Carolina would be
28 subject to this limitation. For North Carolina, the amount is 149,700 MT (165,000 tons).
29

30 Impacts for particular pollutants are as follows:
31

32 Sulfur oxides. Duke states in the Catawba ER that an alternative coal-fired plant located at
33 the Catawba site would use wet scrubber technology utilizing lime/limestone for flue gas
34 desulfurization (Duke 2001).
35

36 A new coal-fired power plant would be subject to the requirements in Title IV of the Clean
37 Air Act. Title IV was enacted to reduce emissions of SO₂ and NO_x, the two principal
38 precursors of acid rain, by restricting emissions of these pollutants from power plants.
39 Title IV caps aggregate annual power plant SO₂ emissions and imposes controls on SO₂
40 emissions through a system of marketable allowances. EPA issues one allowance for each
41 ton of SO₂ that a unit is allowed to emit. New units do not receive allowances, but are

1 required to have allowances to cover their SO₂ emissions. Owners of new units must
2 therefore acquire allowances from owners of other power plants by purchase or reduce SO₂
3 emissions at other power plants they own. Allowances can be banked for use in future
4 years. Thus, a new coal-fired power plant would not add to net regional SO₂ emissions,
5 although it might do so locally. Regardless, SO₂ emissions would be greater for the coal
6 alternative than the OL renewal alternative.

7
8 Duke estimates that, by using the best technology to minimize SO₂ emissions, the total
9 annual stack emissions from a coal-fired plant would be approximately 5757 MT (6346 tons)
10 of SO₂ (Duke 2001).

11
12 Nitrogen oxides. Section 407 of the Clean Air Act establishes technology-based emission
13 limitations for NO_x emissions. The market-based allowance system used for SO₂ emissions
14 is not used for NO_x emissions. A new coal-fired power plant would be subject to the new
15 source performance standards for such plants specified in 40 CFR 60.44a(d)(1). This
16 regulation, issued on September 16, 1998 (63 FR 49453 [EPA 1998]), limits the discharge
17 of any gases that contain nitrogen oxides (expressed as NO₂) in excess of 200 ng/J of
18 gross energy output (1.6 lb/MWh), based on a 30-day rolling average.

19
20 Duke estimates that by using low-NO_x burners with overfire air and selective catalytic
21 reduction, the total annual NO_x emissions for a new coal-fired power plant would be
22 approximately 7196 MT (7932 tons; Duke 2001). This level of NO_x emissions would be
23 greater than the OL renewal alternative.

24
25 Particulates. Duke estimates that the total annual stack emissions would include 288 MT
26 (317 tons) of filterable total suspended particulates (particulates that range in size from less
27 than 0.1 micrometer (µm) up to approximately 45 µm). The 288 MT would include 192 MT
28 (212 tons) of PM₁₀ (particulate matter having an aerodynamic diameter less than or equal to
29 10 µm). Fabric filters or electrostatic precipitators would be used for particulate control
30 (Duke 2001). In addition, coal-handling equipment would introduce fugitive particulate
31 emissions. Particulate emissions would be greater under the coal alternative than the OL
32 renewal alternative.

33
34 Fugitive dust would be generated during construction of a coal-fired plant. In addition,
35 exhaust emissions would come from vehicles and motorized equipment used during
36 construction.

37
38 Carbon monoxide. Duke estimates that the total carbon monoxide emissions would be
39 approximately 1439 MT (1586 tons) per year (Duke 2001). This level of emissions is
40 greater than the OL renewal alternative.

Alternatives

1 Hazardous air pollutants including mercury. In December 2000, EPA issued regulatory
2 findings on emissions of hazardous air pollutants from electric utility steam generating units
3 (EPA 2000a). EPA determined that coal- and oil-fired electric utility steam-generating units
4 are significant emitters of hazardous air pollutants. Coal-fired power plants were found by
5 EPA to emit arsenic, beryllium, cadmium, chromium, dioxins, hydrogen chloride, hydrogen
6 fluoride, lead, manganese, and mercury (EPA 2000a). EPA concluded that mercury is the
7 hazardous air pollutant of greatest concern. EPA, also found that (1) there is a link between
8 coal use and mercury emissions; (2) electric utility steam-generating units are the largest
9 domestic source of mercury emissions; and (3) certain segments of the U.S. population
10 (e.g., the developing fetus and subsistence fish-eating populations) are believed to be at
11 potential risk of adverse health effects due to mercury exposures resulting from consump-
12 tion of contaminated fish (EPA 2000a). Accordingly, EPA added coal- and oil-fired electric
13 utility steam-generating units to the list of source categories under Section 112(c) of the
14 Clean Air Act for which emission standards for hazardous air pollutants will be issued
15 (EPA 2000a).

16
17 Uranium and thorium. Coal contains uranium and thorium. Uranium concentrations are
18 generally in the range of 1 to 10 parts per million. Thorium concentrations are generally
19 about 2.5 times greater than uranium concentrations (Gabbard 1993). One estimate is that
20 a typical coal-fired plant released roughly 4.7 MT (5.2 tons) of uranium and 11.6 MT
21 (12.8 tons) of thorium in 1982 (Gabbard 1993). The population dose equivalent from the
22 uranium and thorium releases and daughter products produced by the decay of these
23 isotopes has been calculated to be significantly higher than that from nuclear power plants
24 (Gabbard 1993).

25
26 A coal-fired plant also would have unregulated carbon dioxide emissions that could
27 contribute to global warming.

28
29 Siting a coal-fired generation plant at a site other than Catawba would not significantly
30 change air-quality impacts, although it could result in installing more or less stringent
31 pollution-control equipment to meet applicable local requirements. Therefore, the impacts
32 are deemed similar to those utilizing the existing Catawba site, or MODERATE.

33
34 Summary. The GEIS analysis did not quantify emissions from coal-fired power plants, but
35 implied that air impacts would be substantial. The analysis in the GEIS also mentioned
36 global warming from unregulated carbon dioxide emissions and acid rain from SO_x and NO_x
37 emissions as potential impacts (NRC 1996). Adverse human health effects, such as cancer
38 and emphysema, have been associated with the products of coal combustion. The appro-
39 priate characterization of air impacts from coal-fired generation would be MODERATE. The
40 impacts would be clearly noticeable, but would not destabilize air quality.

41

1 Siting a coal-fired generation plant at a site other than Catawba would not significantly
 2 change air-quality impacts, although it could result in installing more or less stringent
 3 pollution-control equipment to meet applicable local requirements. Therefore, the impacts
 4 are deemed similar to those utilizing the existing Catawba site, or MODERATE.

5
 6 • **Waste**

7
 8 Coal combustion generates waste in the form of ash, and equipment for controlling air
 9 pollution generates additional ash, spent selective catalytic reduction catalysts, and
 10 scrubber sludge. Four 600-MW(e) coal-fired plants would generate approximately
 11 907,300 MT (1 million tons) of this waste annually. The waste would be disposed of onsite,
 12 accounting for approximately 227 ha (560 ac) of land area over the 40-year plant life. There
 13 would not be sufficient space on the existing Catawba site for disposal of this quantity of
 14 waste. Waste impacts to groundwater and surface water could extend beyond the
 15 operating life of the plant if leachate and runoff from the waste storage area occurs.
 16 Disposal of the waste could noticeably affect land use and groundwater quality, but with
 17 appropriate management and monitoring, it would not destabilize any resources. After
 18 closure of the waste site and revegetation, the land could be available for other uses.
 19 Construction-related debris will also be generated during construction activities.

20
 21 In May 2000, EPA issued a “Notice of Regulatory Determination on Wastes From the
 22 Combustion of Fossil Fuels” (EPA 2000b). EPA concluded that some form of national
 23 regulation is warranted to address coal combustion waste products because (1) the
 24 composition of these wastes could present danger to human health and the environment
 25 under certain conditions; (2) EPA has identified 11 documented cases of proven damages
 26 to human health and the environment by improper management of these wastes in landfills
 27 and surface impoundments; (3) present disposal practices are such that, in 1995, these
 28 wastes were being managed in 40 to 70 percent of landfills and surface impoundments
 29 without reasonable controls in place, particularly in the area of groundwater monitoring; and
 30 (4) gaps in State oversight of coal combustion wastes have been identified. Accordingly,
 31 EPA announced its intention to issue regulations for disposal of coal combustion waste
 32 under subtitle D of the Resource Conservation and Recovery Act (RCRA).

33
 34 For all of the preceding reasons, the appropriate characterization of impacts from waste
 35 generated from burning coal is MODERATE; the impacts would be clearly noticeable, but
 36 would not destabilize any important resource.

37
 38 Siting the coal fired plant at a site other than Catawba would not alter waste generation,
 39 although other sites might have more constraints on disposal locations. Therefore, the
 40 impacts would be MODERATE.

Alternatives

1 • Human Health

2
3 Coal-fired power generation exposes workers to risks from coal and limestone mining,
4 worker and public risks from coal and lime/limestone transportation, worker and public risks
5 from disposal of coal combustion wastes, and public risks from inhalation of stack emis-
6 sions. Emission impacts can be widespread and health risks difficult to quantify. The coal
7 alternative also introduces the risk of coal-pile fires and attendant inhalation risks.
8

9 In the GEIS, the staff states that there could be human health impacts (cancer and
10 emphysema) from inhalation of toxins and particulates from coal-fired plants, but did not
11 identify the significance of these impacts (NRC 1996). In addition, the discharges of
12 uranium and thorium from coal-fired plants can potentially produce radiological doses in
13 excess of those arising from nuclear power plant operations (Gabbard 1993).
14

15 Regulatory agencies, including EPA and State agencies, set air emission standards and
16 requirements based on human health impacts. These agencies also impose site-specific
17 emission limits as needed to protect human health. As discussed previously, EPA has
18 recently concluded that certain segments of the U.S. population (e.g., the developing fetus
19 and subsistence fish-eating populations) are believed to be at potential risk of adverse
20 health effects due to mercury exposures from sources such as coal-fired power plants.
21 However, in the absence of more quantitative data, human health impacts from radiological
22 doses and inhaling toxins and particulates generated by burning coal are characterized as
23 SMALL.
24

25 • Socioeconomics

26
27 Construction of the coal-fired alternative would take approximately 5 years. The staff
28 assumed that construction would take place while Catawba continues operation and would
29 be completed by the time Units 1 and 2 permanently cease operations. The workforce
30 would be expected to vary between 1200 and 2500 workers during the 5-year construction
31 period (NRC 1996). These workers would be in addition to the 1218 workers employed at
32 Catawba. During construction of the new coal-fired plant, communities near Catawba would
33 experience demands on housing and public services that could have SMALL to
34 MODERATE impacts. These impacts would be tempered because Catawba is in an urban
35 area and workers could commute to the site from many communities. Nearby communities
36 to Catawba would be impacted by the loss of the construction jobs once construction is
37 completed. Duke estimates that the completed coal plant would employ approximately
38 250 workers (Duke 2001).
39

40 If the coal-fired replacement plant were constructed at the Catawba site and Units 1 and 2
41 were decommissioned, there would be a loss of 968 permanent high-paying jobs (1218 for

1 the two nuclear units down to 250 for the coal-fired plant), with a commensurate reduction in
2 demand on socioeconomic resources and contribution to the regional economy. These
3 impacts may be offset by nearness to the Charlotte metropolitan area and the overall
4 economic growth taking place in York County. The coal-fired plant would provide a new
5 tax base to offset the loss of tax base associated with decommissioning of the nuclear
6 units. For all of these reasons, the appropriate characterization of nontransportation
7 socioeconomic impacts for operating a coal-fired plant constructed at the Catawba site is
8 considered SMALL.

9
10 Construction of a replacement coal-fired power plant at an alternate site would relocate
11 some socioeconomic impacts, but would not eliminate them. York County, and particularly
12 the Clover School District, would bear the brunt of Catawba operational job losses and
13 would lose a large amount of its tax base. These losses could have potentially SMALL to
14 MODERATE socioeconomic impacts to the county but LARGE impacts to the Clover School
15 District. Communities around the new site would have to absorb the impacts of a large,
16 temporary workforce (up to 2500 workers at the peak of construction) and a permanent
17 workforce of approximately 250 workers. In the GEIS, the staff states that socioeconomic
18 impacts at a rural site would be larger than at an urban site, because more of the peak
19 construction workforce would need to move to the area to work (NRC 1996). Alternate sites
20 would need to be analyzed on a case-by-case basis. Socioeconomic impacts at a rural site
21 could be MODERATE to LARGE, depending on the relative location of the site to towns and
22 cities which might be able to accommodate such impacts.

23
24 For transportation related to commuting of plant operating personnel, the impacts are con-
25 sidered SMALL. The maximum number of plant operating personnel would be approxi-
26 mately 250 compared to the current commuting workforce of 1218. Therefore, traffic
27 impacts associated with plant personnel commuting to a coal-fired plant would be expected
28 to be SMALL compared to the current impacts from Catawba operations.

29
30 However, during the 5-year construction period of the replacement coal-fired units, up to
31 2500 construction workers would be working at the site in addition to the 1218 workers at
32 Catawba. The addition of these workers could place significant traffic loads on existing
33 highways near the Catawba site. Such impacts would be MODERATE to LARGE.

34
35 At Catawba, coal and lime/limestone would likely be delivered by trains of approximately
36 115 cars each on the site's rail spur. Each open-top rail car holds about 90 MT (100 tons)
37 of coal. Additional rail cars would be needed for lime/limestone delivery. In all, approxi-
38 mately 550 trains per year would deliver the coal and lime/limestone for the 4 coal-fired
39 units. An average of roughly 22 train trips per week would occur, because for each full train
40 delivery, there would be an empty return train. On several days per week, there could be

Alternatives

1 three trains per day using the rail spur to the site. Socioeconomic impacts associated with
2 rail transportation, such as delays at rail crossings, would likely be MODERATE to LARGE.

3
4 Transportation-related impacts associated with commuting construction workers at an
5 alternate site are site dependent, but could be MODERATE to LARGE. Transportation
6 impacts related to commuting of plant operating personnel would also be site dependent,
7 but can be characterized as SMALL to MODERATE due to a smaller workforce.

8
9 At an alternate site, coal and lime/limestone would likely be delivered by rail, although barge
10 delivery is feasible for an alternate coastal location. Socioeconomic impacts associated
11 with rail transportation would likely be SMALL in a rural area and MODERATE in a more
12 crowded suburban area.

13 14 • **Aesthetics**

15
16 The four coal-fired power plant units could be as much as 60 m (200 ft) tall and would be
17 visible in daylight hours over many miles. The four exhaust stacks would be as much as
18 185 m (600 ft) high (Duke 2001). The stacks would likely be highly visible in daylight hours
19 for distances up to 16 km (10 mi). Emissions from the stack would be a factor not present
20 with the current nuclear units. The new stacks, and the associated stack emissions, would
21 have a significant impact for the Lake Wylie community surrounding the Catawba site.

22
23 The plant units and associated stacks would also be visible at night because of outside
24 lighting. The Federal Aviation Administration (FAA) generally requires that all structures
25 exceeding an overall height of 61 m (200 ft) above ground level have markings and/or
26 lighting so as not to impair aviation safety (FAA 2000). Visual impacts of a new coal-fired
27 plant could be mitigated by landscaping and color selection for buildings that is consistent
28 with the environment.

29
30 Visual impact at night could be mitigated by reduced use of lighting, provided the lighting
31 meets FAA requirements, and appropriate use of shielding. Overall, the addition of the
32 coal-fired units and the associated exhaust stacks at the Catawba site would have a
33 MODERATE aesthetic impact.

34
35 Coal-fired generation would introduce mechanical sources of noise that would be audible
36 offsite. Sources contributing to total noise produced by plant operations are classified as
37 continuous or intermittent. Continuous sources include the mechanical equipment associ-
38 ated with normal plant operations. Intermittent sources include the equipment related to
39 coal handling, solid-waste disposal, transportation related to coal and lime/limestone

1 delivery, use of outside loudspeakers, and the commuting of plant employees. The
2 incremental noise impacts of a coal-fired plant compared to existing Catawba operations are
3 considered to be MODERATE.
4

5 At an alternate site, there would be an aesthetic impact from the buildings and exhaust
6 stacks. This impact could be LARGE if a greenfield site is selected. There would also be
7 an aesthetic impact if a new transmission line and/or rail spur is needed. Noise impacts
8 associated with rail delivery of coal and lime/limestone would be most significant for
9 residents living in the vicinity of the facility and along the rail route. Although noise from
10 passing trains significantly raises noise levels near the rail corridor, the short duration of the
11 noise reduces the impact. In a more suburban location, the impacts are considered
12 MODERATE. This is due to the frequency of train transport, the fact that many people are
13 likely to be within hearing distance of the rail route, and the impacts of noise on residents in
14 the vicinity of the facility and rail line. At a more rural location, the impacts could be SMALL.
15 Noise and light from the plant would be detectable offsite. Noise associated with barge
16 transportation of coal and lime/limestone would be SMALL. Aesthetic impacts at the plant
17 site would be mitigated if the plant were located in an industrial area adjacent to other power
18 plants or industrial facilities. Overall the aesthetic impacts associated with locating at an
19 alternate site can be categorized as SMALL to LARGE, depending on the characteristics of
20 the site.
21

22 • **Historic and Archaeological Resources**

23
24 At the Catawba site or an alternate site, a cultural resource inventory would likely be needed
25 for any onsite property that has not been previously surveyed. Other lands acquired to sup-
26 port the existing Catawba site would also likely need an inventory of field cultural resources,
27 identification and recording of existing historic and archaeological resources, and possible
28 mitigation of adverse effects from subsequent ground-disturbing actions related to physical
29 expansion of the plant site.
30

31 Before construction at Catawba or at an alternate site, studies would likely be needed to
32 identify, evaluate, and address mitigation of the potential impacts of new plant construction
33 on cultural resources. The studies would likely be needed for all areas of potential distur-
34 bance at the proposed plant site and along associated corridors where new construction
35 would occur (e.g., roads, transmission line rights-of-way, rail lines, or other rights-of-way).
36 Historic and archaeological resource impacts can generally be effectively managed and as
37 such are considered SMALL for both the existing Catawba site (and land purchased to
38 support the site) or at an alternate greenfield site.
39

Alternatives

• **Environmental Justice**

No environmental pathways or locations have been identified that would result in disproportionately high and adverse environmental impacts on minority and low-income populations if a replacement coal-fired plant were built at the Catawba site. Some impacts on housing availability and prices during construction might occur, and this could disproportionately affect minority and low-income populations. Closure of Catawba would result in a decrease in employment of approximately 968 operating employees. Resulting economic conditions could reduce employment prospects for minority or low-income populations. However, Catawba is located in an urban area with many employment possibilities. Overall, impacts are expected to be SMALL to MODERATE.

Impacts at other sites would depend upon the site chosen and the nearby population distribution. If a replacement coal-fired plant were constructed at an alternate site, York County, and in particular the Clover School District, would experience a loss of tax revenue that could affect their ability to provide services and programs. York County would also lose 673 jobs. These impacts would be SMALL to MODERATE for York County and MODERATE to LARGE for the Clover School District. Impacts at the alternate site would vary between SMALL to LARGE, depending on the population makeup and distribution and the economy.

8.2.1.2 Once-Through Cooling System

This section discusses the environmental impacts of constructing a coal-fired generation system at an alternate site using a once-through cooling system. The impacts (SMALL, MODERATE, or LARGE) of this option are the same as the impacts for a coal-fired plant using the closed-cycle cooling system. However, there are some environmental differences between the closed-cycle and once-through cooling systems. Table 8-3 summarizes the incremental differences.

Table 8-3. Summary of Environmental Impacts of Coal-Fired Generation at an Alternate Greenfield Site with Once-Through Cooling

Impact Category	Change in Impacts from Once-Through Cooling System
Land Use	Reservoir or other sufficient cooling source required
Ecology	Impact dependent on ecology at the site
Surface Water Use and Quality	Increased water withdrawal and more thermal load on receiving body of water
Groundwater Use and Quality	No change
Air Quality	No change
Waste	No change
Human Health	No change
Socioeconomics	No change
Aesthetics	Elimination of cooling towers
Historic and Archaeological Resources	No change
Environmental Justice	No change

8.2.2 Oil and Natural-Gas-Fired (Combined Cycle)

The environmental impacts of the oil and natural-gas-fired alternative are examined in this section for both the Catawba site and an alternate site.^(a) For this alternative, Duke considered two variations on the natural gas theme: (1) an oil and natural gas combined-cycle and (2) natural gas alone in a combined-cycle plant.

The staff reviewed the environmental impacts of each option described in the Catawba ER and independently verified Duke’s conclusions, and concurred. The staff decided to report on its findings for the oil and natural gas (combined-cycle) option because the environmental and socioeconomic impacts of both options are almost identical. Two exceptions were identified. The first exception is the oil storage tank, which would be needed at either the Catawba or the

(a) Duke does not consider fuel oil a viable, stand-alone fuel because it is not price competitive when natural gas is readily available. Duke views the fuel oil option as an emergency, backup fuel source during the winter season and is likely to ensure adequate fuel supplies, especially where baseload generation is required (Duke 2001). As such, Duke does not consider the air emissions from fuel oil in their analysis. Aesthetics and other potential impacts from oil transmission lines and oil storage are considered.

Alternatives

1 alternate site. The second exception is the need to construct an oil pipeline to the Catawba
2 site. Whether an oil pipeline would be required at an alternate site would depend on the
3 characteristics and infrastructure at the site.
4

5 For the Catawba site, the staff assumed that the plant would use the closed-cycle cooling
6 system. The plant would consist of five 482-MW(e) combined-cycle units to replace the current
7 power generated by Units 1 and 2. The total generation from the replacement power source
8 would be 2410 MW(e) and, as such, would slightly overestimate the impacts from an exact
9 replacement of Catawba's 2258 MW(e) generating capacity (Duke 2001).
10

11 The Catawba site is not located near a natural gas pipeline capable of supplying the quantities
12 of gas required to operate the new gas-fired units. The nearest interstate pipeline is TRANSCO,
13 which is located 26 km (16 mi) from the site. However, a new pipeline would likely be needed
14 to supply the gas capacities required for a replacement baseload gas-fired plant located at
15 Catawba (Duke 2001).
16

17 If a new natural-gas-fired plant were built elsewhere to replace Catawba, a new transmission
18 line may be needed to connect to existing lines. In addition, construction or upgrade of a
19 natural gas pipeline from the plant to a supply point where an adequate and reliable supply of
20 gas would be available also may be required. One potential source of natural gas is liquefied
21 natural gas (LNG) imported to either the Cove Point facility in Maryland or the Elba Island
22 facility in Georgia. Both facilities are expected to be reactivated in 2002 (DOE/ EIA 2001a).
23 LNG imported to either facility would need to be vaporized and transported to the South
24 Carolina location via pipeline.
25

26 It is assumed that a replacement natural-gas-fired plant would use combined-cycle combustion
27 turbines (Duke 2001). The following assumptions are made for the oil and natural-gas-fired
28 plants (Duke 2001):
29

- 30 • five 482-MW(e) units, each consisting of two 172-MW combustion turbines and a
31 138-MW heat recovery boiler
- 32
- 33 • natural gas with an average heating value of 56 MJ/kg (23,882 Btu/lb) as the
34 primary fuel
- 35
- 36 • use of low-sulfur No. 2 fuel oil as backup fuel
- 37
- 38 • heat rate of 2 J fuel/J electricity (6,800 Btu/kWh)
- 39

- capacity factor of 0.8
- gas consumption of 3.2 billion m³/yr (113 billion ft³/yr).

Unless otherwise indicated, the assumptions and numerical values used in Section 8.2.2 are from the Catawba ER (Duke 2001). The staff reviewed this information and compared it to environmental impact information in the GEIS. Although the OL renewal period is only 20 years, the impact of operating the natural-gas-fired alternative for 40 years is considered a reasonable projection of the operating life of the plant.

8.2.2.1 Closed-Cycle Cooling System

The overall impacts of the combined-cycle fuel oil/natural-gas-generating system are discussed in the following sections and summarized in Table 8-4. The extent of impacts at an alternate site will depend on the location of the particular site selected.

Table 8-4. Summary of Environmental Impacts of Oil and Natural-Gas-Fired Generation at Catawba and an Alternate Greenfield Site Using a Closed-Cycle Cooling System

	Catawba Site			Alternate Greenfield Site	
	Impact Category	Impact	Comments	Impact	Comments
24	Land Use	SMALL to MODERATE	Catawba site sufficient to accommodate new plant. Use existing infrastructure to maximum extent possible. Construction of both oil and gas pipelines required. Up to 235 ha (582 ac) potentially disturbed for each right-of-way. Impacts would be less if pipelines are constructed in existing rights-of-way.	MODERATE to LARGE	81 ha (200 ac) for power-block, offices, roads, switchyard, and parking areas required. Additional land (up to 1500 ha [3600 ac]) possibly impacted for transmission line, oil and natural-gas pipelines, and rail spur. Use of previously undeveloped greenfield site increases impacts.
25	Ecology	SMALL to MODERATE	Uses undeveloped areas at Catawba site plus land for a new oil and gas pipeline.	MODERATE to LARGE	Impact depends on location and ecology of the site, surface water body used for intake and discharge, and possible transmission and oil/gas pipeline routes; potential habitat loss and fragmentation; reduced productivity and biological diversity. Undeveloped greenfield site may increase impacts.

Alternatives

Table 8-4. (contd)

		Catawba Site		Alternate Greenfield Site	
	Impact Category	Impact	Comments	Impact	Comments
6	Water Use and Quality (Surface Water)	SMALL	Uses existing closed-cycle cooling system including existing intake and discharge structures. Surface water use should be less than current uses at Catawba.	SMALL to MODERATE	Impact will depend on the volume of water withdrawn and discharged and the characteristics of the surface water body. New intake and discharge structures required.
9	Water Use and Quality (Groundwater)	SMALL	Less groundwater withdrawn for potable use because of smaller workforce.	SMALL to LARGE	Impacts SMALL if groundwater used only for potable purposes; MODERATE to LARGE if groundwater employed as makeup cooling water. Impacts would be site/aquifer specific.
12	Air Quality	MODERATE	Sulfur oxides • 31 MT/yr (34 tons/yr) Nitrogen oxides • 469 MT/yr (517 tons/yr) Carbon monoxide • 437 MT/yr (482 tons/yr) PM ₁₀ particulates • 260 MT/yr (287 tons/yr) Some hazardous air pollutants.	MODERATE	Potential impacts are the same as for the Catawba site, although pollution control standards may vary.
13	Waste	SMALL	Minimal waste products from fuel combustion.	SMALL	Minimal waste products from fuel combustion. Impacts from combustion of No. 2 fuel oil as a backup are considered SMALL.
14	Human Health	SMALL	Impacts considered to be minor.	SMALL	Impacts considered to be minor.

Table 8-4. (contd)

	Catawba Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments
Socio-economics	SMALL to MODERATE	<p>During construction, impacts would be SMALL to MODERATE. Up to 800 additional workers during the peak of the 2- to 3-year construction period, followed by reduction from the current 1218 Catawba workforce to 150. Tax base preserved. Impacts during operation would be SMALL to MODERATE, due to loss of employment in York County, which may be offset by proximity to Charlotte economy.</p> <p>Transportation impacts during operation would be SMALL due to the smaller workforce. Transportation impacts associated with construction workers would be MODERATE. Up to 800 additional workers during the peak of the 2- to 3-year construction period in addition to workers currently employed at Catawba.</p>	SMALL to LARGE	<p>Impacts depend on site characteristics. During construction, impacts would be SMALL to MODERATE. Tax impacts on receiving county could be SMALL to LARGE. Up to 800 additional workers during the peak of the 3-year construction period. York County would experience loss of Catawba tax base and employment with potentially MODERATE to LARGE impacts. Clover School District in York County would be significantly impacted.</p> <p>Transportation impacts associated with construction workers would be SMALL to LARGE and would be dependent on population density and road infrastructure at alternate site. Impacts during operation would be SMALL due to smaller workforce.</p>

1
2
3
4
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Alternatives

Table 8-4. (contd)

	Catawba Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments
Aesthetics	SMALL to MODERATE	Lake Wylie area impacted. SMALL to MODERATE aesthetic impact from plant and stacks, fuel oil storage tanks, lighting, and mechanical noise associated with operation.	SMALL to LARGE	SMALL if previously developed site and site disturbance minimal. Impacts increased to strongly MODERATE with construction of a transmission line and oil/gas pipeline to previously developed site. LARGE impact if a greenfield site used.
Historic and Archaeological Resources	SMALL	Any potential impacts can be effectively managed.	SMALL	Same as Catawba site; any potential impacts can be effectively managed.
Environmental Justice	SMALL to MODERATE	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction. Loss of 1016 operating jobs at Catawba could reduce employment prospects for minority and low-income populations. Nearness to Charlotte economic area may mitigate impacts.	SMALL to LARGE	Impacts at alternate site vary depending on population distribution and makeup at site could be SMALL to LARGE. York County would lose tax revenue and jobs, which could have a MODERATE impact. Impact on Clover School District would be LARGE. Nearness to Charlotte economic area may mitigate impacts.

• Land Use

The Catawba site is adequate to support a combined-cycle facility (Duke 2001). For siting at Catawba, existing facilities and infrastructure would be used to the extent practicable, thus limiting the amount of new construction that would be required. Specifically, the staff assumed that the oil/natural-gas-fired replacement plant alternative would use the existing closed-cycle cooling system, switchyard, offices, and transmission line rights-of-way. Additional land-use impacts could come from gas and oil construction rights-of-way. Up to 235 ha (582 ac) could be potentially disturbed for each right-of-way. The nearest trunk oil line is 24 km (15 mi) from the Catawba site. The nearest interstate gas pipeline (TRANSCO) is located 26 km (16 mi) from the Catawba site. Land-use impacts from the

1 construction of the pipelines is considered SMALL to MODERATE and would depend on
 2 whether the pipelines can use existing rights-of-way or not. If new land has to be disturbed,
 3 then the impacts could be MODERATE.

4
 5 For construction at an alternate site, Duke assumed that less than 81 ha (200 ac) would be
 6 needed for the plant and associated infrastructure (Duke 2001). Additional land could be
 7 impacted for construction of a transmission line and natural gas and oil pipelines to serve
 8 the plant. In the GEIS, the staff estimates that approximately 1500 ha (3600 ac) would be
 9 needed for a 1000 MW(e) plant (NRC 1996). As reported by Duke in the Catawba ER
 10 (DOE 2001), "the environmental impacts of providing both gas and fuel oil for a very large
 11 baseload facility would be substantial." If legislation requiring reduction of CO₂ levels were
 12 passed, conversion of combustion facilities to natural gas would be required to meet the
 13 new standards. Natural gas may not be available in the quantities that would be required to
 14 offset CO₂ emissions from coal-fired-gas generation. The present interstate natural gas
 15 pipeline system in the Duke service area is not capable of supporting the quantities of gas
 16 required by this size station operating at 90 percent capacity factor.

17
 18 Selection of a greenfield site also would increase the impact of the new facility. Partially
 19 offsetting these offsite land use requirements would be the elimination of the need for
 20 uranium mining to supply fuel for Catawba. In the GEIS, the staff estimates that
 21 approximately 400 ha (1000 ac) would be affected for mining and processing the uranium
 22 during the operating life of a 1000 MW(e) nuclear power plant (NRC 1996). Overall, land-
 23 use impacts at an alternate location would be MODERATE to LARGE.

24
 25 • **Ecology**

26
 27 At the Catawba site, there would be ecological, land-related impacts for siting of the gas-
 28 fired plant; however, the impacts would be SMALL considering the smaller footprint of the
 29 new facility (compared to the existing nuclear facilities) and the fact that land at the site is
 30 previously disturbed. Significant ecological impacts could be associated with bringing a new
 31 underground gas and oil pipeline to the Catawba site. Impacts could include wildlife habitat
 32 loss and reduced productivity, and habitat fragmentation and local reduction in biological
 33 diversity. The degree of impact would depend on where and how the pipelines are
 34 constructed and the ecological state of the areas through which the pipelines traverse (e.g.,
 35 existing or new rights-of-way, above or belowground). Potential impacts are rated SMALL
 36 to MODERATE.

37
 38 Ecological impacts at an alternate site would depend on the nature of the land converted for
 39 the plant and the possible need for a new transmission line and oil and gas pipelines.
 40 Construction of a transmission line and an oil and gas pipeline to serve the plant would be
 41 expected to have temporary ecological impacts. Ecological impacts are the same as with

Alternatives

1 the existing Catawba site and could be exacerbated if threatened or endangered species
2 were involved. A previously undisturbed greenfield site may only heighten the impacts. At
3 an alternate site, the cooling water intake and discharge could have aquatic resource
4 impacts. Overall, the ecological impacts of this alternative are considered MODERATE to
5 LARGE.

6 7 • **Water Use and Quality**

8
9 Surface water. The gas-fired generation alternative at the Catawba site is assumed to use
10 a closed-cycle cooling system, which would minimize incremental water use and quality
11 impacts (Duke 2001). Modifications to meet EPA requirements for altered cooling systems
12 would be undertaken. Water requirements for combined-cycle generation are much less
13 than for conventional steam electric generators, and evaporation from combined cycle
14 cooling towers would be less than from the existing Catawba units (Duke 2001). There also
15 would be sediment impacts to adjacent waters during construction. Surface water impacts
16 are expected to remain SMALL.

17
18 For a gas-fired plant located at an alternate site, it is assumed that a closed-cycle cooling
19 system would be employed (Duke 2001). New intake structures to provide water needs for
20 the facility would need to be constructed. Impacts would be dependent on the volume of
21 water withdrawn for makeup relative to the amount of water available from the intake source
22 and the characteristics of the surface water. Plant discharges would comply with all
23 appropriate permits (Duke 2001). Some erosion and sedimentation probably would occur
24 during construction (NRC 1996). The overall impacts to surface water quality are
25 characterized as SMALL to MODERATE.

26
27 Groundwater. The staff assumed that a gas-fired plant located at Catawba would follow the
28 current practice of obtaining cooling and service water from Lake Wylie and potable water
29 from the Rock Hill Utilities Department (Duke 2001). The three groundwater wells that
30 supply limited special uses at the Catawba site probably would continue to be used. The
31 overall impacts are characterized as SMALL.

32
33 A natural-gas-fired plant at an alternate site may use groundwater. Consumptive use is
34 estimated by Duke to be considerably less than the 63,515 m³/day (16.8 mgd), which is
35 based on the evaporation rates at Catawba's existing cooling system for conventional steam
36 electric generation (Duke 2001). Groundwater withdrawal at an alternate site may require a
37 State permit. The impacts of such a withdrawal rate on an aquifer would be site specific
38 and dependent on the recharge rate and other withdrawal rates from the aquifer. The
39 overall impacts could be SMALL to LARGE.
40

1 • **Air Quality**

2
3 Natural gas is a relatively clean-burning fuel. The gas-fired alternative would release similar
4 types of emissions, but in lesser quantities than the coal-fired alternative. Hence, it would
5 be subject to the same type of air quality regulations as a coal-fired plant.
6

7 A new gas-fired generating plant located at Catawba would likely need a PSD permit and an
8 operating permit under the Clean Air Act. A new combined-cycle, natural-gas power plant
9 would also be subject to the new source performance standards for such units at
10 40 CFR Part 60, Subparts Da and GG. These regulations establish emission limits for
11 particulates, opacity, SO₂, and NO_x. York County is at risk of being in ozone nonattainment.
12 Obtaining air permits for construction of a combined-cycle plant would potentially require
13 emission offsets from other Duke generating facilities.
14

15 Duke projects the following emissions for the natural-gas-fired alternative (Duke 2001):

- 16 • sulfur oxides - 31 MT/yr (34 tons/yr)
- 17 • nitrogen oxides - 469 MT/yr (517 tons/yr)
- 18 • carbon monoxide - 437 MT/yr (482 tons/yr)
- 19 • PM₁₀ particulates - 260MT/yr (287 tons/yr).

20
21
22 A natural-gas-fired plant would also have unregulated carbon dioxide emissions that could
23 contribute to global warming.
24

25 In December 2000, EPA issued regulatory findings on emissions of hazardous air pollutants
26 from electric utility steam-generating units (EPA 2000a). Natural-gas-fired power plants
27 were found by EPA to emit arsenic, formaldehyde, and nickel (EPA 2000a). Unlike coal and
28 oil-fired plants, EPA did not determine that regulation of emissions of hazardous air
29 pollutants from natural-gas-fired power plants should be regulated under Section 112 of the
30 Clean Air Act.
31

32 Construction activities would result in temporary fugitive dust. Exhaust emissions would
33 also come from vehicles and motorized equipment used during the construction process.
34

35 The preceding emissions would likely be the same at Catawba or at an alternate site.
36 Impacts from the above emissions would be clearly noticeable but would not be sufficient to
37 destabilize air resources as a whole. The overall air-quality impact for a new oil/natural-gas-
38 fired generating plant sited at Catawba or at an alternate site is considered MODERATE.
39

Alternatives

1 • Waste

2
3 A small amount of solid waste (i.e., ash), will result from burning natural gas fuel. Duke
4 expects to produce approximately 42 m³ (1500 ft³) of spent SCR catalyst used for NO_x
5 control (Duke 2001). In the GEIS, the staff concludes that waste generation from gas-fired
6 technology would be minimal (NRC 1996). Gas firing results in very few combustion by-
7 products because of the clean nature of the fuel. Waste generation at an operating gas-
8 fired plant would be largely limited to typical office wastes. Construction-related debris
9 would also be generated during construction activities. Overall, the waste impacts would be
10 SMALL for a natural-gas-fired plant sited at Catawba or at an alternate site; impacts would
11 be so minor that they would not noticeably alter any important resource attribute.
12

13 In the winter, it may become necessary for the replacement baseload natural-gas-fired plant
14 to operate on fuel oil due to lack of gas supply. Combustion of No. 2 fuel oil generates
15 minimal waste products. Overall, the waste impacts associated with fuel oil combustion at a
16 combined cycle plant are expected to be SMALL as well.
17

18 • Human Health

19
20 In the GEIS, the staff identifies cancer and emphysema as potential health risks from gas-
21 fired plants (NRC 1996). The risk may be attributable to NO_x emissions that contribute to
22 ozone formation, which in turn contributes to health risks. NO_x emissions from the plant
23 would be regulated by the SCDNR or comparable agency in another state. Human health
24 effects are not expected to be detectable or would be sufficiently minor that they would
25 neither destabilize nor noticeably alter any important attribute of the resource. Overall, the
26 impacts on human health of the natural-gas-fired alternative sited at Catawba or at an
27 alternate site are considered SMALL.
28

29 • Socioeconomics

30
31 Construction of an oil and natural-gas-fired plant would take approximately 2 to 3 years.
32 Peak employment could be as many as 800 workers (Duke 2001). The staff assumed that
33 construction would take place while Catawba Units 1 and 2 continue operation and would be
34 completed by the time they permanently cease operations. During construction, the
35 communities immediately surrounding the Catawba site would experience demands on
36 housing and public services that could have SMALL to MODERATE impacts. These
37 impacts would be tempered by construction workers commuting to the site from cities and
38 towns comprising the Charlotte metropolitan area. After construction, the communities
39 would be impacted by the loss of jobs. The current Catawba workforce (1218 workers)
40 would decline through the decommissioning period to a minimal maintenance size. The
41 new natural-gas-fired plant would replace the nuclear plant tax base at Catawba in York

1 County. Approximately 1068 jobs would be lost because only 150 workers would be
 2 needed to operate the gas plant. The impacts would be SMALL to MODERATE and could
 3 be moderated by Catawba's location in the economically prosperous Charlotte area.
 4

5 At an alternate or greenfield site, construction would take approximately 2 to 3 years, take
 6 place while the existing nuclear plant continued operation, and would be completed by the
 7 time the Catawba reactors cease operations (Duke 2001). The size of the construction and
 8 operational personnel remain the same as at the Catawba site. Siting at an alternate site
 9 would result in the loss of tax revenue and employment in York County with potentially
 10 MODERATE to LARGE socioeconomic impacts. Impacts to the Clover School District in
 11 York County would be particularly significant. Socioeconomic impacts from locating the
 12 facilities at an alternate site would be dependent on the characteristics of the site. Impacts
 13 of construction could range between SMALL to MODERATE. Impacts during plant
 14 operation would be SMALL (fewer employees) and the tax impacts could be SMALL to
 15 LARGE, depending on the relative proportion of taxes paid by the plant to total county taxes
 16 at the new location. In the GEIS (NRC 1996), the staff concludes that socioeconomic
 17 impacts from constructing a natural-gas-fired plant would not be very noticeable and that
 18 the small operational workforce would have the lowest socioeconomic impacts of any
 19 nonrenewable technology. Compared to the coal-fired and nuclear alternatives, socio-
 20 economic impacts would be mitigated by the smaller size of the construction workforce, the
 21 shorter construction time frame, and the smaller size of the operational workforce.
 22

23 Overall, socioeconomic impacts resulting from construction of a natural-gas-fired plant at
 24 Catawba would be SMALL to MODERATE, and may be offset by the continued growth of
 25 the economy in the Charlotte and surrounding area. For construction at an alternate site,
 26 socioeconomic impacts would be SMALL to LARGE, depending on the characteristics of the
 27 alternate site.
 28

29 Transportation impacts associated with construction and operating personnel commuting to
 30 Catawba would be SMALL to MODERATE. The impacts can be classified as SMALL to
 31 LARGE for siting at an alternate site and would be dependent on the characteristics of the
 32 alternate site, including transportation infrastructure.
 33

34 • **Aesthetics**

35
 36 The five power plant units with their stacks (approximately 60-m [200-ft] tall) would be
 37 visible for several miles in the vicinity of Lake Wylie. Visual impacts from stack emissions
 38 also would be present. Fuel oil storage tanks also would be visible offsite, and noise and
 39 light from the plant would be detectable offsite (Duke 2001). Construction of the required
 40 gas and oil pipelines would also contribute to aesthetic impacts. At Catawba, these impacts
 41 would result in a SMALL to MODERATE aesthetic impact.

Alternatives

1 At an alternate site, the buildings and stacks could be visible offsite. Aesthetic impacts
2 could be mitigated if the plant were located in an industrial area adjacent to other power
3 plants or industrial facilities. Overall, the aesthetic impacts associated with a replacement
4 natural-gas-fired plant at an alternate site are categorized as SMALL. The impacts would
5 be greater if new transmission lines and oil/gas pipelines had to be constructed to the
6 alternate site. These impacts are considered MODERATE. The impacts could be LARGE if
7 a greenfield site is developed.

8 9 • **Historic and Archaeological**

10 At both the Catawba site and at an alternate site, a cultural resource inventory would likely
11 be needed for any onsite property that has not been surveyed previously. Other lands, if
12 any, that are acquired to support the plant also would likely need an inventory of field
13 cultural resources, an identification and recording of existing historic and archaeological
14 resources, and possible mitigation of adverse effects from subsequent ground-disturbing
15 actions related to physical expansion of the Catawba plant site.

16 Before construction at an alternate site, similar studies would likely be needed and
17 undertaken. The studies would likely be needed for all areas of potential disturbance at the
18 proposed plant site and along associated rights-of-way where new construction would occur
19 (e.g., roads, transmission lines, pipeline, or other rights-of-way). Hence, impacts to cultural
20 resources can be effectively managed under current laws and regulations and kept SMALL
21 at either the existing Catawba or at an alternative site.

22 23 • **Environmental Justice**

24 No environmental pathways or locations have been identified that would result in dispro-
25 proportionately high and adverse environmental impacts on minority and low-income popula-
26 tions if a replacement natural-gas-fired plant were built at Catawba. Some impacts on
27 housing availability and prices during construction might occur in York County, which could
28 disproportionately affect minority and low-income populations. Closure of Catawba would
29 result in a decrease in employment of approximately 1068 permanent operating employees
30 at the site. Resulting economic conditions could reduce employment prospects for minority
31 or low-income populations in York County. The impacts could be offset by projected
32 economic growth and the ability of affected workers to commute to other jobs in the county
33 or nearby Charlotte. Overall, impacts are expected to be SMALL to MODERATE.

34 Impacts at an alternate site would depend upon the site chosen and the nearby population
35 distribution. Low-income and minority populations at the alternate site could benefit from
36 the plant's relocation, through improvements in job prospects and increased tax base
37 enabling more services to be provided to these populations. These impacts could be
38
39
40
41

SMALL to LARGE. However, if a replacement natural-gas-fired plant were constructed at an alternate site, York County would experience a loss of property tax revenue, as well as approximately 670 jobs of Catawba workers living in the county. This could affect the county's ability to provide services and programs. The Clover School District would experience a significant loss of tax revenue that could affect their ability to provide services and programs to low-income and minority children. Impacts to minority and low-income populations in York County could be MODERATE to LARGE, again potentially offset by other economic growth in the area not related to Catawba.

8.2.2.2 Once-Through Cooling System

This section discusses the environmental impacts of constructing a natural-gas-fired generation system at an alternate location using a once-through cooling system. The impacts (SMALL, MODERATE, or LARGE) of this option are the same as the impacts for a natural-gas-fired plant using closed-cycle cooling. However, there are minor environmental differences between the closed-cycle and once-through cooling systems. Table 8.5 summarizes the incremental differences.

Table 8-5. Summary of Environmental Impacts of Oil and Natural-Gas-Fired Generation at an Alternate Site with a Once-Through Cooling System

Impact Category	Change in Impacts from Once-Through Cooling System
Land Use	Reservoir or other sufficient cooling source required
Ecology	Impact would depend on ecology at the site
Surface Water Use and Quality	Increased water withdrawal and higher thermal load on receiving body of water
Groundwater Use and Quality	No change
Air Quality	No change
Waste	No change
Human Health	No change
Socioeconomics	No change
Aesthetics	Elimination of cooling towers
Historic and Archaeological Resources	No change
Environmental Justice	No change

1 **8.2.3 Nuclear Power Generation**
2

3 Since 1997, the NRC has certified three new standard designs for nuclear power plants under
4 10 CFR Part 52, Subpart B. These designs are the U.S. Advanced Boiling Water Reactor
5 (10 CFR Part 52, Appendix A), the System 80+ Design (10 CFR Part 52, Appendix B), and the
6 AP600 Design (10 CFR Part 52, Appendix C). All of these plants are light-water reactors.
7 Although no applications for a construction permit or a combined license based on these
8 certified designs have been submitted to NRC, the submission of the design certification
9 applications indicates continuing interest in the possibility of licensing new nuclear power plants.
10 In addition, recent escalation in prices of natural gas and electricity have made new nuclear
11 power plant construction more attractive from a cost standpoint. Consequently, construction of
12 a new nuclear power plant at the Catawba site using the existing closed-cycle cooling system
13 and at an alternate site using both closed- and open-cycle cooling are considered in this
14 section. The staff assumed that the new nuclear plant would have a 40-year lifetime.
15

16 NRC has summarized environmental data associated with the uranium fuel cycle in Table S-3
17 of 10 CFR 51.51. The impacts shown in Table S-3 are representative of the impacts that would
18 be associated with a replacement nuclear power plant built to one of the certified designs sited
19 at Catawba or an alternate site. The impacts shown in Table S-3 are for a 1000-MW(e) reactor
20 and would need to be adjusted to reflect replacement of Catawba, Units 1 and 2, which have a
21 total capacity of 2258 MW(e). The environmental impacts associated with transporting fuel and
22 waste to and from a light-water cooled nuclear power reactor are summarized in Table S-4 of
23 10 CFR 51.52. The summary of NRC's findings on NEPA issues for license renewal of nuclear
24 power plants in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, is also relevant, although
25 not directly applicable, for consideration of environmental impacts associated with the operation
26 of a replacement nuclear power plant. Additional environmental impact information for a
27 replacement nuclear power plant using closed-cycle cooling is presented in Section 8.2.3.1 and
28 using once-through cooling in Section 8.2.3.2.
29

30 **8.2.3.1 Closed-Cycle Cooling System**
31

32 The overall impacts of the nuclear generating system are discussed in the following sections.
33 The impacts are summarized in Table 8-6. The extent of impacts at an alternate site will
34 depend on the location of the particular site selected.
35
36

Table 8-6. Summary of Environmental Impacts of New Nuclear Generation at Catawba and at an Alternate Greenfield Site Using Closed-Cycle Cooling

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Catawba Site			Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments
Land Use	SMALL to MODERATE	Requires approximately 200 ha (500 ac) for the plant.	MODERATE to LARGE	Requires approximately 200 to 400 ha (500 to 1000 ac) for the plant. Possible additional land if a new transmission line is needed. MODERATE impact for previously disturbed alternate site; LARGE impact for a greenfield site.
Ecology	MODERATE	Uses undeveloped areas at current Catawba site plus additional offsite land. Potential habitat loss and fragmentation and reduced productivity and biological diversity on offsite land.	MODERATE to LARGE	Impact depends on location and ecology of the site, surface water body used for intake and discharge, and transmission line route; potential habitat loss and fragmentation; reduced productivity and biological diversity.
Water Use and Quality (Surface Water)	SMALL	Uses existing closed-cycle cooling system.	SMALL to MODERATE	Impact will depend on the volume of water withdrawn and discharged and the characteristics of the surface water body.
Water Use and Quality (Groundwater)	SMALL	Total water usage similar to current Catawba use.	SMALL to LARGE	Impacts SMALL if groundwater used only for potable purposes; MODERATE to LARGE if groundwater employed as makeup cooling water. Impacts would be site/aquifer specific.
Air Quality	SMALL	Fugitive emissions and emissions from vehicles and equipment during construction. Small amount of emissions from diesel generators and possibly other sources during operation. Emissions are similar to current releases from Catawba.	SMALL	Same impacts as at Catawba.

Alternatives

Table 8-6. (contd)

		Catawba Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments	
Waste	SMALL	Waste impacts for an operating nuclear power plant are set out in 10 CFR Part 51, Appendix B, Table B-1. Debris would be generated and removed during construction.	SMALL	Same impacts as at Catawba.	
Human Health	SMALL	Human health impacts for an operating nuclear power plant are set out in 10 CFR Part 51, Appendix B, Table B-1.	SMALL	Same impacts as at Catawba.	
Socioeconomics	SMALL to MODERATE	During construction, impacts would be SMALL to MODERATE. Up to 2500 workers during the peak of the 5-year construction period. Operating workforce assumed to be similar to Catawba. Tax base preserved. Transportation impacts associated with construction and ongoing operating personnel of Catawba Units 1 and 2 could be MODERATE to LARGE. Transportation impacts of commuting plant operating personnel considered SMALL.	SMALL to LARGE	Construction impacts depend on location. Impacts at a rural, greenfield location could be LARGE. York County would experience loss of tax base and employment with MODERATE to LARGE impacts, possibly offset by economic growth in the Charlotte metropolitan area. Transportation impacts associated with commuting construction workers could be MODERATE to LARGE. Impacts during operation would be SMALL to MODERATE.	
Aesthetics	SMALL	No exhaust stacks or cooling towers would be needed. Daytime visual impact could be mitigated by landscaping and appropriate color selection for buildings. Visual impact at night could be mitigated by reduced use of lighting and appropriate shielding. Noise impacts would be relatively small and could be mitigated.	SMALL to LARGE	Impacts would depend on the characteristics of the alternate site. Impacts would be SMALL if the plant is located adjacent to an industrial area. New transmission lines would add to the impacts and could be MODERATE. If a greenfield site is selected, the impacts could be LARGE.	
Historic and Archaeological Resources	SMALL	Any potential impacts can likely be managed effectively.	SMALL	Any potential impacts can likely be managed effectively.	

Table 8-6. (contd)

		Catawba Site	Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments
Environmental Justice	SMALL	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction.	SMALL to LARGE	Impacts will vary depending on population distribution and makeup at the site. Impacts to minority and low-income residents of York County associated with closure of Catawba could be MODERATE to LARGE. Impacts to receiving County is site specific and could range from SMALL to LARGE.

• Land Use

The existing facilities and infrastructure at Catawba would be used to the extent practicable, limiting the amount of new construction that would be required. Specifically, the staff assumed that a replacement nuclear power plant would use the existing cooling system, switchyard, offices, and transmission line rights-of-way. A replacement nuclear power plant at Catawba would require approximately 200 ha (500 ac) of new land some of which may be previously underdeveloped land. Additional land beyond the current Catawba site boundary may be needed to construct a new nuclear power plant while the existing Units 1 and 2 continue to operate.

There would be no net change in land needed for uranium mining because land needed for the new nuclear plant would offset land needed to supply uranium for fuel for the existing Catawba reactors.

The impact of a replacement nuclear generating plant adjacent to the existing Catawba site is best characterized as SMALL to MODERATE. The impact would be greater than the OL renewal alternative.

Land-use requirements at an alternate greenfield site would be approximately 200 to 400 ha (500 to 1000 ac) plus the possible need for a new transmission line (NRC 1996). In addition, it may be necessary to construct a rail spur to an alternate site to deliver equipment during construction. Depending on new transmission line routing, siting a new nuclear plant at an alternate site could result in MODERATE to LARGE land-use impacts, and probably would be LARGE for a previously undisturbed greenfield site.

Alternatives

• Ecology

1
2
3 Locating a replacement nuclear power plant at the Catawba site would alter ecological
4 resources because of the need to convert additional land to industrial use. Potential habitat
5 loss and fragmentation and reduced productivity and biological diversity could result. Some
6 of this land, however, may have been previously disturbed. Siting at Catawba would have a
7 MODERATE ecological impact that would be greater than renewal of the OLs for the
8 existing reactors.
9

10 At an alternate site, there would be construction impacts and new incremental operational
11 impacts. Even assuming siting at a previously disturbed area, the impacts could alter the
12 ecology. Impacts could include wildlife habitat loss, reduced productivity, habitat
13 fragmentation, and a local reduction in biological diversity. Use of cooling makeup water
14 from a nearby surface water body could have adverse impacts on aquatic resources.
15 Construction and maintenance of a new transmission line could also have ecological
16 impacts. Overall, the ecological impacts at an alternate site would be MODERATE to
17 LARGE.
18

• Water Use and Quality

19
20
21 Surface water. A replacement nuclear plant alternative at the Catawba site would most
22 likely use the existing closed-cycle cooling system. Thus, the environmental impacts would
23 be similar to the existing Catawba Nuclear Station. For a new nuclear plant, water makeup
24 requirements due to evaporative losses in the cooling towers would be comparable to that
25 currently experienced at Catawba (Duke 2001). There would be sediment impacts to
26 adjacent waters during construction. Surface water impacts are expected to remain
27 SMALL; the impacts would be sufficiently minor that they would not noticeably alter any
28 important attribute of the resource.
29

30 For a replacement nuclear plant located at an alternate site, the staff assumed that a
31 closed-cycle cooling system would be employed (Duke 2001). New intake structures to
32 provide water needs for the facility would need to be constructed. Impacts would depend on
33 the volume of water withdrawn for makeup relative to the amount of water available from the
34 intake source and the characteristics of the surface water. Plant discharges would comply
35 with all appropriate permits (Duke 2001). Some erosion and sedimentation would likely
36 occur during construction (NRC 1996). The overall impacts are characterized as SMALL to
37 MODERATE.
38

39 Groundwater. The staff assumed that a replacement nuclear plant located at Catawba
40 would follow the current practice of obtaining cooling and service water from Lake Wylie and
41 potable water from the Rock Hill Utilities Department (Duke 2001). The three groundwater

1 wells that supply limited special uses at the Catawba site would also likely continue to be
 2 used. The overall impacts to groundwater are characterized as SMALL.

3
 4 A nuclear power plant sited at an alternative site may use groundwater. Consumptive use is
 5 estimated by Duke to be 63,500 m³/day (16.8 mgd), which is based on the evaporation
 6 rates at Catawba's existing cooling system (Duke 2001) for conventional steam electric
 7 generation. Groundwater withdrawal at an alternate site may require a permit from the
 8 SCDHEC or comparable agency in another state. The impacts of such a withdrawal rate on
 9 an aquifer would be site specific and dependent on aquifer recharge and other withdrawal
 10 rates from the aquifer. The overall impacts could be SMALL to LARGE.

11
 12 • **Air Quality**

13
 14 Construction of a new nuclear plant sited at the Catawba or alternate site would result in
 15 fugitive emissions during the construction process. Exhaust emissions also would come
 16 from vehicles and motorized equipment used during the construction process. An operating
 17 nuclear plant would have minor air emissions associated with diesel generators. Emissions
 18 would be regulated by the SCDENR or comparable agency in another state. Overall,
 19 emissions and associated impacts are considered SMALL.

20
 21 • **Waste**

22
 23 The waste impacts associated with operation of a nuclear power plant are set out in
 24 Table B-1 of 10 CFR Part 51 Subpart A, Appendix B, Table B-1. Construction-related
 25 debris generated during construction activities would be removed to an appropriate disposal
 26 site. Overall, impacts from waste are considered to be SMALL.

27
 28 Siting the replacement nuclear power plant at a site other than Catawba would not alter
 29 waste generation. Therefore, the impacts for that alternative also would be SMALL.

30
 31 • **Human Health**

32
 33 Human health impacts for an operating nuclear power plant are set out in 10 CFR Part 51
 34 Subpart A, Appendix B, Table B-1. Overall, human health impacts are considered SMALL.

35
 36 Siting the replacement nuclear power plant at a site other than Catawba would not alter
 37 human health impacts. Therefore, the impacts would be SMALL.

Alternatives

• Socioeconomics

The construction period and the peak workforce associated with construction of a new nuclear power plant are currently unquantified (NRC 1996). The staff assumed that in the absence of quantified data, a construction period of 5 years and a peak of workers of 2500 would be employed. This workforce would be in addition to the 1218 individuals already employed at the plant. The staff assumed that construction would take place while the existing Catawba reactors continue operation and would be completed by the time the existing reactors permanently cease operations. During construction, the communities surrounding the Catawba site would experience demands on housing and public services that could have SMALL to MODERATE impacts. These impacts would be tempered by construction workers commuting to the site from the cities and towns comprising the Charlotte metropolitan area. After construction, the communities would be impacted by the loss of the construction jobs.

Alternate plant sites would need to be analyzed on a case-by-case basis. In the GEIS (NRC 1996), the staff notes that socioeconomic impacts at a rural site would be larger than at an urban site because more of the peak construction workforce would need to move to the area to work. Construction of a replacement nuclear power plant at an alternate site would relocate some socioeconomic impacts, but would not eliminate them. York County would still experience the impact of Catawba operational job loss and loss of tax base, and the communities around the new site would have to absorb the impacts of a large, temporary workforce (up to 2500 workers at the peak of construction) and a permanent workforce of up to 1218 workers. For the Clover School District (York County), the socioeconomic impacts could be MODERATE to LARGE. The socioeconomic impacts to the county at the alternate location could be SMALL to LARGE depending on the degree of economic development, the proportion of the County's property tax base represented by the new plant, etc.

During the 5-year construction period, up to 2500 construction workers would be working at the Catawba site in addition to the 1218 workers already employed there. The addition of the construction workers could place significant traffic loads on existing highways, particularly those leading to the site. Such impacts would be MODERATE to LARGE. Transportation impacts related to commuting of plant operating personnel would be similar to current impacts associated with operation of the existing reactors and are considered SMALL.

Transportation-related impacts associated with commuting construction workers at an alternate location are site dependent, but could be MODERATE to LARGE. Transportation impacts related to commuting of plant operating personnel would also be site dependent, but can be characterized as SMALL to MODERATE.

1 • **Aesthetics**

2
3 The containment buildings for a replacement nuclear power plant and other associated
4 buildings sited at Catawba would likely be visible in daylight hours over many miles. Visual
5 impacts could be mitigated by landscaping and by selecting a building color that is con-
6 sistent with the environment. Visual impact at night could be mitigated by reduced use of
7 lighting and appropriate use of shielding. No exhaust stacks would be needed. Cooling
8 towers would be visible assuming a closed-cycle cooling system is used.

9
10 Noise inputs from operations at a replacement nuclear power plant potentially could be
11 heard offsite under calm wind conditions or when the wind is blowing in the direction of the
12 listener. Mitigation measures, such as reduced or non-use of outside loudspeakers, can be
13 employed to reduce the noise level and keep the impact SMALL.

14
15 At an alternate site, there would be an aesthetic impact from the buildings. There would
16 also be a significant aesthetic impact if a new transmission line is needed. Noise and light
17 from the plant would be detectable offsite. The impact of noise and light would be mitigated
18 if the plant is located in an industrial area adjacent to other power plants, or industrial
19 facilities, in which case the impact is SMALL. The impact could be MODERATE if a
20 transmission line needs to be built to the alternate site. The impact could be LARGE if a
21 greenfield site is selected.

22
23 • **Historic and Archaeological Resources**

24
25 At both Catawba and an alternate site, a cultural resource inventory would likely be needed
26 for any onsite property that has not been previously surveyed. Other lands, if any, that are
27 acquired to support the plant would also likely need an inventory of field cultural resources,
28 identification and recording of existing historic and archaeological resources, and possible
29 mitigation of adverse effects from subsequent ground-disturbing actions related to physical
30 expansion of the plant site.

31
32 Before construction at Catawba or another site, studies would likely be needed to identify,
33 evaluate, and address mitigation of the potential impacts of new plant construction on
34 cultural resources. The studies would likely be needed for all areas of potential disturbance
35 at the proposed plant site and along associated line corridors where new construction would
36 occur (e.g., roads, transmission line rights-of-way, rail lines, or other rights-of-way). Historic
37 and archaeological resource impacts can generally be effectively managed and as such are
38 considered SMALL.

Alternatives

• Environmental Justice

No environmental pathways or locations have been identified that would result in disproportionately high and adverse environmental impacts on minority and low-income populations if a replacement nuclear plant were built at Catawba. Some impacts on housing availability and prices during construction might occur, and this could disproportionately affect minority and low-income populations. However, this situation is expected to be mitigated by Catawba's proximity to Charlotte. After completion of construction, it is possible that the ability of the local government to maintain social services could be reduced at the same time as diminished economic conditions reduce employment prospects for the minority and low-income populations. However, the economic health of York County and the Clover School District should improve as the tax base of the older nuclear units are replaced by the new, higher valued (i.e., less depreciated) plant. Hence, the ability of the county to provide social services should improve because of the higher tax base, assuming assessment rates remain stable. Overall, socioeconomic impacts are expected to be SMALL.

Impacts at an alternate site would depend upon the site chosen and the nearby population distribution. If a replacement nuclear plant were constructed at an alternate site, York County and the Clover School District would experience a significant loss of property tax revenue which could affect their ability to provide services and programs. Impacts to minority and low-income populations in York County could be MODERATE to LARGE, but potentially could be offset by other related economic growth in the area. Impacts to the receiving county could be SMALL to LARGE depending on the relative increase to the tax base resulting from the new plant's construction.

8.2.3.2 Once-Through Cooling System

This section discusses the environmental impacts of constructing a nuclear power plant at an alternate site using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are the same as the impacts for a nuclear power plant using the closed-cycle system. However, there are minor environmental differences between the closed-cycle and once-through cooling systems. Table 8-7 summarizes the incremental differences.

Table 8-7. Summary of Environmental Impacts of a New Nuclear Power Plant Sited at an Alternate Greenfield Site with Once-Through Cooling

Impact Category	Change in Impacts from Once-Through Cooling System
Land Use	Reservoir or other cooling source required
Ecology	Impact would depend on ecology at the site
Surface Water Use and Quality	Increased water withdrawal and more thermal load on receiving body of water
Groundwater Use and Quality	No change
Air Quality	No change
Waste	No change
Human Health	No change
Socioeconomics	No change
Aesthetics	Elimination of cooling towers
Historic and Archaeological Resources	No change
Environmental Justice	No change

8.2.4 Purchased Electrical Power

If available, purchased power from other sources could potentially obviate the need to renew the Catawba OLS. Duke currently purchases power from other generators, but because there is no certainty that imported power will be available, it does not consider the power-purchase option to be a reasonable replacement for the license renewal alternative (Duke 2001).

Duke includes future power purchases in its Annual Power Plan (Duke 2000). The Plan indicates how Duke will meet customers' energy needs through existing generation, customer demand-side options, short-term purchase power transactions, and new generating resources constructed by Duke. The 2000 Plan shows power purchases of 1243 MW for the summer of 2001, gradually decreasing to 121 MW in the winter of 2006 (Duke 2000).

Imported power from Canada or Mexico is unlikely to be available for replacement of Catawba generating capacity. In Canada, 62 percent of the country's electricity capacity is derived from renewable energy sources, principally hydropower (DOE/EIA 2001b). Canada has plans to continue developing hydroelectric power, but the plans generally do not include large-scale

Alternatives

1 projects (DOE/EIA 2001b). Canada's nuclear generation is projected to increase by 1.7 percent
2 by 2020, but its share of power generation in Canada is projected to decrease from 14 percent
3 currently to 13 percent by 2020 (DOE/EIA 2001b). EIA projects that total gross U.S. imports of
4 electricity from Canada and Mexico will gradually increase from 47.9 billion kWh in year 2000 to
5 66.1 billion kWh in year 2005, and then will decrease gradually to 47.4 billion kWh in year 2020
6 (DOE/EIA 2001b). Consequently, it is unlikely that electricity imported from Canada or Mexico
7 would be able to replace the Catawba generating capacity.

8
9 If power to replace Catawba generating capacity were to be purchased from sources within the
10 United States or a foreign country, the generating technology would likely be one of those
11 described in this SEIS and in the GEIS (probably coal, natural gas, or nuclear). The description
12 of the environmental impacts of other technologies in Chapter 8 of the GEIS is representative of
13 the purchased electrical power alternative to renewal of the Catawba OLS. Thus, the environ-
14 mental impacts of imported power would still occur, but would be located elsewhere within the
15 region, the nation, or another country.

16 17 **8.2.5 Other Alternatives**

18
19 Other generation technologies are discussed in the following subsections.

20 21 **8.2.5.1 Oil-Fired Generation**

22
23 EIA projects that oil-fired plants will account for very little of the new generation capacity in the
24 United States from 2000 to 2020 because of higher fuel costs and lower efficiencies (DOE/
25 EIA 2001a). Oil-fired operation is more expensive than nuclear or coal-fired operation. Future
26 increases in oil prices are expected to make oil-fired generation increasingly more expensive
27 than coal-fired generation. The high cost of oil has prompted a steady decline in its use for
28 electricity generation. In Section 8.3.11 of the GEIS, the staff estimated that construction of
29 a 1000-MW(e) oil-fired plant would require about 50 ha (120 ac). Additionally, operation of
30 oil-fired plants would have environmental impacts (including impacts on the aquatic
31 environment and air) that would be similar to those from a coal-fired plant.

32 33 **8.2.5.2 Wind Power**

34
35 Most of South Carolina is in a wind power Class 1 region (average wind speeds at 10-m [30-ft]
36 elevation of 0 to 4.4 m/s [0 to 9.8 mph]). Class 1 has the lowest potential for wind energy
37 generation (DOE 2001a). Wind turbines are economical in wind power Classes 4 through 7
38 (average wind speeds of 5.6 to 9.4 m/s [12.5 to 21.1 mph]; DOE 2001a). Aside from the
39 coastal areas and exposed mountains and ridges of the Appalachians, there is little wind
40 energy potential in the East Central region of the United States for current wind turbine
41 applications (Elliott et al. 1986). Wind turbines typically operate at a 30 to 35 percent capacity

1 factor compared to 90 to 95 percent for a power plant (NWPPC 2000). Nine offshore wind
2 power projects are currently operating in Europe. The European plants together provide
3 approximately 90 MW, which is far less than the electrical outputs of Catawba (British Wind
4 Energy Association 2002). For the preceding reasons, the staff concludes that locating a wind-
5 energy facility on or near the Catawba site or offshore would not be economically feasible given
6 the current state of wind energy generation technology.

8 8.2.5.3 Solar Power

9
10 Solar technologies use the sun's energy and light to provide heat and cooling, light, hot water,
11 and electricity for homes, businesses, and industry. Solar power technologies, photovoltaic
12 and thermal, currently cannot compete with conventional fossil-fueled technologies in grid-
13 connected applications due to higher capital costs per kilowatt of capacity. The average capa-
14 city factor of photovoltaic cells is about 25 percent (NRC 1996), and the capacity factor for solar
15 thermal systems is about 25 percent to 40 percent (NRC 1996). Energy storage requirements
16 limit the use of solar-energy systems as baseload electricity supply.

17
18 There are substantial impacts to natural resources (wildlife habitat, land-use, and aesthetic
19 impacts) from construction of solar-generating facilities. As stated in the GEIS (NRC 1996),
20 land requirements are high—14,000 ha (35,000 ac) per 1000 MW(e) for photovoltaic and
21 approximately 6000 ha (14,000 ac) per 1000 MW(e) for solar thermal systems. Neither type of
22 solar-electric system would fit at the Catawba site, and both would have LARGE environmental
23 impacts at a greenfield site.

24
25 The Catawba site receives approximately 4 to 5 kWh of direct normal solar radiation per square
26 meter per day compared to 7 to 8 kWh of solar radiation per square meter per day in areas of
27 the western United States, such as California, which are most promising for solar technologies
28 (DOE/EIA 2000c). Because of the natural-resource impacts (land and ecological), the area's
29 relatively low rate of solar radiation, and its high system cost, solar power is not considered to
30 be a feasible baseload alternative to renewal of the Catawba OLS. Some onsite generated
31 solar power (e.g., from rooftop photovoltaic applications) may substitute for electric power from
32 the grid. Implementation of solar generation on a scale large enough to replace Catawba's
33 generating capacity would likely result in LARGE environmental impacts.

34 8.2.5.4 Hydropower

35
36
37 South Carolina has an estimated 1133 MW of undeveloped hydroelectric resource
38 (INEEL 1997). This amount is less than the amount needed to replace the 2258 MW(e)
39 capacity of Catawba. As stated in Section 8.3.4 of the GEIS, hydropower's percentage of U.S.
40 generating capacity is expected to decline because hydroelectric facilities have become difficult
41 to site as a result of public concern about flooding, destruction of natural habitat, and alteration

Alternatives

1 of natural river courses. In the GEIS (NRC 1996), the staff estimates that land requirements for
2 hydroelectric power are approximately 400,000 ha (1 million ac) per 1000 MW(e). Replacement
3 of Catawba generating capacity would require flooding more than this amount of land. Due to
4 the relatively low amount of undeveloped hydropower resource in South Carolina and the large
5 land-use and related environmental and ecological resource impacts associated with siting
6 hydroelectric facilities large enough to replace Catawba, the staff concludes that local
7 hydropower is not a feasible alternative to renewal of the Catawba OLS. Any attempts to site
8 hydroelectric facilities large enough to replace Catawba would result in LARGE environmental
9 impacts.

11 8.2.5.5 Geothermal Energy

12
13 Geothermal energy has an average capacity factor of 90 percent and can be used for baseload
14 power where available. However, geothermal technology is not widely used as baseload
15 generation due to the limited geographical availability of the resource and the immature status
16 of the technology (NRC 1996). As illustrated by Figure 8.4 in the GEIS, geothermal plants are
17 most likely to be sited in the western continental United States, Alaska, and Hawaii where
18 hydrothermal reservoirs are prevalent. There is no feasible eastern location for geothermal
19 capacity to serve as an alternative to Catawba. The staff concludes that geothermal energy is
20 not a feasible alternative to renewal of the Catawba OLS.

22 8.2.5.6 Wood Waste

23
24 A wood-burning facility can provide baseload power and operate with an average annual
25 capacity factor of around 70 to 80 percent and with 20 to 25 percent efficiency (NRC 1996).
26 The fuels required are variable and site-specific. A significant barrier to the use of wood waste
27 to generate electricity is the high delivered-fuel cost and high construction cost per MW of
28 generating capacity. The larger wood-waste power plants are only 40 to 50 MW(e) in size.
29 Estimates in the GEIS suggest that the overall level of construction impact per MW of installed
30 capacity should be approximately the same as that for a coal-fired plant, although facilities
31 using wood waste for fuel would be built at smaller scales (NRC 1996). Like coal-fired plants,
32 wood-waste plants require large areas for fuel storage and processing and involve the same
33 type of combustion equipment.

34
35 Due to uncertainties associated with obtaining sufficient wood and wood waste to fuel a base-
36 load generating facility, ecological impacts of large-scale timber cutting (e.g., soil erosion and
37 loss of wildlife habitat), and high inefficiency, the staff has determined that wood waste is not a
38 feasible alternative to renewing the Catawba OLS.

8.2.5.7 Municipal Solid Waste

Municipal waste combustors incinerate the waste and use the resultant heat to generate steam, hot water, or electricity. The combustion process can reduce the volume of waste by up to 90 percent and the weight of the waste by up to 75 percent (EPA 2001). Municipal waste combustors use three basic types of technologies: mass burn, modular, and refuse-derived fuel (DOE/EIA 2001c). Mass burning technologies are most commonly used in the United States. This group of technologies process raw municipal solid waste "as is," with little or no sizing, shredding, or separation before combustion. Because of the need for specialized waste-separation and waste-handling equipment for municipal solid waste, the initial capital costs for municipal solid-waste plants are greater than for comparable steam-turbine technology at wood-waste facilities (NRC 1996).

Growth in the municipal waste combustion industry slowed dramatically during the 1990s after rapid growth during the 1980s. The slower growth was due to three primary factors: (1) the Tax Reform Act of 1986, which made capital-intensive projects such as municipal waste combustion facilities more expensive relative to less capital-intensive waste disposal alternatives such as landfills; (2) the 1994 Supreme Court decision (*C&A Carbone, Inc. v. Town of Clarkstown*), which struck down local flow control ordinances that required waste to be delivered to specific municipal waste combustion facilities rather than landfills that may have had lower fees; and (3) increasingly stringent environmental regulations that increased the capital cost necessary to construct and maintain municipal waste combustion facilities (DOE/EIA 2001c).

Municipal solid waste combustors generate an ash residue that is buried in landfills. The ash residue is composed of bottom ash and fly ash. Bottom ash refers to that portion of the unburned waste that falls to the bottom of the grate or furnace. Fly ash represents the small particles that rise from the furnace during the combustion process. Fly ash is generally removed from flue-gases using fabric filters and/or scrubbers (DOE/EIA 2001c).

Currently, there are approximately 102 waste-to-energy plants operating in the United States. These plants generate approximately 2800 MW(e), or an average of approximately 28 MW(e) per plant (Integrated Waste Services Association 2001). The staff concludes that generating electricity from municipal solid waste would not be a feasible alternative to replace the 2258 MW(e) baseload capacity of Catawba and, consequently, would not be a feasible alternative to renewal of the Catawba OLS.

8.2.5.8 Other Biomass-Derived Fuels

In addition to wood and municipal solid waste fuels, there are several other concepts for fueling electric generators, including burning crops, converting crops to a liquid fuel such as ethanol,

Alternatives

1 and gasifying crops (including wood waste). In the GEIS, the staff states that none of these
2 technologies has progressed to the point of being competitive on a large scale or of being
3 reliable enough to replace a baseload plant such as Catawba (NRC 1996). For these reasons,
4 such fuels do not offer a feasible alternative to renewal of the Catawba OLS.

6 **8.2.5.9 Fuel Cells**

7
8 Fuel cells work without combustion and its environmental side effects. Power is produced
9 electrochemically by passing a hydrogen-rich fuel over an anode and air over a cathode and
10 separating the two by an electrolyte. The only by-products are heat, water, and carbon dioxide.
11 Hydrogen fuel can come from a variety of hydrocarbon resources by subjecting them to steam
12 under pressure. Phosphoric acid fuel cells are generally considered first-generation
13 technology. Higher-temperature, second-generation fuel cells achieve higher fuel-to-electricity
14 and thermal efficiencies. The higher temperatures contribute to improved efficiencies and give
15 the second-generation fuel cells the capability to generate steam for cogeneration and
16 combined-cycle operations.

17
18 DOE projects that by 2003, two second-generation fuel cell technologies using molten
19 carbonate and solid oxide technology, respectively, will be commercially available in sizes up to
20 2 MW at a cost of \$1000 to \$1500 per kW of installed capacity (DOE 2001b). For comparison,
21 the installed capacity cost for a natural-gas-fired combined-cycle plant is on the order of \$500 to
22 \$600 per kW (NWPPC 2000). As market acceptance and manufacturing capacity increase,
23 natural-gas-fueled fuel cell plants in the 50- to 100-MW range are projected to become
24 available (DOE 2001b). At the present time, however, fuel cells are not economically or
25 technologically competitive with other alternatives for baseload electricity generation.
26 Consequently, fuel cells are not a feasible alternative to renewal of the Catawba OLS.

28 **8.2.5.10 Delayed Retirement**

29
30 Through the year 2014, Duke projects that 23 of its generating units with a total capacity of
31 584 MW will be retired (Duke 2000). Delayed retirement of these 23 units would not come
32 close to replacing the 2258 MW(e) capacity of Catawba. For this reason, delayed retirement of
33 Duke generating units would not be a feasible alternative to renewal of the Catawba OLS.

35 **8.2.5.11 Utility-Sponsored Conservation**

36
37 Duke has developed residential, commercial, and industrial programs to reduce both peak
38 demands and daily energy consumption. These programs are commonly referred to as
39 demand-side management (DSM). The effects of the DSM programs are captured in the
40 customer load forecast in the Duke Power Plan (Duke 2000).

1 Duke currently has two residential DSM programs (Duke 2000). The water heater program
2 allows a customer to be billed at a lower rate for all water heating energy consumption in
3 exchange for allowing Duke to control the water heater. The special needs energy products
4 loan program provides loans for heat pumps, central air conditioning systems, and energy-
5 efficiency measures such as insulation, tune-ups of heating and air conditioning systems, and
6 sealing of duct systems. The two residential programs are reflected in Duke's plan for meeting
7 customer loads (Duke 2000). Because these DSM savings are part of the long-range plan for
8 meeting projected demand, they are not available offsets for Catawba.

9
10 Duke operates two programs for commercial and industrial customers to provide a source of
11 interruptible capacity (Duke 2000). Participants in the standby generator control program
12 contractually agree to transfer electrical loads from Duke to their standby generators when
13 requested by Duke. Participating customers receive payments for capacity and/or energy
14 based on the amount of capacity and/or energy transferred to their generator. Participants in
15 the interruptible power service program agree to reduce their electrical loads to specified levels
16 when requested by Duke. The two programs are not reflected in Duke's customer load forecast
17 because load control contribution depends upon actuation (Duke 2000).

18
19 The staff concludes that additional DSM, by itself, would not be sufficient to replace the
20 2258 MW(e) capacity of Catawba and that it is not a reasonable replacement for the OL
21 renewal alternative.

22 23 **8.2.6 Combination of Alternatives**

24
25 Even though individual alternatives to Catawba might not be sufficient on their own to replace
26 the Catawba generating capacity due to the small size of the resource or lack of cost-effective
27 opportunities, it is conceivable that a combination of alternatives might be cost-effective.

28
29 As discussed in Section 8.2, Catawba has a combined average net capacity of 2258 MW(e).
30 There are many possible combinations of alternatives to replace that power. Table 8-8 contains
31 a summary of the environmental impacts of an assumed combination of alternatives consisting
32 of 1928 MW(e) of combined-cycle oil/natural-gas-fired generation at Catawba, using four
33 482-MW(e) combined-cycle, natural gas units. The existing closed-cycle cooling system would
34 be used at the Catawba site. Closed-cycle cooling would also be employed at an alternate
35 location. Purchases from other power generators could account for 165 MW(e) of power, and
36 165 MW(e) could be gained from additional DSM measures. The impacts associated with the
37 combined-cycle, oil/natural-gas-fired units are based on the gas-fired generation impact
38 assumptions discussed in Section 8.2.2, adjusted for the reduced generating capacity. While
39 the DSM measures would have few environmental impacts, operation of the new gas-fired plant
40 would result in increased emissions and environmental impacts. The environmental impacts
41 associated with power purchased from other generators would still occur, but would be located

Alternatives

1 elsewhere within the region, nation, or another country as discussed in Section 8.2.4. The
 2 environmental impacts associated with purchased power are not shown in Table 8-8. The staff
 3 concludes that it is very unlikely that the environmental impacts of any reasonable combination
 4 of generating and conservation options could be reduced to the level of impacts associated with
 5 renewal of the Catawba OLs.

6
 7 **Table 8-8.** Summary of Environmental Impacts for an Assumed Combination of
 8 Generating and Acquisition Alternatives
 9

		Catawba Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments	
13 Land Use	SMALL to MODERATE	Catawba site is sufficient to accommodate new plant (16 ha [40 ac] needed for power block, roads, and parking area). Possible additional impact for construction of an underground oil/gas pipeline—235 ha (582 ac) potentially disturbed for rights-of-way.	MODERATE to LARGE	50 ha (130ac) for power-block, offices, roads, switchyard, and parking areas. Additional land (up to 705 ha [1742 ac]) possibly impacted for transmission line and for natural gas pipeline—MODERATE. Use of previously undeveloped greenfield site increases impacts to LARGE.	
14 Ecology	SMALL to MODERATE	Uses undeveloped areas at Catawba site, plus land for a new gas pipeline.	SMALL to LARGE	Impact depends on whether greenfield or previously developed site. Impact also depends on ecology of the site, surface water body used for intake and discharge, and possible transmission and oil/gas pipeline routes; potential habitat loss and fragmentation; reduced productivity and biological diversity. Use of undeveloped greenfield site increases impacts.	

Table 8-8. (contd)

		Catawba Nuclear Station Site		Alternate Greenfield Site	
	Impact Category	Impact	Comments	Impact	Comments
5 6 7	Water Use and Quality (Surface Water)	SMALL	Uses existing closed-cycle cooling system existing intake structures. Surface water use should be less than current uses with Catawba, Units 1 and 2.	SMALL to MODERATE	Impact will depend on the volume of water withdrawn and discharged and the characteristics of the surface water body. New intake and discharge structures required.
8 9 10	Water Use and Quality (Groundwater)	SMALL	Less groundwater withdrawn for potable use because of smaller workforce.	SMALL to LARGE	Impacts SMALL if groundwater used only for potable purposes. Impacts MODERATE to LARGE if groundwater employed as makeup cooling water. Impacts would be site/aquifer specific.
11	Air Quality	SMALL	Sulfur oxides • 25 MT/yr (27 tons/yr) Nitrogen oxides • 375 (410 tons/yr) Carbon monoxide • 350 MT/yr (382 tons/yr) PM ₁₀ particulates • 208 MT/yr (227 tons/yr) Some hazardous air pollutants.	SMALL	Potentially same impacts as at the Catawba site, although pollution control standards may vary.
12	Waste	SMALL	Minimal waste product from fuel combustion.	SMALL	Minimal waste product from fuel combustion.
13	Human Health	SMALL	Impacts considered to be minor.	SMALL	Impacts considered to be minor.

Alternatives

Table 8-8. (contd)

		Catawba Nuclear Station Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments	
Socioeconomics	SMALL to MODERATE	During construction, impacts would be SMALL to MODERATE. Up to 640 additional workers during the peak of the 3-year construction period, followed by reduction from current Catawba Units 1 and 2 workforce by 1098 to around 120 workers; tax base preserved. Impacts during operation would be SMALL to MODERATE, due to loss of employment in York County which may be offset by proximity to Charlotte economy.	SMALL to LARGE	Impacts depend on site characteristics. During construction, impacts would be SMALL to MODERATE. Tax impacts on receiving county could be SMALL to LARGE. Up to 640 additional workers during the peak of the 3-year construction period. York County would experience loss of Catawba Units 1 and 2 tax base and employment with potentially MODERATE to LARGE associated impacts.	
		<p>Transportation impacts associated with construction workers would be SMALL to MODERATE. Transportation impacts during operation would be SMALL due to smaller workforce. During construction, impacts would be MODERATE. Up to 640 additional workers during the peak of the 2- to 3-year construction period in addition to workers currently employed at Catawba. Impacts during operation would be SMALL.</p> <p>Transportation impacts associated with construction workers would be MODERATE.</p>		<p>Transportation impacts associated with construction workers would be SMALL to LARGE and would depend on population density and road infrastructure at alternate site. Impacts during operation would be SMALL due to smaller workforce.</p>	

Table 8-8. (contd)

		Catawba Nuclear Station Site		Alternate Greenfield Site	
Impact Category	Impact	Comments	Impact	Comments	
Aesthetics	SMALL to MODERATE	Lake Wylie area impacted. SMALL to MODERATE aesthetic impact from plant and stacks, fuel oil storage tanks, lighting, and mechanical noise associated with operation.	SMALL to LARGE	SMALL if previously developed site is used and site disturbance is minimal. Impacts increase to strongly MODERATE with construction of a transmission line and oil/gas pipeline to previously developed site. LARGE if greenfield site developed.	
Historic and Archaeological Resources	SMALL	Any potential impacts can likely be managed effectively.	SMALL	Same as at Catawba; any potential impacts can likely be managed effectively.	
Environmental Justice	SMALL to MODERATE	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction. Loss of approximately 1098 operating jobs at Catawba could reduce employment prospects for minority and low-income populations. Nearness to Charlotte economic area may mitigate impacts.	SMALL to LARGE	Impacts at alternate site vary depending on population distribution and makeup at site could be SMALL to LARGE. Loss of tax revenue for York County could have a MODERATE impact. Impact to Clover School District would be LARGE. Nearness of York County to Charlotte economic area may mitigate impacts.	

8.3 Summary of Alternatives Considered

The environmental impacts of the proposed action, renewal of the Catawba OLs, are SMALL for all impact categories (except collective offsite radiological impacts from the fuel cycle and from HLW and spent fuel disposal, for which a single significance level was not assigned). Several alternative actions were considered — no-action (discussed in Section 8.1), new generation alternatives (from coal, oil/natural gas, and nuclear discussed in Sections 8.2.1 through 8.2.3,

Alternatives

1 respectively), purchased electrical power (discussed in Section 8.2.4), alternative technologies
2 (discussed in Section 8.2.5), and the combination of alternatives (discussed in Section 8.2.6).
3

4 The no-action alternative would require the replacing of electrical generating capacity by
5 (1) DSM and energy conservation, (2) power purchased from other electricity providers,
6 (3) generating alternatives other than Catawba, or (4) some combination of these options, and
7 would result in decommissioning Catawba. For each of the new generation alternatives (coal,
8 natural gas, and nuclear), the environmental impacts would not be less than the impacts of
9 license renewal. For example, the land-disturbance impacts resulting from construction of any
10 new facility would be greater than the impacts of continued operation of Catawba. The impacts
11 of purchased electrical power would still occur, but would occur elsewhere. Alternative
12 technologies are not considered feasible at this time and it is very unlikely that the environ-
13 mental impacts of any reasonable combination of generation and conservation options could be
14 reduced to the level of impacts associated with renewal of the OLs for Catawba.
15

16 The staff concludes that the alternative actions, including the no-action alternative, may have
17 environmental effects in at least some impact categories that reach MODERATE or LARGE
18 significance.
19

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9.0 Summary and Conclusions

1 By letter dated June 13, 2001, Duke Energy Corporation (Duke) submitted an application to the
2 U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses (OLs) for Catawba
3 Nuclear Station, Units 1 and 2 (Catawba) for an additional 20-year period (Duke 2001a). If the
4 OLs are renewed, State regulatory agencies and Duke will ultimately decide whether the plant
5 will continue to operate based on factors such as the need for power or other matters within the
6 State's jurisdiction or the purview of the owners. If the OLs are not renewed, then the plant
7 must be shut down at or before expiration of the current OLs (i.e., December 6, 2024, for Unit 1
8 and February 24, 2026, for Unit 2).

9
10 Section 102 of the National Environmental Policy Act (NEPA) (42 USC 4321) directs that an
11 environmental impact statement (EIS) is required for major Federal actions that significantly
12 affect the quality of the human environment. The NRC has implemented Section 102 of NEPA
13 in 10 CFR Part 51, which identifies licensing and regulatory actions that require an EIS. In
14 10 CFR 51.20(b)(2), the Commission requires preparation of an EIS or a supplement to an EIS
15 for renewal of a reactor OL; 10 CFR 51.95(c) states that the EIS prepared at the OL renewal
16 stage will be a supplement to the *Generic Environmental Impact Statement for License
17 Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996, 1999).^(a)
18

19 Upon acceptance of the Duke application, the NRC began the environmental review process
20 described in 10 CFR Part 51 by publishing a notice of intent to prepare an EIS and conduct
21 scoping (66 FR 48489 [NRC 2001]) on September 20, 2001. The staff visited the Catawba site
22 in October 2001, and held public scoping meetings on October 23, 2001, in Rock Hill, South
23 Carolina (NRC 2001). The staff reviewed the Catawba Environmental Report (ER;
24 Duke 2001b) and compared it to the GEIS, consulted with other agencies, and conducted an
25 independent review of the issues following the guidance set forth in NUREG-1555, Supple-
26 ment 1, the *Standard Review Plans for Environmental Reviews for Nuclear Power Plants,
27 Supplement 1: Operating License Renewal* (NRC 2000). The staff also considered the public
28 comments received during the scoping process for preparation of this draft Supplemental
29 Environmental Impact Statement (SEIS) for Catawba. The public comments received during
30 the scoping process that were considered to be within the scope of the environmental review
31 are provided in Appendix A, Part 1, of this SEIS.
32

33 The staff will hold two public meetings in Rock Hill, South Carolina, in June 2002 to describe the
34 preliminary results of the NRC environmental review and to answer questions to provide mem-
35 bers of the public with information to assist them in formulating their comments on this draft

(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.

Summary and Conclusions

1 SEIS. When the comment period ends, the staff will consider and address all of the comments
2 received that are determined to be within the scope of the EIS. These comments will be
3 addressed in Appendix A, Part 2, of the final SEIS.
4

5 This draft SEIS includes the NRC staff's preliminary analysis that considers and weighs the
6 environmental effects of the proposed action, the environmental impacts of alternatives to the
7 proposed action, and mitigation measures available for reducing or avoiding adverse effects. It
8 also includes the staff's preliminary recommendation regarding the proposed action.
9

10 The NRC has adopted the following statement of purpose and need for license renewal from
11 the GEIS:
12

13 The purpose and need for the proposed action (renewal of an operating license) is to
14 provide an option that allows for power generation capability beyond the term of a
15 current nuclear power plant operating license to meet future system generating needs,
16 as such needs may be determined by State, utility, and, where authorized, Federal
17 (other than NRC) decisionmakers.
18

19 The goal of the staff's environmental review, as defined in 10 CFR 51.95(c)(4) and the GEIS, is
20 to determine
21

22 ...whether or not the adverse environmental impacts of license renewal are so great that
23 preserving the option of license renewal for energy planning decisionmakers would be
24 unreasonable.
25

26 Both the statement of purpose and need and the evaluation criterion implicitly acknowledge that
27 there are factors, in addition to license renewal, that will ultimately determine whether an
28 existing nuclear power plant continues to operate beyond the period of the current OLs.
29

30 NRC regulations [10 CFR 51.95(c)(2)] contain the following statement regarding the content of
31 SEISs prepared at the license renewal stage:
32

33 The supplemental environmental impact statement for license renewal is not required to
34 include discussion of need for power or the economic costs and economic benefits of the
35 proposed action or of alternatives to the proposed action except insofar as such benefits
36 and costs are either essential for a determination regarding the inclusion of an alternative in
37 the range of alternatives considered or relevant to mitigation. In addition, the supplemental

1 environmental impact statement prepared at the license renewal stage need not discuss
2 other issues not related to the environmental effects of the proposed action and the
3 alternatives, or any aspect of the storage of spent fuel for the facility within the scope of the
4 generic determination in § 51.23(a) and in accordance with § 51.23(b).^(a)
5

6 The GEIS contains the results of a systematic evaluation of the consequences of renewing an
7 OL and operating a nuclear power plant for an additional 20 years. It evaluates 92 environmen-
8 tal issues using the NRC's three-level standard of significance—SMALL, MODERATE, or
9 LARGE—developed using the Council on Environmental Quality guidelines. The following
10 definitions of the three significance levels are set forth in the footnotes to Table B-1 of 10 CFR
11 Part 51, Subpart A, Appendix B:
12

13 **SMALL** — Environmental effects are not detectable or are so minor that they will neither
14 destabilize nor noticeably alter any important attribute of the resource.
15

16 **MODERATE** — Environmental effects are sufficient to alter noticeably, but not to
17 destabilize, important attributes of the resource.
18

19 **LARGE** — Environmental effects are clearly noticeable and are sufficient to destabilize
20 important attributes of the resource.
21

22 For 69 of the 92 issues considered in the GEIS, the analysis in the GEIS shows the following:
23

- 24 (1) The environmental impacts associated with the issue have been determined to apply either
25 to all plants or, for some issues, to plants having a specific type of cooling system or other
26 specified plant or site characteristic.
27
- 28 (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the
29 impacts (except for collective offsite radiological impacts from the fuel cycle and from high
30 level waste [HLW] and spent fuel disposal).
31
- 32 (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis,
33 and it has been determined that additional plant-specific mitigation measures are likely not
34 to be sufficiently beneficial to warrant implementation.
35

36 These 69 issues were identified in the GEIS as Category 1 issues. In the absence of new and
37 significant information, the staff relied on conclusions as amplified by supporting information in

(a) The title of 10 CFR 51.23 is "Temporary storage of spent fuel after cessation of reactor operations-
generic determination of no significant environmental impact."

Summary and Conclusions

1 the GEIS for issues designated Category 1 in Table B-1 of 10 CFR Part 51, Subpart A,
2 Appendix B.

3
4 Of the 23 issues that do not meet the criteria set forth above, 21 are classified as Category 2
5 issues requiring analysis in a plant-specific supplement to the GEIS. The remaining two issues,
6 environmental justice and chronic effects of electromagnetic fields, were not categorized.
7 Environmental justice was not evaluated on a generic basis and must also be addressed in a
8 plant-specific supplement to the GEIS. Information on the chronic effects of electromagnetic
9 fields was not conclusive at the time the GEIS was prepared.

10
11 This draft SEIS documents the staff's evaluation of all 92 environmental issues considered in
12 the GEIS. The staff considered the environmental impacts associated with alternatives to
13 license renewal and compared the environmental impacts of license renewal and the alterna-
14 tives. The alternatives to license renewal that were considered include the no-action alternative
15 (not renewing the OLS for Catawba) and alternative methods of power generation. These
16 alternatives are evaluated assuming that the replacement power generation plant is located at
17 either the Catawba site or some other unspecified greenfield location.

18 19 **9.1 Environmental Impacts of the Proposed Action —** 20 **License Renewal**

21
22 Duke and the staff have established independent processes for identifying and evaluating the
23 significance of any new information on the environmental impacts of license renewal. Neither
24 Duke nor the staff has identified information that is both new and significant related to Category
25 1 issues that would call into question the conclusions in the GEIS. Similarly, neither the
26 scoping process, Duke, nor the staff has identified any new issue applicable to Catawba that
27 has a significant environmental impact. Therefore, the staff relies upon the conclusions of the
28 GEIS for all Category 1 issues that are applicable to Catawba.

29
30 Duke's license renewal application presents an analysis of the Category 2 issues that are
31 applicable to Catawba, plus environmental justice and chronic effects from electromagnetic
32 fields. The staff has reviewed the Duke analysis for each issue and has conducted an
33 independent review of each issue. Six Category 2 issues are not applicable because they are
34 related to plant design features or site characteristics not found at Catawba. Four Category 2
35 issues are not discussed in this draft SEIS because they are specifically related to refurbish-
36 ment. Duke has stated that its evaluation of structures and components, as required by
37 10 CFR 54.21, did not identify any major plant refurbishment activities or modifications as
38 necessary to support the continued operation of Catawba for the license renewal period
39 (Duke 2001b). In addition, any replacement of components or additional inspection activities

1 are within the bounds of normal plant component replacement and, therefore, are not expected
2 to affect the environment outside of the bounds of the plant operations evaluated in the *Final*
3 *Environmental Statement Related to Operation of Catawba Nuclear Station, Units 1 and 2*
4 (AEC 1983).

5
6 Eleven Category 2 issues related to operational impacts and postulated accidents during the
7 renewal term, as well as environmental justice and chronic effects of electromagnetic fields, are
8 discussed in detail in this draft SEIS. Four of the Category 2 issues and environmental justice
9 apply to both refurbishment and to operation during the renewal term and are only discussed in
10 this draft SEIS in relation to operation during the renewal term. For all 11 Category 2 issues
11 and environmental justice, the staff concludes that the potential environmental effects are of
12 SMALL significance in the context of the standards set forth in the GEIS. In addition, the staff
13 determined that appropriate Federal health agencies have not reached a consensus on the
14 existence of chronic adverse effects from electromagnetic fields. Therefore, no further
15 evaluation of this issue is required. For severe accident mitigation alternatives (SAMAs), the
16 staff concludes that a reasonable, comprehensive effort was made to identify and evaluate
17 SAMAs. Based on its review of the SAMAs for Catawba Units 1 and 2, and the plant
18 improvements already made, the staff concludes that two of the candidate SAMAs are cost-
19 beneficial. Although the staff concludes that these two SAMAs (providing back-up power to the
20 igniters to establish hydrogen control in SBO events and installing a watertight wall around the
21 6900/4160 V transformers) are cost-beneficial and offer a level of risk reduction, these SAMAs
22 do not relate to adequately managing the effects of aging during the period of extended
23 operation. Therefore, they need not be implemented as part of license renewal pursuant to 10
24 CFR Part 54. However, the hydrogen control SAMA is being pursued as a Generic Safety
25 Issue, and both SAMAs are being evaluated further as current operating license issues.

26
27 Mitigation measures were considered for each Category 2 issue. Current measures to mitigate
28 the environmental impacts of plant operation were found to be adequate, and no additional
29 mitigation measures were deemed sufficiently beneficial to be warranted.

30
31 The following sections discuss unavoidable adverse impacts, irreversible or irretrievable
32 commitments of resources, and the relationship between local short-term use of the environ-
33 ment and long-term productivity.

34 35 **9.1.1 Unavoidable Adverse Impacts**

36
37 An environmental review conducted at the license renewal stage differs from the review
38 conducted in support of a construction permit because the plant is in existence at the license
39 renewal stage and has operated for a number of years. As a result, adverse impacts
40 associated with the initial construction have been avoided, have been mitigated, or have

Summary and Conclusions

1 already occurred. The environmental impacts to be evaluated for license renewal are those
2 associated with refurbishment and continued operation during the renewal term.

3
4 The adverse impacts of continued operation identified are considered to be of SMALL signifi-
5 cance, and none warrants implementation of additional mitigation measures. The adverse
6 impacts of likely alternatives if Catawba ceases operation at or before the expiration of the
7 current OLs will not be smaller than those associated with continued operation of these units,
8 and they may be greater for some impact categories in some locations.

9 10 **9.1.2 Irreversible or Irretrievable Resource Commitments**

11
12 The commitment of resources related to construction and operation of Catawba during the
13 current license period was made when the plant was built. The resource commitments to be
14 considered in this draft SEIS are associated with continued operation of the plant for an
15 additional 20 years. These resources include materials and equipment required for plant
16 maintenance and operation, the nuclear fuel used by the reactors, and ultimately, permanent
17 offsite storage space for the spent fuel assemblies.

18
19 The most significant resource commitments related to operation during the renewal term are
20 the fuel and the permanent storage space. Catawba replaces approximately one third of the
21 fuel assemblies in each of the two units during every refueling outage, which occurs on an 18-
22 to 24-month cycle.

23
24 The likely power generation alternatives if Catawba ceases operation on or before the
25 expiration of the current OLs will require a commitment of resources for construction of the
26 replacement plants as well as for fuel to run the plants.

27 28 **9.1.3 Short-Term Use Versus Long-Term Productivity**

29
30 An initial balance between short-term use and long-term productivity of the environment at the
31 Catawba site was set when the plant was approved and construction began. That balance is
32 now well established. Renewal of the OLs for Catawba and continued operation of the plant will
33 not alter the existing balance, but may postpone the availability of the site for other uses.
34 Denial of the application to renew the OLs will lead to shutdown of the plant and will alter the
35 balance in a manner that depends on subsequent uses of the site. For example, the
36 environmental consequences of turning the Catawba site into a park or an industrial facility are
37 quite different.

9.2 Relative Significance of the Environmental Impacts of License Renewal and Alternatives

The proposed action is renewal of the OLs for Catawba. Chapter 2 describes the site, power plant, and interactions of the plant with the environment. As noted in Chapter 3, no refurbishment and no refurbishment impacts are expected at Catawba, Chapters 4 through 7 discuss environmental issues associated with renewal of the OLs. Environmental issues associated with the no-action alternative and alternatives involving power generation and use reduction are discussed in Chapter 8.

The significance of the environmental impacts from the proposed action (approval of the application for renewal of the OLs), the no-action alternative (denial of the application), alternatives involving nuclear or coal- and gas-fired generation of power at the Catawba site and an unspecified "greenfield site," and a combination of alternatives are compared in Table 9-1. Continued use of a closed-cycle cooling system for Catawba is assumed for Table 9-1.

Substitution of once-through cooling for the recirculating cooling system in the evaluation of the nuclear and gas- and coal-fired generation alternatives would result in somewhat greater environmental impacts in some impact categories.

Table 9-1 shows that the significance of the environmental effects of the proposed action are SMALL for all impact categories (except for collective offsite radiological impacts from the fuel cycle and from HLW and spent fuel disposal, for which a single significance level was not assigned [see Chapter 6]). The alternative actions, including the no-action alternative, may have environmental effects in at least some impact categories that reach MODERATE or LARGE significance.

9.3 Staff Conclusions and Recommendations

Based on (1) the analysis and findings in the GEIS (NRC 1996, 1999); (2) the Catawba ER (Duke 2001b); (3) consultation with Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments received during the scoping process, the preliminary recommendation of the staff is that the Commission determine that the adverse environmental impacts of license renewals for Catawba Units 1 and 2 are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable.

Table 9-1. Summary of Environmental Significance of License Renewal, the No-Action Alternative, and Alternative Methods of Generation

Impact Category	Proposed Action	No-Action Alternative	Coal-Fired Generation		Natural Gas-Fired Generation		New Nuclear Generation		Combination of Alternatives	
	License Renewal	Denial of Renewal	Catawba Site	Alternate Greenfield Site	Catawba Site	Alternate Greenfield Site	Catawba Site	Alternate Greenfield Site	Catawba Site	Alternate Greenfield Site
Land Use	SMALL	SMALL	MODERATE to LARGE	SMALL to LARGE	SMALL to MODERATE	MODERATE to LARGE	SMALL to MODERATE	MODERATE to LARGE	SMALL to MODERATE	MODERATE to LARGE
Ecology	SMALL	SMALL	MODERATE to LARGE	SMALL to LARGE	SMALL to MODERATE	MODERATE to LARGE	MODERATE	MODERATE to LARGE	SMALL to MODERATE	SMALL to LARGE
Water Use and Quality—Surface Water	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE
Water Use and Quality—Groundwater	SMALL	SMALL	SMALL	SMALL to LARGE	SMALL	SMALL to LARGE	SMALL	SMALL to LARGE	SMALL	SMALL to LARGE
Air Quality	SMALL	SMALL	MODERATE	MODERATE	MODERATE	MODERATE	SMALL	SMALL	SMALL	SMALL
Waste	SMALL	SMALL	MODERATE	MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Human Health	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Socioeconomics	SMALL	SMALL to MODERATE	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE
Transportation	SMALL	SMALL	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE
Aesthetics	SMALL	SMALL	MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE	SMALL	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE
Historic and Archaeological Resources	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Environmental Justice	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE	SMALL	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE

(a) Except for collective offsite radiological impacts from the fuel cycle and from HLW and spent-fuel disposal, for which a significance level was not assigned. See Chapter 6 for details.

May 2002

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33 U.S. Nuclear Regulatory Commission (NRC). 2001. "Duke Energy Corporation, Catawba
34 Nuclear Station, Units 1 and 2; Notice of Intent to Prepare an Environmental Impact Statement
35 and Conduct Scoping Process." *Federal Register*. Vol. 66, No. 183, pp. 48489-48491.
36 September 20, 2001.

Appendix A

Comments Received on the Environmental Review

Appendix A

Comments Received on the Environmental Review

Part I - Comments Received During Scoping

On September 20, 2001, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent in the Federal Register (66 FR 48489), to notify the public of the staff's intent to prepare a plant-specific supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, to support the renewal application for the Catawba Nuclear Station, Units 1 and 2, operating licenses and to conduct scoping. This plant-specific supplement to the GEIS has been prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) guidelines, and 10 CFR Part 51. As outlined by NEPA, the NRC initiated the scoping process with the issuance of the Federal Register Notice. The NRC invited the applicant; Federal, State, and local government agencies; local organizations; and individuals to participate in the scoping process by providing oral comments at scheduled public meetings and/or submitting written suggestions and comments no later than November 22, 2001.

The scoping process included two public scoping meetings, which were held in the Council Chamber at the City Hall, located at 155 Johnston Street, Rock Hill, South Carolina, on October 23, 2001. More than 100 individuals attended the meetings. Each session began with NRC staff members providing brief overviews of the license renewal process and the NEPA process. After the NRC's prepared statements, the meetings were opened for public comments. Twenty four attendees (six of whom spoke at both sessions) provided either oral statements that were recorded and transcribed by a certified court reporter or written statements. The meeting transcripts are an attachment to the scoping meeting summary dated November 29, 2001. In addition to the comments provided during the public meetings, two e-mail messages and one letter were received by the NRC in response to the Notice of Intent.

At the conclusion of the scoping period, the NRC staff and its contractors reviewed the transcripts and all written material received to identify specific comments and issues. Each set of comments from an individual was given a unique identifier (Commenter ID), so that the comments could be traced back to the original transcript or e-mail containing the comment. Specific comments were numbered sequentially within each comment set. Several commenters submitted more than one set of comments (i.e., they made statements in both the afternoon and evening scoping meetings). In these cases, there is a unique Commenter ID for each set of comments.

Table A.1 identifies the individuals who provided comments applicable to the environmental review and gives the Commenter ID associated with each set of comments. Individuals who

Appendix A

1 spoke at the scoping meetings are listed in the order in which they spoke at the public meeting,
 2 and individuals who provided comments by letter or e-mail are listed in alphabetical order. To
 3 maintain consistency with the scoping summary report, (Catawba Scoping Summary Report,
 4 dated March 27, 2002), the unique identifier used in that report for each set of comments is
 5 retained in this report.

6
 7 **Table A.1. Individuals Providing Comments During Scoping Comment Period**

8	9	10	11	12
Commenter ID	Commenter	Affiliation (If Stated)	Comment Source	
11	A	Doug Echols	Rock Hill, SC	Afternoon Scoping Meeting
12	B	Vance Stine	Clover, SC	Afternoon Scoping Meeting
13	C	Mike Channell	York County Office of Emergency Management	Afternoon Scoping Meeting
14	D	Gary Peterson	Catawba Nuclear Station	Afternoon Scoping Meeting
15	E	Margot Rott	Catawba Nuclear Station	Afternoon Scoping Meeting
16	F	Dennis Merrill	York Technical College	Afternoon Scoping Meeting
17	G	Mark Farris	York County Economic Development Board	Afternoon Scoping Meeting
18	H	Janet Zeller	Blue Ridge Environmental Defense League	Afternoon Scoping Meeting
19	I	Steve Taylor	Palmetto Council Boy Scouts	Afternoon Scoping Meeting
20	J	Lou Zeller	Blue Ridge Environmental Defense League	Afternoon Scoping Meeting
21	K	John Byrd	Lower Lake Wylie Association	Afternoon Scoping Meeting
22	L	Tim Morgan	York County Chamber of Commerce	Afternoon Scoping Meeting
23	M	Don Moniak	Blue Ridge Environmental Defense League	Afternoon Scoping Meeting
24	N	Mike Bush	Daniel Stowe Botanical Garden	Afternoon Scoping Meeting
25	O	Ann Barton	York County Adult Day Care Services	Afternoon Scoping Meeting
26	P	Nate Barber	Winthrop University	Afternoon Scoping Meeting

1	Q	Don Moniak	Blue Ridge Environmental Defense League	Evening Scoping Meeting
2	R	Mike Channell	York County Office of Emergency Management	Evening Scoping Meeting
3	S	Gary Peterson	Catawba Nuclear Station	Evening Scoping Meeting
4	T	Margot Rott	Catawba Nuclear Station	Evening Scoping Meeting
5	U	Angela Viney	South Carolina Wildlife Federation	Evening Scoping Meeting
6	V	Gregg Jocoy		Evening Scoping Meeting
7	W	Janet Zeller	Blue Ridge Environmental Defense League	Evening Scoping Meeting
8	X	Lewis Patrie	Physicians for Social Responsibility	Evening Scoping Meeting
9	Y	Mary Olson	Nuclear Information and Resource Service	Evening Scoping Meeting
10	Z	Lou Zeller	Blue Ridge Environmental Defense League	Evening Scoping Meeting
11	AA	Glenn Carroll	Georgians Against Nuclear Energy	Evening Scoping Meeting
12	AB	Ed FitzGerald		Evening Scoping Meeting
13	AC	Trey Eubanks	York, SC	Evening Scoping Meeting
14	AD	Judith Aplin		Electronic mail
15	AE	Hugh Jackson	Public Citizen's Critical Mass Energy and Environment Program	Electronic mail
16	AF	Edmund FitzGerald	Sierra Club	Written comments at Evening Scoping Meeting
17	AG	Jesse Riley	Carolina Environmental	Letter

18
19 Specific comments were categorized and consolidated by topic. Comments with similar specific
20 objectives were combined to capture the common essential issues raised by the commenters.
21 The comments fall into one of several general groups. These groups include
22

Appendix A

- 1 • Specific comments that address environmental issues within the purview of the NRC
2 environmental regulations related to license renewal. These comments address
3 Category 1 or Category 2 issues or issues that were not addressed in the GEIS. They
4 also address alternatives and related federal actions.
5
- 6 • General comments (1) in support of or opposed to nuclear power or license renewal or
7 (2) on the license renewal process, the NRC's regulations, and the regulatory process.
8 These comments may or may not be specifically related to the Catawba license renewal
9 application.
10
- 11 • Questions that do not provide new information.
12
- 13 • Specific comments that address issues that do not fall the within or are specifically
14 excluded from the purview of NRC environmental regulations. These comments
15 typically address issues such as the need for power, emergency preparedness, current
16 operational safety issues, and safety issues related to operation during the renewal
17 period.
18

19 Each comment applicable to this environmental review is summarized in this section. This
20 information, which was extracted from the Catawba Scoping Summary Report, is provided for
21 the convenience of those interested in the scoping comments applicable to this environmental
22 review. The comments that are general or outside the scope of the environmental review for
23 McGuire are not included here. More detail regarding the disposition of general or
24 nonapplicable comments can be found in the summary report. The ADAMS accession number
25 for the summary report is: ML020870376.
26

27 This accession number is provided to facilitate access to the document through the Public
28 Electronic Reading Room (ADAMS) <http://www.nrc.gov/reading-rm.html> .
29

30 The following pages summarize the comments and suggestions received as part of the scoping
31 process that are applicable to this environmental review, and discuss the disposition of the
32 comments and suggestions. The parenthetical alpha-numeric identifier after each comment
33 refers to the comment set (Commenter ID) and the comment number.
34

35 Comments in this section are grouped in the following categories:
36

- 37 1. Comments Concerning Aquatic Ecology Issues
- 38 2. Comments Concerning Terrestrial Resource Issues
- 39 3. Comments Concerning Threatened and Endangered Species Issues
- 40 4. Comments Concerning Air Quality Issues
- 41 5. Comments Concerning Human Health Issues

- 1 6. Comments Concerning Socioeconomic Issues
 2 7. Comments Concerning Postulated Accident Issues
 3 8. Comments Concerning Uranium Fuel Cycle and Waste Management Issues
 4 9. Comments Concerning Alternate Energy Sources
 5 10. Comments Concerning Safety Issues Within the Scope of License Renewal
 6

7 **Comments**

8
 9 **1. Comments Concerning Aquatic Ecology Issues**

10 As stated in 10 CFR Part 51, Table B-1, Category 1 aquatic ecology issues include:

- 11
 12
 13
 14 – Entrainment of fish and shellfish in early life stages
 15 – Impingement of fish and shellfish
 16 – Heat shock
 17

18 **Comment:** Duke Energy has conducted water testing on Lake Wylie since the early 1970s.
 19 The areas we study include water quality, water flow at Catawba's intake and discharge
 20 structures and aquatic ecology. Our evaluation of historical data indicates no changes to Lake
 21 Wylie's aquatic resources as a result of Catawba's operation. Using scientific data, we
 22 concluded that our continued operation would not have an adverse effect on the Lake or River.
 23 (E-1)(T-1)
 24

25 **Comment:** They've been an excellent steward, certainly, of Lake Wylie, a tremendous
 26 resource for us from visitors and convention-related activities. We certainly place that as one of
 27 our jewels in our environmental resources, and they've been an excellent steward of Lake Wylie
 28 and the Catawba River. (G-3)
 29

30 **Response:** *The comments are noted and are supportive of license renewal at Catawba.*
 31 *Aquatic ecology will be discussed in Chapter 2 and Chapter 4 or the SEIS. The comments*
 32 *provide no new information; therefore, they will not be evaluated further.*
 33

34 **2. Comments Concerning Terrestrial Resource Issues**

35
 36 As stated in 10 CFR Part 51, Table B-1, Category 1 terrestrial resource issues include:
 37

- 38 – Cooling tower impacts on crops and ornamental vegetation
 39 – Cooling tower impacts on native plants
 40 – Bird collisions with cooling towers
 41 – Cooling pond impacts on terrestrial resources

Appendix A

- 1 – Power line rights-of-way management (cutting and herbicide application)
- 2 – Bird collisions with power lines
- 3 – Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops,
- 4 honeybees, wildlife, livestock)
- 5 – Floodplains and wetland on power line rights-of-way

6
7 **Comment:** One of the other offshoots of the Backyard Wildlife Habitat Program is the WAIT
8 Program that Margot mentioned. And, in fact, Duke Power is one of the founding partners.
9 Having worked to protect and enhance wildlife habitat at the World of Energy in Seneca in
10 1996, the South Carolina Wildlife Federation, the South Carolina Department of Natural
11 Resources and the National Wild Turkey Federation worked with Duke Power at that site and
12 was so impressed with the outcome that this new wildlife habitat education program was
13 created. (U-1)

14
15 **Comment:** The Catawba Nuclear Station is our most recent WAIT site, and they've gone over
16 and above the standard requirements in creating their WAIT site. They've hosted one of our
17 habitat steward classes in 2000 at Energy Quest. In addition, they initiated partnerships with
18 three schools in the area. York Junior High School, Goldhill Elementary, and Goldhill Middle
19 School are being assisted in the creation of their schoolyard habitats, their outdoor classrooms,
20 by the staff of Catawba Nuclear Station. There are numerous wildlife habitat management and
21 protection initiatives at Catawba Nuclear Station to include osprey towers. To date, four have
22 been installed to encourage an osprey nest on-site. Wood duck boxes have been installed in
23 the standby nuclear service water pond. Wildlife food plots have been planted, wetlands within
24 the site boundary have been identified and signs posted. Selective mowing is in place to
25 provide meadows for wildlife habitat. Educational brochures are available at the visitors center
26 with information on butterfly gardens and native wild flowers. An educational nature trail is
27 available with a brochure to identify plants, trees and vines on the trail. (U-2)

28
29 **Response:** *The comments are noted. The comments discuss the participation of Duke as a*
30 *steward of the environment. They provide no new information and will not be evaluated further.*
31 *The appropriate descriptive information regarding the terrestrial ecology of the site will be*
32 *addressed in Chapters 2 and 4 of the Catawba SEIS.*

34 **3. Comments Concerning Threatened and Endangered Species Issues**

35
36 As stated in 10 CFR Part 51, Table B-1, the following is a Category 2 issue:

- 37
38 – Threatened or endangered species

39
40 **Comment:** The second category we evaluated is plants and animals. As part of our study,
41 Duke Energy worked with Dr. L.L. Gaddy, a well-known environmental scientist, to perform a

1 study of threatened and endangered species at the Catawba site. Results of the study indicate
2 there were no state or federally recognized threatened or endangered species identified; in fact,
3 Catawba has a thriving population of quail, beaver, bobcats, Canada geese, osprey, deer and
4 many other wildlife species. Catawba has many ongoing environmental initiatives managed in
5 cooperation with the South Carolina Department of Natural Resources, the South Carolina
6 Wildlife Federation and the Wild Turkey Federation. The Catawba site is in the final stages of
7 becoming WAIT-certified by the South Carolina Wildlife Federation, and wait, W-A-I-T, stands
8 for Wildlife and Industry Together. Catawba hosts a butterfly garden and various other wildlife
9 areas. Based on review of our operating history and a look at our continued operation, we
10 conclude that license renewal will not adversely affect plants and animals. (E-2)(T-2)

11
12 **Response:** *The comment is noted. The appropriate descriptive information provided by Duke*
13 *regarding the terrestrial ecology of the site will be addressed in Chapters 2 and 4 of the SEIS.*

14 15 **4. Comments Concerning Air Quality Issues**

16 As stated in 10 CFR Part 51, Table B-1, Category 1 air quality issues include:

- 17
18
19 – Air quality effects of transmission lines

20
21 **Comment:** Duke Power has an excellent record of maintenance, and the nuclear generation is
22 the cleanest way, I think, for us to address the major air quality problems which we have in the
23 Charlotte metro area. (A-4)

24
25 **Comment:** The third [environmental] category we evaluated is air quality. Nuclear power
26 provides about 50 percent of Duke Energy's total electric generation in the Piedmont Carolinas.
27 And by design, nuclear power is [a] clean air energy source. Data shows Catawba's operation
28 has not adversely impacted the region's air quality, and there are no plans associated with
29 license renewal that would alter the air quality. (E-3)(T-3)

30
31 **Comment:** I also think that the concept of clean air is an important one to look at. (N-2)

32
33 **Response:** *The comments are noted. Air quality impacts from plant operations were*
34 *evaluated in the GEIS and found to be minimal. These emissions are regulated through*
35 *permits issued by the U.S. Environmental Protection Agency and South Carolina. Air quality*
36 *effects are a Category 1 issue as evaluated in the GEIS and will be discussed in Chapter 2 of*
37 *the SEIS. The comments provide no new information and, therefore, will not be evaluated*
38 *further.*

Appendix A

1 **5. Comments Concerning Human Health Issues**

2
3 As stated in 10 CFR Part 51, Table B-1, Category 1 human health issues include:

- 4
5 - Radiation exposure to the public during refurbishment
6 - Occupational radiation exposure during refurbishment
7 - Microbiological organisms (occupational health)
8 - Noise
9 - Radiation exposures to public (license renewal term)
10 - Occupational radiation exposures (license renewal term)
11

12 **Comment:** There are some real problems with describing nuclear power as clean, safe
13 technology. It may not produce the kinds of pollution that we see from Duke's seven coal plants
14 in North Carolina, and I'm not sure how many in South Carolina, but it does produce ionizing
15 radiation. And this ionizing radiation is legally emitted from the Catawba Plants in day-to-day
16 operations of the Plant. You can't see it, you can't taste it, you can't feel it, but it's there, and
17 legal emissions can cause, I think, excessive cancer deaths. In addition, ionizing radiation
18 causes birth defects, and it causes immune disorders. So the true health impacts of nuclear
19 power can't be looked at in terms of what your ozone levels are. (H-1)
20

21 **Comment:** One of the specifics that we are looking at for the license extension is the number
22 of people that would be projected to die an early death from cancer from the additional nearly
23 two decades, right at two decades, or operation of the Catawba Plants. And at this point, in
24 looking at that date, we believe that that number exceeds what is allowed under Nuclear
25 Regulatory Commission rules. (H-2)
26

27 **Comment:** The EPA—just as an aside, a parenthetical piece here, the EPA, if you live near a
28 chemical plant, requires that that chemical plant kill no more than one person in a million from
29 cancer. The requirements for the Nuclear Regulatory Commission for nuclear power plants are
30 much, much less rigid, so these can be very dangerous plants, and we want to know from the
31 NRC just how many people in this area can be expected to die an early death from the license
32 extension, and we will be presenting that analysis ourselves. (H-3)
33

34 **Comment:** Even the NRC admits that with no accident, no problem, just plain old routine
35 activities, 12 excess deaths will occur from 20 years of reactor operation at any reactor in the
36 United States, which is a ludicrous proposition to suggest that such a thing is totally linear and
37 totally quantifiable. But I'll take the bait. Okay, 12 deaths from extending Catawba's license.
38 Well guess what? There's 100 reactors looking for license extensions. That's 1,200 deaths
39 from license extension, according to NRC. Not me. I'd multiply it by at least ten times. So that

1 takes us back to what I started with: acceptable end risk. NRC knows that [I have] never
 2 accepted the same definition as acceptable. I can't get up before you without reminding you
 3 that you should be regulating to protect children. (Y-6)
 4

5 **Response:** *The comments are noted. Radiation exposure to the public and workers was*
 6 *evaluated in the GEIS and determined to be a Category 1 issue. The NRC's regulatory limits*
 7 *for radiological protection are set to protect workers and the public from the harmful health*
 8 *effects of radiation on humans. The limits were based on the recommendations of standard-*
 9 *setting organizations. Radiation standards reflect extensive scientific study by national and*
 10 *international organizations (International Commission on Radiological Protection [ICRP],*
 11 *National Council on Radiation Protection and Measurements, and National Academy of*
 12 *Sciences) and are conservative to ensure that the public and workers at nuclear power plants*
 13 *are protected. The radiation exposure standards are presented in 10 CFR Part 20, "Standards*
 14 *for Protection Against Radiation," and are based on the recommendations in ICRP 26 and 30.*
 15

16 *The comments provide no new information, and do not pertain to the scope of license renewal*
 17 *as set forth in 10 CFR Parts 51 and 54. Therefore, they will not be evaluated further.*
 18

19 **6. Comments Concerning Socioeconomic Issues**

20 As stated in 10 CFR Part 51, Table B-1, Category 1 and 2 socioeconomic issues include:
 21
 22

23 Category 1

- 24
- 25 • Public services: public safety, social services, and tourism and recreation
- 26 • Public services, education (license renewal term)
- 27 • Aesthetic impacts (refurbishment)
- 28 • Aesthetic impacts (license renewal)
- 29 • Aesthetic impacts of transmission lines (license renewal term)
- 30

31 Category 2

- 32
- 33 • Housing impacts
- 34 • Public services: public utilities
- 35 • Public services, education (refurbishment)
- 36 • Offsite land use (refurbishment)
- 37 • Offsite land use (license renewal term)
- 38 • Public services, transportation
- 39 • Historic and archaeological resources
- 40

Appendix A

1 **Comment:** There are many economic advantages, I believe, to us having a reliable and clean
2 source of energy. (A-3)
3

4 **Comment:** The employees of Catawba are an important part of this community. They live and
5 work here, are active in supporting area civic, charitable and business endeavors. They
6 volunteer in the community, they contribute financially to organizations serving Rock Hill, York
7 County and this region. (A-6)
8

9 **Comment:** Duke Energy's been a valued corporate citizen for many years. Its employees are
10 hardworking members of surrounding communities, active in our schools, churches and civic
11 organizations. In addition to the obvious asset of generating safe, reliable energy for our
12 homes and businesses, Duke Energy participates in the activities of our area, annually
13 supporting the efforts of the United Way, the Red Cross, Adopt-a-Highway Programs and other
14 civic activities. (AC-2)
15

16 **Comment:** They have been a good corporate citizen of our community. (B-1)
17

18 **Comment:** Duke Power and Catawba, as Mayor Echols and Mayor Stine have already
19 mentioned, have always been good citizens of York County. They're a very big asset to York
20 County in our view. We are constantly working with Catawba on emergency planning issues,
21 on safety issues. (C-1)
22

23 **Comment:** We are active volunteers in the community. For 11 years, we've hosted Boy Scout
24 encampments where our employees teach classes in electricity, crime prevention, energy,
25 computers, electronics and communications. Over 1,000 boys have attended these events at
26 Catawba Station. Our employees are also part of the Junior Achievement Program, partnering
27 with local schools teaching business skills, providing tutors and mentors. And one thing I'm
28 particularly proud of is each year our employees collect coats and blankets for area shelters
29 and gather school supplies for area schools. They also volunteer hundreds of hours to United
30 Way agencies, and every year our employees donate well over \$100,000 to area United Way
31 agencies. Catawba employees also are involved in blood drives and donate annually over 300
32 units of blood. And we've also hosted Women in the Outdoors and Jake's Events and
33 partnered with local schools to create schoolyard habitats and nature trails. (D-2)(S-2)
34

35 **Comment:** In addition to being safely operated, Catawba has provided many benefits for the
36 community. For example, Duke Energy has contributed millions of dollars in property taxes to
37 York County. We have over 1,100 employees helping maintain a strong economy in this area.
38 Our annual payroll of over \$70 million helps support local businesses and industries. And as
39 Gary mentioned earlier, our employees spend hundreds of hours each year volunteering for
40 community, school, civic and church programs and projects. (E-5)(T-5)
41

1 **Comment:** I hope you'll give appropriate positive recognition to the record, because I don't
2 think anything speaks more loudly than the record-the record on participation in all of our
3 community and civic activities. (F-3)
4

5 **Comment:** Certainly, there are obvious benefits to having the Catawba Nuclear Station in York
6 County, primarily the tax benefits. (G-1)
7

8 **Comment:** Without a facility like this and other supporting industries, we would not have some
9 of the highest SAT scores, if not the highest, in the State of South Carolina. Our school
10 systems have the highest percentage of teachers with master's degrees, and then we also have
11 the highest average teacher salary. It's tremendously beneficial to us. And at a ten and a half
12 percent assessment, industries like Duke pay two and a half times the property taxes that our
13 residential development does. (G-2)
14

15 **Comment:** The Catawba Nuclear Power and the millions of dollars of revenue that's been
16 generated from that Station has created an opportunity for York County to provide for the
17 health, safety and welfare of our citizens to a much greater extent than we would have without
18 it. (G-4)
19

20 **Comment:** They [scouts in York County and the Lancaster and Chester areas] have been
21 privileged to be invited to Duke Power property at the Catawba Nuclear Station for the last 11
22 years and accounting for 1,000 kids during that time to be taught a variety of different merit
23 badge skills. (I-1)
24

25 **Comment:** Duke Power Company, and Catawba Nuclear in particular, have been good
26 community stewards. They have been an outstanding community partner participating with us
27 locally as well as on a regional basis. When I think about the people that I know with Duke
28 Power Company, and in particular Catawba Nuclear Station, I know that they've taught kids first
29 aid, they've managed the Council's web site, which was the first nationally accredited Boy
30 Scouts of America web site in the nation. They have constructed camp shelters at Camp Bob
31 Harden, they've managed major programs, they've provided untold hours of volunteer
32 community service and provided support services to the scouting leaders in the surrounding
33 areas as well. (I-2)
34

35 **Comment:** These are good community stewards, these are good people, these are our
36 neighbors, and these folks live here, they're conscientious community partners. (I-3)
37

38 **Comment:** I think of Duke Energy as being at the top of that list as far as promoting a good
39 quality of life in this area. (L-1)
40

Appendix A

1 **Comment:** Duke, as it was said earlier, has a history of being a good corporate citizen here in
2 York County. The majority of the employees live in the community. Duke employees are not
3 only involved in most of the major community organizations, they are actively encouraged by
4 Management to become involved in their local communities. And I want to stress this goes
5 beyond financial involvement and includes what I would call human capital or leadership to
6 these organizations. (L-3)
7

8 **Comment:** [On behalf of York County Adult Day Services,] I have been very blessed to find
9 that these people [Catawba employees] repeatedly come back and try and serve the community
10 needs. They started out with building a concrete path for wheelchair vans to unload the clients,
11 they screened in porches at the facilities, they assisted with new renovations, and this was to
12 meet the new DEHAC regulations, and this included safety precautions and guidelines. (O-1)
13

14 **Comment:** I think that Catawba Nuclear for us has been a very good neighbor. They are there
15 with the know-how and the heart to get the job done in this community, and they are quite
16 aware of the community needs, and we're proud of them. (O-2)
17

18 **Comment:** I think that Duke has been, and will hopefully continue to be, a good corporate
19 neighbor. (P-4)
20

21 **Comment:** I think that Catawba itself has proven to not only be an asset to our community by
22 generating power there, but I think they -- but also because they are an active neighbor in our
23 area. They're not just there as a corporation, they're there as a neighbor as well. (R-1)
24

25 **Comment:** In conjunction with Catawba Nuclear Station efforts to partner with schools, they
26 have a program underway to supply every elementary and middle school near Catawba Nuclear
27 Site, within a ten-mile radius, with environmental workshop backpacks that will include kits for
28 environmental and wildlife monitoring. In all of these conversation education programs, the
29 Catawba Nuclear Station has developed and sustained partnerships with the South Carolina
30 Department of Natural Resources, the South Carolina Wildlife Federation, the National Wild
31 Turkey Federation, the Stowe Botanical Garden, the Piedmont Council of the Boy Scouts of
32 America and the schools in the area, specifically the ones I mentioned earlier. (U-3)
33

34 **Comment:** their (Duke) employees are good citizens. (AD-2)
35

36 **Response:** *The comments are noted. The comments are supportive of license renewal at*
37 *Catawba, and are general in nature. The comments provide no new information; therefore,*
38 *they will not be evaluated further. Socioeconomic issues specific to the plant are Category 2*
39 *issues and will be addressed in Chapters 2 and 4 of the SEIS.*
40

1 **Comment:** We are also wanting the NRC to evaluate some liability issues. Thanks to our
2 friend, Mary Olson, from Nuclear Information and Resource Service, we were alerted that Duke
3 recently filed with the Federal Energy Regulatory Commission to set up a limited liability
4 corporation, thereby relieving them from the day-to-day operations liability at their nuclear
5 power stations. We want the socioeconomic impacts of the potential for this new limited liability
6 corporation to be factored into a complete EIS. (W-5)
7

8 **Comment:** In this EIS, you've got to look ahead, and you've got to figure that sometime in the
9 next 20 years we're not going to have a regulated energy market in the Southeast. And you've
10 got to look at Duke Power's behavior in the West, and you've got to ask yourself what's going to
11 happen to the municipalities and the co-ops when Duke is unregulated, and they have to sell at
12 their bond rate? And you've got to look at what kind of a white elephant Catawba's going to be
13 for those communities. (Y-8)
14

15 **Response:** *The comments are noted. The comments relate to corporate liability and energy*
16 *deregulation. These are NRC policy issues and are outside the scope of license renewal. The*
17 *comments provide no new information and, therefore, will not be evaluated further.*
18

19 **7. Comments Concerning Postulated Accident Issues**

20
21 As stated in 10 CFR Part 51, Table B-1, Category 1, postulated accidents issues include:

- 22 • Design basis accidents
- 23 • Severe accidents
- 24
- 25

26 The environmental impacts of design basis accidents is a Category 1 issue in the GEIS. Also,
27 the Commission has determined that the probability-weighted environmental consequences
28 from severe accidents (i.e., beyond design basis accidents) are small for all plants but that
29 alternatives to mitigate severe accidents must be considered for all plants that have not
30 considered such alternatives. See 10 CFR 51.53(c)(3)(iii)(L).
31

32 **Comment:** [During a plant tour, we learned that] the Plant was designed to withstand
33 tremendous forces, both natural and unnatural—what we were told, certainly, was that
34 earthquake, hurricane and commercial jetliner crash had all been tested in the laboratory-type
35 testing to be concurrent. (N-5)
36

37 **Response:** *The comment is noted. The comment states an awareness of the types of*
38 *accidents that the Catawba Nuclear Station was designed to withstand. The comment provide*
39 *no new information; therefore, it will not be evaluated further.*
40

1 **8. Comments Concerning Uranium Fuel Cycle and Waste Management Issues**

2
3 As stated in 10 CFR Part 51, Table B-1, Category 1 uranium fuel cycle and waste management
4 issues include:

- 5
6 • Offsite radiological impacts (individual effects from other than the disposal of
7 spent fuel and high level waste)
8 • Offsite radiological impacts (collective effects)
9 • Offsite radiological impacts (spent fuel and high level waste disposal)
10 • Nonradiological impacts of the uranium fuel cycle
11 • Low level waste storage and disposal
12 • Mixed waste storage and disposal
13 • On-site spent fuel
14 • Nonradiological waste
15 • Transportation

16
17 **Comment:** The longer a reactor operates, the more nuclear waste it generates. The nation
18 still has no workable solution for the disposal of deadly nuclear waste. (AE-3)

19
20 **Comment:** The NRC “believes that there is reasonable assurance that at least one mined
21 geological repository will be available within the first quarter of the twenty-first century, and
22 sufficient repository capacity will be available within 30 years beyond the licensed life for
23 operation of any reactor . . .” (10 CFR 51.23) What if there isn’t? Since the commission
24 rendered it’s belief, it’s become just as reasonable to assume that there may in fact not be a
25 geological repository in the first quarter of this century, or the first half of it, for that matter.
26 What then? (AE-13)

27
28 **Comment:** If the NRC relicenses Catawba, nuclear waste, whether stored in pools or in dry
29 storage, would continue to accumulate over an additional 20 years of an extended license
30 period. What “reasonable,” to use the NRC’s word, grounds are there for preferring that option
31 to the no-option alternative in the Catawba SEIS? (AE-14)

32
33 **Comment:** The generic EIS, (6.4.6.7) states: “Within the context of a license renewal review
34 and determination, the Commission finds that there is ample basis to conclude that continued
35 storage of existing spent fuel and storage of spent fuel generated during the license renewal
36 period can be accomplished safely and without significant environmental impacts.” Does that
37 finding assume that a permanent repository will be built, or is the NRC stating that waste can be
38 stored safely, without impacts, indefinitely? (AE-15)

1 **Comment:** In previous nuclear power plant relicensing documents, the NRC has failed to
2 assign a level of significant impact to collective offsite radiological impacts from the fuel cycle
3 and from high level waste and spent fuel disposal (NUREG 1437, Supplement 5, Chapter 6). If
4 the NRC is tempted to reach a similar conclusion with the Catawba SEIS, it raises the question:
5 How can the NRC claim that relicensing is a preferable alternative to the no-action alternative,
6 when the waste disposal question is so uncertain that the NRC can't even assign it a level of
7 significance? (AE-16)

8
9 **Response:** *Onsite storage and offsite disposal of spent nuclear fuel are Category 1 issues.*
10 *The safety and environmental effects of long-term storage of spent fuel onsite has been*
11 *evaluated by the NRC and, as set forth in the Waste Confidence Rule, the NRC generically*
12 *determined that such storage could be accomplished without significant environmental impact.*
13 *In the Waste Confidence Rule, the Commission determined that spent fuel can be stored onsite*
14 *for at least 30 years beyond the licensed operating life, which may include the term of a*
15 *renewed license. At or before the end of that period, the fuel would be moved to a permanent*
16 *repository. The GEIS is based upon the assumption that storage of the spent fuel onsite is not*
17 *permanent. The plant-specific supplement to the GEIS regarding license renewal for Catawba*
18 *will be prepared based on the same assumption. The comment provides no new information;*
19 *therefore, the comment will not be evaluated further.*

20 21 **9. Comments Concerning Alternative Energy Sources**

22
23 **Comment:** We're always looking at new alternatives to better serve our customers. During
24 this license renewal application process, we did look at many alternatives for providing-for
25 generating baseload electricity, such as conventional fossil generation, wind, solar and
26 photocells. But when compared to the amount of electricity generated by Catawba, these
27 alternatives were not selected because of environmental impacts, land use requirements,
28 inadequate electricity output and, finally, cost. (D-5)(S-5)

29
30 **Comment:** Any self-respecting environmental impact statement would have alternatives. And
31 alternatives to the licensing extension of the Catawba Plants would be the focus on safer
32 alternative energy, ones that would not be terrorist magnets, like wind farms. (H-9)

33
34 **Comment:** We need to look for other alternative types of things [energy sources] to move into
35 as our need for energy grows. (N-3)

36
37 **Comment:** As far as alternatives go, we heard earlier from Duke Energy that they evaluated
38 other sources of energy. However, what they didn't tell you is that in the Nuclear Regulatory
39 Guide 1437, Volume 1, Section 0.81 [8.1], the NRC has determined that a reasonable set of
40 alternatives should be limited to analysis of single, discrete electric generation sources and only
41 electric generation sources that are technically feasible and commercially viable. So the

Appendix A

1 alternatives that were not considered as reasonable power, some of which Duke Energy earlier
2 claimed twice today, twice at McGuire that they did analyze and never really did, is [include]
3 wind, photovoltaic cells, solar thermal power, hydroelectric generation, geothermal, wood
4 waste, municipal solid waste, energy crops, delayed retirement of non-nuclear units, imported
5 power, conservation and combination of alternatives. The only thing they did analyze was for
6 replacement power alternatives is your basic centralized plants, such as conventional coal-fired,
7 oil- and gas-fired, gas-fired only, combined cycle, advanced light water nuclear reactor, even
8 though that's not necessarily technically feasible at this time. That remains to be seen. I would
9 wager that the advances that have occurred in wind energy, although this isn't the best part of
10 the world for it. (Q-4)

11
12 **Comment:** We also believe that energy alternatives have not been adequately addressed by
13 the Duke license extension application. And the NRC must do a much better job than Duke did
14 of evaluating realistic alternatives to a 19-year license extension of the Catawba and McGuire
15 reactors. (W-4)

16
17 **Comment:** So what are the alternatives? There are alternatives. Get it straight, guys. There
18 are alternatives, because we're not talking about today's jobs. We're talking about jobs that
19 start, what, 20 years from now? Right. Well, guess what? All of the alternatives have jobs too.
20 And guess what? Duke could provide them. So get it straight. Offshore wind is a great poten-
21 tial. If there's a single order for 500 megawatts of solar, it will be down below natural gas in its
22 kilowatt hour charge. Just make one big order for solar, and it's going to be affordable. (Y-7)

23
24 **Comment:** I'd like to comment here tonight on the lack or the inadequate analysis done by
25 Duke Energy in its submission for the license renewal at Catawba, the inadequate job done in
26 analyzing alternative sources which could be used to generate the power, which is now
27 provided by the Catawba Nuclear Station. (Z-1)

28
29 **Comment:** The State of South Carolina has a huge wind potential located offshore, out of sight
30 of some of the beautiful beaches. (Z-2)

31
32 **Comment:** The National Environmental Policy Act requires that the NRC consider all
33 reasonable alternatives to a proposal, including the no-action alternative. In this case, that
34 would mean not renewing the license for the Catawba units. Public Citizen believes that
35 inasmuch as the expiration dates on the current Catawba licenses are a staggering more-than
36 two decades away, the most prudent and wise course the NRC could take would be to adopt a
37 no-action alternative in the Catawba supplemental environmental impact statement (SEIS).
38 What would be the environmental and socio-economic impacts of the no-action alternative?
39 Given that the licenses at Catawba units 1 and 2 will expire in 2024 and 2026, respectively, it is

1 hard to imagine the no-action alternative could conceivably lead to any additional negative
2 environmental or socio-economic impacts on either the licensee, the community or the region's
3 land, air and water. (AE-6)

4
5 **Comment:** How can the NRC justify the assertion (implicit if the relicensing alternative is
6 preferred) that the impacts from relicensing will be smaller than the impacts from the no-action
7 alternative, when relicensing is an event that as a practical matter doesn't take effect for more
8 than two decades? (AE-9)

9
10 **Comment:** But wait-there's more! Because if you relicense now, the NRC will throw in a bonus
11 analytical conclusion: no alternative energy sources are viable, and none will be—at least not for
12 40 years! (AE-11)

13
14 **Comment:** The generic EIS "assumes that conservation technologies produce enough energy
15 savings to permit the closing of a nuclear plant." (NUREG-1437, Vol.1, 8.3.14). Is that true with
16 respect to the Catawba plant? (AE-17)

17
18 **Comment:** What is the projected energy conservation from demand-side management in the
19 Catawba service area over the next 20, 30 and 45 years? (AE-18)

20
21 **Comment:** By how much will new federal appliance energy standards, implemented or
22 adopted since the GEIS was written, effect energy conservation in the Catawba service area
23 over the next 20, 30 and 45 years? (AE-19)

24
25 **Comment:** The GEIS tends to dismiss solar and wind power as "baseline" sources of
26 replacement. What is the potential of solar and wind power as replacement if considered as
27 distributive sources, rather than baseline sources, over the next 20, 30 and 45 years? (AE-20)

28
29 **Comment:** What are the environmental and socio-economic impacts of solar and wind power if
30 considered as distributive sources rather than baseline sources, and within that scenario, why
31 would the impacts from the relicensing alternative be preferred. (AE-21)

32
33 **Comment:** Could a combination of alternatives, blending conservation, energy efficiencies,
34 distributive power, including fuel cells, and renewable energy sources constitute a cost-effective
35 replacement for the Catawba capacity? Is the prospect of such combination being cost-
36 effective more, or less, likely in 20, 30 and 45 years? (AE-22)

37
38 **Comment:** In previous nuclear power plant relicensing documents, the NRC has dismissed
39 combination alternatives, such as a mix of conservation and distributive power, as "not
40 considered feasible at this time" (draft NUREG-1437, Supplement 5, 8.3). If the NRC is

Appendix A

1 tempted to reach a similar conclusion with regard to Catawba, it begs the question: why does
2 the NRC care what is feasible “at this time” when the applicant’s current licensing is not going to
3 expire for more than two decades? (AE-23)
4

5 **Comment:** If, after rigorous analysis of the questions raised above regarding alternative
6 energy sources, it is determined that those sources may likely constitute a cost-effective
7 alternative to relicensing, then, given the distant expiration dates of the applicant’s current
8 licensing, why is relicensing preferable to the no-action alternative? (AE-24)
9

10 **Response:** *The comments are noted. The GEIS included an extensive discussion of*
11 *alternative energy sources. Environmental impacts associated with various reasonable*
12 *alternatives to renewal of the operating licenses for Catawba Nuclear Station, Units 1 and 2, will*
13 *be discussed in Chapter 8 of the SEIS.*
14

15 **Comment:** We have another economic problem, and maybe the EIS surprises me. Analyze it.
16 Because there’s a requirement to do cost/benefit analysis and comparison. Surprise me. Put
17 in the alternative energies. (AA-4)
18

19 **Response:** *The comment is noted. A cost-benefit analysis is specifically excluded from the*
20 *analysis of the impacts of license renewal. However, environmental impacts associated with*
21 *various reasonable alternatives to renewal of the operating licenses for Catawba will be*
22 *discussed in Chapter 8 of the SEIS.*
23

24 **10. Comments Concerning Safety Issues Within the Scope of License Renewal**

25

26 **Comment:** A subsidiary of Duke has been rapidly developing the buffer zone. So the buffer
27 zone’s going away. It’s not—it’s new information that the NRC needs to look at. (H-7)
28

29 **Comment:** I want to briefly mention that our concerns encompass issues like the aging of
30 these reactors, impacts on the Catawba River, impacts on endangered species and microbial
31 impacts. (Y-2)
32

33 **Comment:** There are some things about Catawba and McGuire that are pretty obvious. The
34 containment system, the freeze-thaw cycle from the ice condenser technology, which is used is
35 causing warpage so that doors and valves do not open properly, which creates safety
36 conditions. (AA-1)
37

38 **Comment:** The Catawba Plant is one of the thin-walled, ice condenser designs and is more
39 vulnerable to a catastrophic early containment failure that would release radioactive materials
40 into the environment. (AB-3)(AF-3)
41

1 **Comment:** Whereas, the Catawba and McGuire nuclear plants represent four of only nine U.S.
2 reactors with thin-walled, so called "ice-condenser" concrete containments that the Nuclear
3 Regulatory Commission estimates are significantly more vulnerable to a catastrophic early
4 containment failure that would release radioactive material to the environment. (AF-9)
5

6 **Comment:** Shortly after the Oconee Plant was relicensed, they found these initiation and
7 growth of significant cracks in PWR Alloy 600 weldments, apparently at growth rates that are
8 faster than previously modeled. So this represents what Dave Lockbaum, who's a nuclear
9 scientist, nuclear engineer with the Union of Concerned Scientists, said that the aging failures
10 that have occurred in the last few years indicate beyond a reasonable doubt that the aging
11 management programs in support of relicensing are inadequate because they are not
12 preventing equipment failures, such as the DC Summer hot leg nozzle to pipe weld crack that
13 had some potential generic issues, such as they found that they were due to extensive weld
14 repairs during construction occurred on those areas. It added stress to those. (Q-6)
15

16 **Comment:** Correct assessment of reactor vessel integrity. The reactor is currently limited to
17 200 refuelings, i.e. cycles of heating and cooling. It is subjected to the stress of internal
18 pressure and to stresses due to the thermal gradients from inside to outside making for a
19 differential in thermal expansion. Fatigue is the term used to characterize the losses of tensile
20 properties due to repeated cycles of stress. Tensile property losses are also caused by
21 irradiation from the reactor fuel. Coupons of the reactor metal are placed inside the reactor to
22 monitor tensile property losses. But they are not subject to stress fatigue. As a result they do
23 not accurately reflect the tensile properties of the fatigue-subjected reactor. (AG-1)
24

25 **Comment:** The reactor stud bolts are exposed to greater stress than the reactor vessel. Are
26 they replaced at refuelings? Are they the same material as the vessel? On what evidence are
27 the tensile properties of the stud bolts based? (AG-2)
28

29 **Response:** *The comments are noted. The NRC's environmental review is confined to*
30 *environmental matters relevant to the extended period of operation requested by the applicant.*
31 *To the extent that the comments pertain to safety of equipment and aging within the scope of*
32 *license renewal, these issues will be addressed during the parallel safety analysis review*
33 *performed under 10 CFR Part 54. Operational safety issues are outside the scope of 10 CFR*
34 *Part 51 and will not be evaluated further in the SEIS. The comments provide no new*
35 *information and, therefore, will not be evaluated further in the context of the environmental*
36 *review. However, the comments will be forwarded to the project manager for the license*
37 *renewal safety review for consideration.*
38

Appendix A

1 **Part II - Comments Received on the Draft SEIS**

2

3 (Reserved for comments received on the draft SEIS.)

Appendix B

Contributors to the Supplement

Appendix B

Contributors to the Supplement

1 The overall responsibility for the preparation of this supplement was assigned to the Office of
2 Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission (NRC). The statement was
3 prepared by members of the Office of Nuclear Reactor Regulation with assistance from other
4 NRC organizations and the Pacific Northwest National Laboratory, Lawrence Livermore
5 National Laboratory, Los Alamos National Laboratory, and Argonne National Laboratory.

Name	Affiliation	Function or Expertise
NUCLEAR REGULATORY COMMISSION		
John Tappert	Nuclear Reactor Regulation	Section Chief
James Wilson	Nuclear Reactor Regulation	Project Manager
Barry Zalzman	Nuclear Reactor Regulation	Technical Monitor
Gregory Suber	Nuclear Reactor Regulation	Environmental Engineer
Duke Wheeler	Nuclear Reactor Regulation	Project Management
Robert Schaaf	Nuclear Reactor Regulation	Project Management
Stacey Fox	Nuclear Reactor Regulation	Environmental Engineer
Robert Palla	Nuclear Reactor Regulation	Severe Accident Mitigation Alternatives
Richard Emch	Nuclear Reactor Regulation	Radiological Safety
PACIFIC NORTHWEST NATIONAL LABORATORY^(a)		
Mary Ann Parkhurst		Task Leader
Daniel Tano		Deputy Task Leader
Bill Sandusky		Air Quality
Mary Ann Parkhurst		Radiation Protection
John Jaksch		Socioeconomics
Paul Nickens		Cultural Resources
Lance Vail		Water Use, Hydrology
Cary Counts		Technical Editor
Debora Schulz, Jean Cheyney, Lisa Smith, Colleen Warnecke		Document Design
Lawrence Livermore National Laboratory^(b)		
Tina Carlsen		Aquatic Ecology
Los Alamos National Laboratory^(c)		
Ted Doerr		Terrestrial Ecology
Argonne National Laboratory^(d)		
Bill Metz		Land Use

Appendix B

1	Energy Research, Inc.	
2	Mohsen Khatib-Rahbar	Severe Accident Mitigation Alternatives
3	Michael Zavisca	Severe Accident Mitigation Alternatives
4	Information Systems Laboratory	
5	Kim Green	Severe Accident Mitigation Alternatives
6	Jim Meyer	Severe Accident Mitigation Alternatives
7	(a) Pacific Northwest National Laboratory is operated for the U.S. Department of Energy (DOE) by Battelle	
8	Memorial Institute.	
9	(b) Lawrence Livermore National Laboratory is operated for DOE by the University of California.	
10	(c) Los Alamos National Laboratory is operated for DOE by the University of California.	
11	(d) Argonne National Laboratory is operated for the DOE by the University of Chicago.	
12		
13		

Appendix C

Chronology of NRC Staff Environmental Review Correspondence Related to Duke Energy Corporation's Application for License Renewal of Catawba Nuclear Station, Units 1 and 2

Appendix C

Chronology of NRC Staff Environmental Review Correspondence Related to Duke Energy Corporation's Application for License Renewal of Catawba Nuclear Station, Units 1 and 2

This appendix contains a chronological listing of correspondence between the NRC and Duke Energy Corporation (Duke) and other correspondence related to the NRC staff's environmental review, under 10 CFR Part 51, of Duke's application for renewal of the Catawba Nuclear Station, Units 1 and 2 operation licenses. All documents, with the exception of those containing proprietary information, have been placed in the Commission's Public Document Room, at One White Flint North, 15555 Rockville Pike, Rockville, Maryland, and are available electronically from the Public Electronic Reading Room found on the Internet at the following net address: <http://www.nrc.gov/NRC/Adams/index.html>. From this site, the public can gain access to the NRC's Agency wide Document Access and Management Systems (ADAMS) which provides text and image files of NRC's public documents in the Publicly Available Records component of ADAMS. The ADAMS accession numbers for each document are included below.

- | | |
|--------------------|--|
| June 12, 2001 | Letter from NRC to Mr. David Lyon, York County Library System, regarding Maintenance of Documents at the Former Catawba Local public Document Room Related to Application by Duke Energy for License Renewal of Catawba Nuclear Station, Units 1 and 2, for an Additional 20 Years (Accession No. ML011660168) |
| June 13, 2001 | Letter from Duke to NRC forwarding application to renew the operating licenses of McGuire Nuclear Station, Units 1 and 2 and Catawba Nuclear Station, Units 1 and 2. (Accession No. ML011660138) |
| August 15, 2001 | Letter from NRC to Duke forwarding Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding an Application from Duke Energy Corporation for Renewal of the Operating Licenses for McGuire, Units 1 and 2 and Catawba, Units 1 and 2 (Accession No. ML012270107) |
| September 14, 2001 | Letter from NRC to Duke forwarding Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process for Catawba (Accession No. ML012570124) |

1 February 8, 2002 Duke Energy Corporation's response to request for additional information
2 dated December 12, 2001, related to the staff's review of the
3 environmental report for license renewal at Catawba Nuclear Station,
4 Units 1 and 2. (Accession No. ML020450547)
5
6 March 14, 2002 Note to File: Information Provided by Duke Energy Corporation related to
7 Severe Accident Mitigation Alternatives in its License Renewal Application
8 for the Catawba Nuclear Station, Units 1 and 2 (Accession No.
9 ML020740179)
10
11 March 27, 2002 Scoping Summary Report for supplemental environmental impact
12 statement for Catawba license renewal. (Accession No. ML020870376)
13

Appendix D

Organizations Contacted

Appendix D

Organizations Contacted

1 During the course of the staff's independent review of environmental impacts from operations
2 during the renewal term, the following Federal, State, regional, and local agencies were
3 contacted:

4
5 Catawba Cultural Preservation Project, Rock Hill, South Carolina

6
7 Catawba Indian Nation Cultural Preservation Project, Rock Hill, South Carolina

8
9 Catawba Regional Planning Council, Rock Hill, South Carolina

10
11 Centralina Council of Governments, Charlotte, South Carolina

12
13 County Administrator, York, South Carolina

14
15 County Auditor, York, South Carolina

16
17 Historical Center of York County, York, South Carolina

18
19 Lake Wylie Chamber of Commerce, Lake Wylie, South Carolina

20
21 Museum of York County, Rock Hill, South Carolina

22
23 Salvation Army, Rock Hill, South Carolina

24
25 South Carolina Department of Archives and History, Columbia, South Carolina

26
27 South Carolina Department of Natural Resources, Rock Hill, South Carolina

28
29 South Carolina Institute of Archaeology and Anthropology, Columbia, South Carolina

30
31 South Carolina State Archaeologist, Columbia, South Carolina

32
33 South Carolina State Historic Preservation Officer, Columbia, South Carolina

34
35 Tuttle Real Estate, Rock Hill, South Carolina

36
37 U.S. Fish and Wildlife Service, Charleston, South Carolina

38
39 U.S. Fish and Wildlife Service, Asheville, North Carolina

Appendix D

- 1 York Chamber of Commerce, Rock Hill, South Carolina
- 2
- 3 York County Economic Development, Fort Mill, South Carolina
- 4
- 5 York County Extension Agents, York, South Carolina
- 6
- 7 York County Historical Commission, York, South Carolina
- 8
- 9 York County Planning Department, Rock Hill South Carolina

Appendix E

**Duke Energy Corporation's Compliance Status and
Consultation Correspondence**

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Appendix E

Duke Energy Corporation's Compliance Status and Consultation Correspondence

The list of licenses, permits, consultations, and other approvals obtained from Federal, State, regional, and local authorities for Catawba Nuclear Station, Units 1 and 2 (Catawba) are shown in Table E-1. Following Table E-1 are reproductions of correspondence prepared and sent during the evaluation process of the application for renewal of the operating licenses for Catawba.

Table E-1. Federal, State, Local, and Regional Licenses, Permits, Consultations, and Other Approvals for Catawba Units 1 and 2

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NRC	10 CFR Part 50	Operating license, Catawba Unit 1	NPF-35	01/17/85	01/17/25	Authorizes operation of Unit 1
NRC	10 CFR Part 50	Operating license, Catawba Unit 2	NPF-52	05/15/86	05/15/26	Authorizes operation of Unit 2
FWS	Endangered Species Act	Consultation				FWS letter included in Appendix (pp E-4 to E-7).
FWS	Migratory Bird Treaty Act (16 U.S.C. 703-712)	Permit	DPRD 757484	Annual	Annual	Depredation permit. Renewed annually.
SHPO	Section 106 of the National Historic Preservation Act (16 U.S.C. 470f)	Consultation	Letter from Nancy Brock, Coordinator, Review and Compliance Programs, South Carolina Department of Archives and History 05/30/00	05/30/00	None	The National Historic Preservation Act requires Federal agencies to take into account the effect of any undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. The South Carolina State Department of Archives & History determined that the renewal of the Catawba OLs should not have an effect on National Register eligible or listed properties.
SCDHEC	Clean Water Act, Section 402	NPDES stormwater permit	SCR003773	06/01/01	01/31/03	In compliance.
SCDHEC	Clean Water Act, Section 402	NPDES wastewater permit	SC0004278	04/30/01	04/30/06	In compliance.
SCDHEC	RCRA, Section 3010	EPA identification number for generation and storage of hazardous waste	SCD070619796	01/17/85	Annual	EPA ID issues at the opening of the facility and remains with site for life of station. Annual operating fee submitted to SCDHEC. In compliance.
SCDHEC	RCRA Subtitle IX	Underground storage tank permit	R-46-NN-09244	Annual	Annual	Renewed annually. In compliance.

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Appendix E

May 2002

Table E.1. (contd)

Appendix E

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
SCDHEC	RCRA Subtitle D	Landfill permit	463303-1601	Prior to 1989	Under Revision	Issued prior to 1989. The permit is currently under revision with SCDHEC. In compliance.
SCDHEC	40 CFR 61, Subpart M	Asbestos non-scheduled removal permit	8044	Annual	Annual	The non-scheduled asbestos permits are annual permits - 1/1 through 12/31. In compliance.
SCDHEC	Clean Air Act	Air emissions and operating permits	2440-0070	01/3/01	12/31/05	In compliance.

CFR = Code of Federal Regulations
 EPA = U.S. Environmental Protection Agency
 FWS = U.S. Fish and Wildlife Service
 SCDHEC = South Carolina Department of Health and Environmental Control
 NPDES = National Pollution Discharge Elimination System
 NRC = U.S. Nuclear Regulatory Commission.
 RCRA = Resource Conservation and Recovery Act
 SHPO = South Carolina State Historic Preservation Office
 U.S.C. = United States Code

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E-3



United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

February 12, 2002

Ms. Cynthia A. Carpenter, Chief
Risk Informed Initiatives, Environmental
Decommissioning, and Rulemaking Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Request for List of Protected Species within the Area Under Evaluation for the Catawba
Nuclear Station License Renewal
FWS Log No. 4-6-02-122

Dear Ms. Carpenter:

We have reviewed the information received December 26, 2001 concerning the above-referenced project. The following comments are provided in accordance with section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531-1543).

Per your request, we are providing a list of the federally endangered (E) and threatened (T) and candidate (C) species which potentially occur in Cherokee, Chester, Lancaster, and York counties, South Carolina and Gaston and Mocklenburg counties, North Carolina to aid you in determining the impacts your project may have on protected species. The list also includes species of concern under review by the Service. Species of concern (SC) are not legally protected under the Endangered Species Act, and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as endangered/threatened. We are including these species in our response for the purpose of giving you advance notification. These species may be listed in the future, at which time they will be protected under the Endangered Species Act. Therefore, it would be prudent for you to consider these species early in project planning to avoid any adverse effects.

In-house surveys should be conducted by comparing the habitat requirements for the attached listed species with available habitat types at the project site. Field surveys for the species should be performed if habitat requirements overlap with that available at the project site. Surveys for protected plant species must be conducted by a qualified biologist during the flowering or

This is your future. Don't leave it blank. - Support the 2000 Census.

fruiting period(s) of the species. Surveys for the red-cockaded woodpecker should be conducted in accordance with the "Guidelines for preparation of biological assessments and evaluations for the red-cockaded woodpecker" by Gary Henry. A copy of these guidelines is available from this office. Please notify this office with the results of any surveys for the attached list of species and an analysis of the "effects of the action," as defined by 50 CFR 402.02 on any listed species including consideration of direct, indirect, and cumulative effects.

Please keep this office apprised of the progress on this project. If you have any questions please contact Ms. Lori Duncan of my staff at (843) 727-4707 ext. 21. In future correspondence concerning the project, please reference FWS Log No. 4-6-02-122.

Sincerely yours,



Roger L. Banks
Field Supervisor

RLB/LWD

**South Carolina Distribution Records of
Endangered, Threatened, Candidate and Species of Concern
February 7, 2002**

E	Federally endangered
T	Federally threatened
P	Proposed in the Federal Register
CH	Critical Habitat
C	The U.S. Fish and Wildlife Service or the National Marine Fisheries Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species
S/A	Federally protected due to similarity of appearance to a listed species
SC	Federal Species of concern. These species are rare or limited in distribution but are not currently legally protected under the Endangered Species Act.

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated continually and may be different from the following.

<u>County</u>	<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Cherokee	Dwarf-flowered heartleaf	<i>Hexastylis naniflora</i>	T
	Georgia aster	<i>Aster georgianus</i>	C
	Southeastern myotis	<i>Myotis austroriparius</i>	SC
Chester	Bald eagle	<i>Haliaeetus leucocephalus</i>	T
	Red-cockaded woodpecker	<i>Picoides borealis</i>	E
	Georgia aster	<i>Aster georgianus</i>	C
	Shoals spider-lily	<i>Hymenocallis coronaria</i>	SC
Lancaster	Carolina heelsplitter	<i>Lasmigona decorata</i>	E
	Little amphianthus	<i>Amphianthus pusillus</i>	T
	Smooth coneflower	<i>Echinacea laevigata</i>	E
	Schweinitz's sunflower	<i>Helianthus schweinitzii</i>	E
	Black-spored quillwort	<i>Isoetes melanospora</i>	E
	Brook floater	<i>Alasmidonta varicosa</i>	SC
	Shoals spider-lily	<i>Hymenocallis coronaria</i>	SC
York	Bald eagle	<i>Haliaeetus leucocephalus</i>	T
	Little amphianthus	<i>Amphianthus pusillus</i>	T
	Schweinitz' sunflower	<i>Helianthus schweinitzii</i>	E
	Dwarf-flowered heartleaf	<i>Hexastylis naniflora</i>	T
	Georgia aster	<i>Aster georgianus</i>	C
	Carolina darter	<i>Etheostoma collis</i>	SC
	Shoals spider-lily	<i>Hymenocallis coronaria</i>	SC
	Sun-facing coneflower	<i>Rudbeckia heliopsisidis</i>	SC

Gaston

Bog turtle	<i>Clemmys muhlenbergii</i>	T(S/A)
Bald eagle	<i>Haliaeetus leucocephalus</i>	T
Georgia aster	<i>Aster georgianus</i>	C
Schweinitz's sunflower	<i>Helianthus schweinitzii</i>	E

Mecklenburg

Bald eagle	<i>Haliaeetus leucocephalus</i>	T
Carolina heelsplitter	<i>Lasmigona decorata</i>	E
Smooth coneflower	<i>Echinacea laevigata</i>	E
Schweinitz's sunflower	<i>Helianthus schweinitzii</i>	E
Michaux's sumac	<i>Rhus michauxii</i>	E
Georgia aster	<i>Aster georgianus</i>	C
Carolina darter	<i>Etheostoma collis collis</i>	SC
Tall larkspur	<i>Delphinium exaltatum</i>	SC
Virginia quillwort	<i>Isoetes virginica</i>	SC
Heller's trefoil	<i>Lotus helleri</i>	SC

Appendix F

GEIS Environmental Issues Not Applicable to Catawba Nuclear Station, Units 1 and 2

Appendix F

GEIS Environmental Issues Not Applicable to Catawba Nuclear Station, Units 1 and 2

1 Table F-1 lists those environmental issues listed in the *Generic Environmental Impact*
2 *Statement for License Renewal of Nuclear Plants (GEIS)* (NRC 1996; 1999)^(a) and 10 CFR
3 Part 51, Subpart A, Appendix B, Table B-1, that are not applicable to Catawba Nuclear Station,
4 Units 1 and 2, (Catawba) because of plant or site characteristics.

5
6 **Table F-1. GEIS Environmental Issues Not Applicable to Catawba**

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
SURFACE WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)			
Altered salinity gradients	1	4.2.1.2.2 4.4.2.2	Catawba discharges into fresh water, not into and estuary.
Water-use conflicts (plants with once- through cooling systems)	1	4.2.1.3	Catawba uses cooling towers rather than once-through cooling.
AQUATIC ECOLOGY (FOR PLANTS WITH ONCE-THROUGH AND COOLING POND HEAT DISSIPATION SYSTEMS)			
Entrainment of fish and shellfish in early life stages	2	4.3.3	Catawba uses cooling towers rather than once-through cooling.
Impingement of fish and shellfish	2	4.3.3	Catawba uses cooling towers rather than once-through cooling.
Heat Shock	2	4.3.3	Catawba uses cooling towers rather than once-through cooling.

(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.

Appendix F

Table F.1. (contd)

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
GROUNDWATER USE AND QUALITY			
Groundwater-use conflicts (potable and service water, and dewatering; plants that use >100gpm)	2	4.8.1.1 4.8.1.2	Groundwater consumption at Catawba is <100 gpm
Groundwater-use conflicts (Ranney wells)	2	4.8.1.4	Catawba does not use Ranney wells.
Groundwater quality degradation (Ranney wells)	1	4.8.2.2	Catawba does not use Ranney wells.
Groundwater quality degradation (saltwater intrusion)	1	4.8.2.1	Not applicable due to the location of Catawba.
Groundwater quality degradation (cooling ponds in salt marshes)	1	4.8.3	Not applicable due to the location of Catawba.
Groundwater quality degradation (cooling ponds at inland sites)	2	4.8.3	Catawba does not use a cooling pond heat dissipation system.
TERRESTRIAL RESOURCES			
Cooling pond impacts on terrestrial resources	1	4.4.4	Catawba does not use cooling ponds.

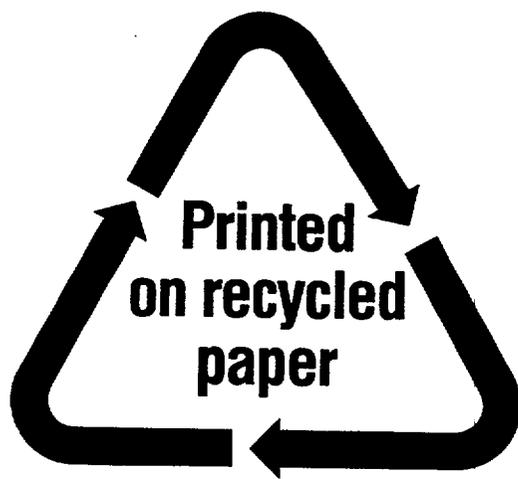
F.1 References

10 CFR 51. Code of Federal Regulations, *Title 10, Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

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

U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Main Report*, NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

NRC FORM 335 (2-89) NRCM 1102, 3201, 3202	U.S. NUCLEAR REGULATORY COMMISSION BIBLIOGRAPHIC DATA SHEET <i>(See instructions on the reverse)</i>	1. REPORT NUMBER (Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.) NUREG-1437, Supplement 9			
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11. ABSTRACT <i>(200 words or less)</i> <p>This draft supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted to the Nuclear Regulatory Commission (NRC) by Duke Energy Corporation (Duke) to renew the operating licenses for Catawba Nuclear Station, Units 1 and 2, for up to an additional 20 years under 10 CFR Part 54. The SEIS includes the staff's preliminary analysis that considers and weighs the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse impacts. It also includes the staff's preliminary recommendations regarding the proposed action.</p> <p>The staff's preliminary recommendation is that the Commission determine that the adverse environmental impacts of license renewal for Catawba Units 1 and 2 are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable. This preliminary recommendation is based on the analysis and findings in the Generic Environmental Impact Statement (NUREG-1437), the Environmental Report submitted by Duke, consultation with other Federal, State, and local agencies, the staff's own independent review, and the staff's consideration of public comments received during the scoping period for this review.</p>					
12. KEY WORDS/DESCRIPTORS <i>(List words or phrases that will assist researchers in locating the report.)</i> License Renewal National Environmental Policy Act NEPA Catawba Catawba Nuclear Station, Units 1 and 2 Supplement to the Generic Environmental Statement	13. AVAILABILITY STATEMENT unlimited <hr/> 14. SECURITY CLASSIFICATION <i>(This Page)</i> unclassified <hr/> <i>(This Report)</i> unclassified <hr/> 15. NUMBER OF PAGES <hr/> 16. PRICE				



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