CHAPTER 10, PROPOSED ACTION CONSEQUENCES

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CHAPTER 10, PROPOSED ACTION CONSEQUENCES

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10.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

This chapter presents the potential environmental consequences of constructing and operating VCSNS Units 2 and 3 at the site. The environmental consequences are evaluated in the following five sections:

- Unavoidable adverse environmental impacts of construction and operations (Section 10.1)
- Irreversible and irretrievable commitments of resources (Section 10.2)
- Relationship between short-term uses and long-term productivity of the human environment (Section 10.3)
- Benefit-cost balance (Section 10.4)
- Cumulative impacts (Section 10.5)

10.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable adverse impacts are predicted adverse environmental impacts that remain after all practical mitigation measures have been taken. This section considers unavoidable adverse impacts from construction and operation of the two AP1000 reactors and new transmission lines constructed in new transmission corridors.

10.1.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS OF CONSTRUCTION

Construction impacts are described in detail in Chapter 4. Table 4.6-1 briefly summarizes those impacts and identifies the measures and controls that would be implemented to reduce or eliminate impacts. The expected impacts and the mitigation measures available to reduce these impacts include compliance with regulations, permit conditions, and other requirements; best management practices; and condition-specific actions that are summarized in Table 10.1-1. Some mitigation measures that would be applied are referred to as “best management practices.” Typically, these mitigation measures are based on the types of activities that are to be performed. The mitigation measures are frequently implemented through plans and procedures developed for construction activities.

Unavoidable adverse impacts would occur from construction of Units 2 and 3 and construction of new transmission lines. Construction of the new units would have impacts such as loss of forested habitat and temporary degradation of water quality at the Monticello and Parr Reservoirs. Impacts, with the exception of socioeconomic ones that are primarily beneficial and affect the four-county region of influence (Fairfield, Lexington, Newberry, and Richland), would occur in Fairfield County. The construction of new transmission lines would extend beyond the four-county region and areas could experience localized, MODERATE impacts including loss of wooded habitat and wildlife, disturbances at stream crossings, and increased noise, fugitive dust, and emissions from construction equipment. The selection of transmission corridors would be guided by a siting study that takes into account environmental impacts and input from various federal and state agencies.

As presented in Chapter 4 and Table 10.1-1, the unavoidable adverse impacts from construction would include the removal of 434 acres of pine forest and hardwoods, concomitant loss or displacement of animals, sediment loading in waterbodies, additional traffic on local roads, and an increase in noise, fugitive dust, and air pollution from exhaust emissions from commuting vehicles and construction equipment. The impacts, other than socioeconomic, from the construction of new units would be SMALL. The traffic impact on local roads in Fairfield and Newberry Counties would be MODERATE to LARGE and would be mitigated by a construction management traffic plan developed before the start of construction.

10.1.2 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS OF OPERATIONS

Operational impacts of new units are discussed in detail in Chapter 5. Table 5.10-1 briefly describes those impacts and identifies measures and controls that would be implemented to reduce or eliminate adverse impacts. The expected impacts and the mitigation measures that are available to reduce these impacts are summarized in Table 10.1-2. Unavoidable adverse impacts from operations of Units 2 and 3 include evaporative water loss from the Monticello Reservoir, small liquid and gaseous radiological emissions, radioactive and nonradioactive waste to be treated and disposed of, increases in local traffic, and the addition of cooling towers, intake structures on the Monticello Reservoir, and a discharge structure on the Parr Reservoir to the landscape.

The level of unavoidable adverse impacts from operation of the new units would be SMALL when applicable mitigation measures are considered, except the impact of increased traffic on the local roads would be SMALL to MODERATE.

10.1.3 SUMMARY OF UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS FROM CONSTRUCTION AND OPERATIONS

As can be seen from Tables 10.1-1 and 10.1-2, most of the adverse environmental impacts associated with the construction and operation of Units 2 and 3 would be reduced to SMALL through the application of mitigation measures. The unavoidable impacts expected to result in MODERATE impacts are summarized below.

Land use impacts from construction of new transmission corridors would be SMALL to MODERATE. The land would be cleared, and after construction, allowed to revegetate in grasses, forbs, and low shrubs. Land use would be converted from forestry, agriculture, or other uses to scrub/shrub or grassland communities to support electricity transmission and maintenance of the transmission lines.

Most of the socioeconomic impacts are beneficial or SMALL. The socioeconomic impact that is adverse and is MODERATE is increased traffic on the local roads in Fairfield and Newberry Counties. This level of impact is expected for both construction and operations. Traffic congestion would be mitigated by traffic control plans during normal operations and staggering outage schedules and shifts to minimize additions to the number of vehicles arriving at VCSNS at a given time.

Table 10.1-1 (Sheet 1 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Land Use	Approximately 500 acres would be cleared during construction, including a loss of approximately 434 acres of pine and hardwoods. Land would not be available for other uses.	Implement storm water management systems, groundwater monitoring wells, and spill containment controls. Permanently disturbed locations would be stabilized and contoured in accordance with design specifications. Follow South Carolina Storm Water Management Best Management Practices handbook and industry guidance. Locate all structures except for intake and discharge structures outside of 500-year floodplains. Restrict construction activities to the Construction and Operating License site. Incorporate recommendations of federal and state agencies including South Carolina Department of Health and Environmental Control (SCDHEC), South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Archives and History (SHPO), U.S. EPA, U.S. Fish & Wildlife Service.	Approximately 240 acres of land would be occupied on a long-term basis by the two units and associated infrastructure.
	Construction of transmission lines in new corridors across 10 counties in South Carolina.	Conduct siting study that takes into account environmental impacts. Incorporate recommendations of federal and state agencies into route selections including the recommendations of the SCDHEC, SCDNR, South Carolina Department of Archives and History (SHPO), U.S. EPA, U.S. Fish & Wildlife Service, U.S. Army Corps of Engineers.	Land use on some of the land would change. Transmission corridors crossing forest would change from woodland to open scrub or grassland.

Table 10.1-1 (Sheet 2 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Land Use (continued)		Site new corridors to avoid critical or sensitive habitats or species as much as possible. Restrict construction activities to transmission corridors and access roads. Restrict sites of access to corridors. Before site disturbance, conduct archaeological and ecological surveys and determine site-specific erosion control measures. Comply with applicable laws, regulations, permits, sound engineering, environmental management, and construction practices.	
	Ground-disturbing activities at the VCSNS site and transmission corridors have the potential to disturb unknown historic, archaeological, or paleontological resources.	Select transmission routes to avoid historical properties. Consult South Carolina Department of Archives and History (SHPO). Before site disturbance, conduct archaeological surveys. Develop and implement procedure for construction activities that includes actions to protect cultural, historic, or paleontological resources.	No unavoidable adverse impacts
	Construction debris would be disposed in offsite landfills.	Implement waste minimization program.	Landfill space would be consumed for disposal of construction debris from VCSNS and not available for landfilling of other wastes.
Hydrologic and Water Use	Construction would require up to 420 gallons of water per minute from Monticello Reservoir.	Continue conducting hydrological monitoring (level measurements) to determine baseline hydrological conditions (groundwater levels, flow paths, and gradients) and detect changes.	Consumption of surface water for construction activities

Table 10.1-1 (Sheet 3 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Hydrologic and Water Use (continued)	Management of water from dewatering of excavation areas	Install drainage system to divert dewatering runoff to settling basin before discharge through a permitted NPDES outfall. Follow best management practices for erosion control.	No unavoidable adverse impact
	Land clearing, excavation, and grading associated with facilities, supporting infrastructure, and transmission corridors resulting in sediment loading. Construction of intake and discharge structures and potential dredging would increase turbidity . Potential minor spills of petroleum products.	Use best management practices, including structural (*e.g.*, silt fences and sediment retention basins) and operational controls, to prevent movement of pollutants (including sediments) into wetlands and water bodies. Develop erosion, sedimentation, and pollution control plans. Obtain and comply with storm water permit; conduct monitoring as required by the permit. Develop and comply with approved Storm Water Pollution Prevention Plan. Obtain state (including NPDES) and U.S. Army Corps of Engineers permits and comply with permit requirements. Conduct shoreline construction, when pool level of Parr Reservoir is low, to the extent practicable. Quickly clean up any spilled fuel or oil. Before site disturbance at new transmission corridors, determine site-specific erosion control measures. Follow South Carolina storm water management Best Management Practices handbook and industry guidance. Install storm water drainage system and stabilize disturbed soils.	Temporary degradation of water quality due to sediment loading.

Table 10.1-1 (Sheet 4 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Aquatic Ecology	Permanent loss of less than one acre of aquatic habitat. Temporarily degraded aquatic habitat due to sediment loading. Potential impact to surface water from petroleum/solvent spills.	Prepare and implement Spill Prevention Control and Countermeasure Plan for construction activities. Restrict activities using petroleum products and solvents to designated areas that are equipped with spill containment. Install cofferdam and store excavated sediment and soils in spoils area designed to prevent loading in wetlands and watercourses, use storm water retention basins as needed; reseeding of spoils area after construction. Develop and implement a construction Storm Water Pollution Prevention Plan; conduct monitoring as required by the stormwater general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, re-seed the areas. Follow South Carolina Forestry Commission Best Management Practices manual and SCDHEC handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance.	Permanent loss of less than one acre of aquatic habitat.

Table 10.1-1 (Sheet 5 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Aquatic Ecology (continued)		Avoid wetlands and water bodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and waterbodies that must be crossed; use equipment specifically designed for work around wetlands and streams, install erosion controls, and implement best management practices to minimize impacts to aquatic ecosystems. Before transmission line construction, conduct ecological surveys and determine site-specific erosion control measures. If there is potential for construction of a new transmission line to degrade habitat of a listed aquatic species, work closely with the state agency to develop a construction schedule and construction techniques that are protective of the habitat and species in question.	
Terrestrial Ecology	Habitat loss, but no threatened or endangered plants or animals are on the site or within one mile of construction area. Displacement of animals from the construction site. Loss of less mobile individual animals. Potential degradation of wetlands located on the cooling tower construction site and access road.	Land clearing would be conducted according to federal and state regulations and permits, SCE&G procedures, good construction practices, and established best management practices. Schedule equipment maintenance procedures to minimize emission and spills. Minimize fugitive dust by watering. Implement construction practices to reduce wetlands impacts due to construction activities at or affecting the cooling tower and Mayo Creek bridge construction sites. Additional mitigation measures related to wetlands would be determined through the Clean Water Act Section 404 permitting process.	Permanent loss of approximately one acre of wetlands.

Table 10.1-1 (Sheet 6 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Socioeconomics	Temporary and localized noise, fugitive dust, and exhaust emissions during construction	Train and appropriately protect construction workers to reduce the risk of potential exposure to noise, dust and exhaust emissions. Make public announcements or prior notification of atypically loud construction activities. Regularly inspect and maintain equipment to include exhaust and noise aspects. Phase construction to minimize daily emissions. Restrict extreme noise-related activities (*e.g.*, blasting, steam blows) to daylight hours. Restrict delivery times to daylight hours. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc.	Temporary and localized noise, fugitive dust, and exhaust emissions during construction.
	Construction workers could experience occupational illnesses, injuries, or death	Train contractors on safety requirements. Require construction contractors and subcontractors to develop and implement safety procedures. Provide onsite services for emergency first aid; conduct regular health and safety monitoring.	No unavoidable adverse impact.

Table 10.1-1 (Sheet 7 of 7)
Construction-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Environmental Impact
Socioeconomics (continued)	Increased traffic on local roads in Fairfield and Newberry Counties, approaching and exceeding capacity.	Develop construction management traffic plan before the start of construction. Provide island and turning lanes at intersection of access road/Parr Road and SC 213 to facilitate access to and from SC 213. Post signs near construction entrances and exits to make the public aware of potentially high construction traffic areas.	Increased traffic on local roads.
Radiological	Construction workers exposed to small doses of radiation from the existing unit.	No mitigation measures required. Estimated radiation exposure would be well below all limits including annual dose to members of the public.	Small dose to construction workers.
Atmospheric and Meteorological	Temporary and localized noise, fugitive dust, and exhaust emissions during construction.	Regularly inspect and maintain equipment. Phase construction to minimize daily emissions. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc.	Temporary and localized noise, fugitive dust, and exhaust emissions during construction.
Environmental Justice	No disproportionately high or adverse impacts to minority or low-income populations were identified.	No mitigation would be required.	No unavoidable adverse impact.

SCDHEC (South Carolina Department of Health and Environmental Control)
SHPO (State Historic Preservation Office)

Table 10.1-2 (Sheet 1 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Land Use	Land use would be changed to generation and transmission of electricity, precluding the land at the VCSNS site and within the transmission corridors from being developed as residential or industrial properties.	No mitigation would be required.	Approximately 240 acres of land would be occupied on a long-term basis by the two units and associated infrastructure.
	Deposition of low concentrations of solids on SCE&G property from operation of the cooling towers.	No mitigation would be required.	No unavoidable adverse impact.
	Generation of nonradioactive and low-level radioactive waste that would require disposal in offsite permitted facilities. Generation of spent fuel requiring disposal in a geologic repository.	Implement waste minimization plan.	Landfill space would be consumed for disposal of radioactive and nonradioactive wastes from VCSNS and not available for landfilling of other wastes. Repository capacity would be consumed by disposal of spent fuel.
	Potential to impact identified cultural resources. Potential for unidentified sites within the site boundary.	Continue to have a fence barrier around Pearson Cemetery. Conduct earth-disturbing activities under existing procedures that prescribe actions to be taken in the event that significant archaeological or paleontological artifacts are encountered.	No unavoidable adverse impact.
	Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.	No mitigation would be required.	Permanent commitment of 17 acres of land per year for each AP1000 unit.

Table 10.1-2 (Sheet 2 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Hydrologic and Water Use	Makeup water would be withdrawn from Monticello Reservoir at a rate of approximately 37,200 gpm during normal operations to 61,800 gpm during maximum operations and at a velocity of less than 0.5 foot per second. Water would be withdrawn from Monticello Reservoir to meet potable water needs.	Design and operate intake structures based on best technology available.	The consumptive loss of water is projected to be 27,800 gpm during normal operations and 31,100 gpm during maximum use operations. Withdrawal would physically affect much less than 2.92 acres (the maximum area of hydraulic influence from Unit 1) of Monticello Reservoir.
	Increase to total volume of water and chemical and other pollutants content in the NPDES permitted discharge. Increase in storm water discharge over current VCSNS volume Potential for minor spills of petroleum products.	Monitor constituent emissions as required by NPDES permit. Implement waste minization plan. Implement SCE&G's Spill Prevention, Control, and Countermeasure Plan. Conduct storm water monitoring as required by storm water permit. Continue voluntary monitoring program for water quality in Monticello Reservoir.	Discharges to surface waters within NPDES limits.
	Water consumption and discharges during fuel cycle activities.	No mitigation would be required.	Water loss from process cooling would be 210 million gallons per year for each AP1000 unit. Mine drainage discharges would be 170 million gallons per year for each AP1000 unit due to the fuel cycle.
Aquatic Ecology	Impingement of aquatic life on intake structures at Monticello Reservoir.	Use Best Technology Availability and withdrawal velocity of 0.5 foot per second or less.	Loss of small numbers (estimated to be less than that removed daily by fisherman and natural mortality rates) of abundantly occurring fish, none of which are endangered or threatened.

Table 10.1-2 (Sheet 3 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Aquatic Ecology (continued)	Discharge of heated water into Parr Reservoir. Discharge of solids and chemicals used for cooling tower water treatment into Parr Reservoir.	No mitigation would be required.	Discharge of waste heat and wastewater into Parr Reservoir affecting a small area in the immediate area of the discharge opening. Discharge velocity would result in minor bottom scour, causing local reduction in numbers of benthic organisms, but sediment is continually redeposited.
	Maintenance activities would be conducted in transmission corridors potentially at or near water bodies and wetlands and could potentially impact water quality and subsequently important species.	Implement existing procedures intended to prevent impacts to water quality and be protective of wetlands and stream crossings including restriction of heavy equipment to prevent erosion, use of approved herbicides only, and spill prevention practices when fueling or lubricating equipment.	No unavoidable adverse impacts.
Terrestrial Ecology	Maximum expected salt deposition rate from the combination of all four towers would be significantly less than the rate that is considered a threshold value for leaf damage in sensitive species.	No mitigation would be required.	No unavoidable adverse impacts.
	Noise level from cooling towers beyond 200 feet would not lead to significant incremental increases in noise level.	No mitigation would be required.	No unavoidable adverse impacts.
	Noise from low-flying aircraft conducting aerial surveys of and tree trimming in transmission corridors would temporarily disrupt animal behavior.	No mitigation would be required.	Temporary disruption of animal behavior.

Table 10.1-2 (Sheet 4 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Terrestrial Ecology (continued)	Vegetation growth in corridors would be kept in check, including eliminating woody growth, by periodic maintenance including mowing and applying herbicides.	Implement existing procedures for transmission line maintenance designed to protect flora and fauna. Train personnel in the handling of fuel and lubricants and the clean-up and reporting of any incidental spills. Have adequate spill response equipment on hand during maintenance activities in the corridors.	No unavoidable adverse impacts.
Socioeconomics	Cooling tower noise. Noise from switchyard. Intermittent noise from vehicles, diesel generators, and public address system.	Pave access roads and set speed limits for vehicle traffic to minimize noise impacts.	Low-level noise from cooling towers outside the immediate vicinity of the towers. Noise audible onsite and noise (*i.e.* public address system announcements and signals) potentially audible offsite.
	New transmission lines built in new corridors may induce shock in vehicles parked beneath lines. Transmission lines could emit corona-induced noise at very low or inaudible levels. New transmission lines could have visual impacts.	Build new transmission lines to national electrical standards to limit shock from induced currents.	No unavoidable adverse impacts.
	Roads in the vicinity would experience temporary increases in traffic at the beginning and end of the workday.	Before the start of Unit 2 operation, develop an operations management traffic plan. Stagger outage schedules to minimize traffic congestion.	Roads in the vicinity would experience temporary increases in traffic at the beginning and end of the workday.
	Air emissions would result from standby diesel generators.	No mitigation would be required.	No unavoidable adverse impacts

Table 10.1-2 (Sheet 5 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Socioeconomics (continued)	Intake and discharge structures would be visible from the reservoirs. Cooling tower plumes would be visible for some distance from VCSNS.	Minimize the visual impact of the structures through use of topography, design, materials, and color.	Intake and discharge structures would be visible from the reservoirs. Cooling tower plumes would be visible for some distance from VCSNS.
	Potential for occupational injuries and illnesses.	Implement existing SCE&G industrial safety program at Units 2 and 3.	No unavoidable adverse impacts.
	Consumption of fossil fuels during the fuel cycle process would be small relative to the power production.	No mitigation would be required.	Consumption of relatively small quantities of fossil fuels.
	Fuel cycle activities would have liquid discharges.	No mitigation would be required.	Liquid would be discharged within permit and regulatory limits.
Radiological	Small discharges of radioactive liquids and gases to the environment. Direct radiation would result in small increases at the site boundary.	Implement radiological monitoring program as required.	Small discharges of radioactive liquids and gases to the environment Direct radiation would result in small increases at the site boundary.
	Potential doses to the public from operations of Units 2 and 3 within regulatory limits of 40 CFR 190 Potential doses to the public and transportation workers from the transport of unirradiated fuel, spent fuel, and radiological waste from operations and decommissioning. Potential doses to the public from the mining and processing of uranium for the fuel cycle.	Conduct radiological monitoring program as required. Conduct meteorological monitoring.	Potential doses to the public that are well below regulatory limits.
	Potential doses to biota from liquid and gaseous effluents would be much less than the 100 mrad/day.	Conduct radiological monitoring program as required.	Potential doses to biota from liquid and gaseous effluents would be much less than the 100 mrad/day.

Table 10.1-2 (Sheet 6 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Radiological (continued)	Maximum annual occupational dose for Units 2 and 3 is expected to be similar to or less than that for Unit 1, which averaged 51 person-rem for the 2003 to 2005 period. Occupational doses to decommissioning workers would be comparable to those associated with refueling and plant maintenance.	Conduct radiological monitoring program as required.	Workers would receive small occupational dose.
	Expected annual generation of less than 17 cubic feet of liquid mixed waste and less than 7.5 cubic feet of solid mixed waste for each AP1000 unit.	Implement existing Unit 1 waste minimization practices at Units 2 and 3.	Radioactive waste would be generated.
	Expected annual generation of low-level radioactive waste of 5,760 cubic feet for each AP1000 unit. Volume to be shipped offsite for disposal reduced to 1,960 cubic feet per unit through onsite processing.	Implement existing Unit 1 waste minimization practices at Units 2 and 3.	Radioactive waste would be generated.
Atmospheric and Meteorological	Plumes from Units 2 and 3 cooling towers.	No mitigation would be required.	No unavoidable adverse impacts.
	Increase in air emissions from VCSNS primarily from auxiliary systems such as emergency diesel generators.	No mitigation would be required. All emissions would be within regulatory limits.	No unavoidable adverse impacts.
	Relatively small quantities of air pollutants would be result from the fuel cycle.	No mitigation would be required.	Relatively small quantities of air pollutants would be result from the fuel cycle and emissions would be within permit limits.

Table 10.1-2 (Sheet 7 of 7)
Operations-Related Unavoidable Adverse Environmental Impacts

Category	Adverse Impact	Mitigation Measure	Unavoidable Adverse Environmental Impact
Environmental Justice	SCE&G did not identify any location-dependent disproportionately high and adverse impacts affecting minority and low-income populations. No operations-related disproportionately high and adverse health or environmental effects impacting minority or low-income populations' health or welfare were found.	No mitigation would be required.	No unavoidable adverse impacts.

NPDES = National Pollutant Discharge Elimination System
SCDHEC = South Carolina Department of Environmental Control
SHPO = State Historic Preservation Office

10.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section describes the expected irreversible and irretrievable environmental resource commitments used in the construction and operation of VCSNS Units 2 and 3. The term “irreversible commitments of resources” describes environmental resources that would be potentially changed by the construction or operation of new units and that could not be restored at some later time to the resource’s state before construction or operation. Irretrievable resources are generally materials that would be used for the new units in such a way that they could not, by practical means, be recycled or restored for other uses. As described in Chapters 4 and 5, impact to each of these resources is SMALL.

10.2.1 IRREVERSIBLE COMMITMENTS OF RESOURCES

Irreversible commitments of environmental resources resulting from Units 2 and 3, in addition to the materials used for the nuclear fuel include:

10.2.1.1 Surface Water

Some of the cooling water taken from the Monticello Reservoir would be lost through evaporation. Because the resource use is consumptive, it would not be available for other uses.

10.2.1.2 Land Use

Land committed to the disposal of radioactive and nonradioactive wastes is committed to that use, and cannot be used for other purposes.

Once Units 2 and 3 cease operations and the plant is decommissioned in accordance with NRC requirements, the land that supports the facilities could be returned to other industrial or nonindustrial uses.

10.2.1.3 Aquatic and Terrestrial Biota

Construction would temporarily adversely affect the abundance and distribution of local flora and fauna on the VCSNS site. However, no significant effect on habitat or individual species is expected to occur. Similar impacts should occur on the new transmission corridors. Once construction is complete, flora and fauna would recover in areas that are not directly adjacent to or part of operations.

10.2.1.4 Releases to Air and Surface Water

Dust and other emissions such as vehicle exhaust would be released to the air during construction. During operations, vehicle exhaust emissions would continue and other air pollutants and chemicals including very low concentrations of radioactive gases and particulates would be released from the facility to the air and surface water. All the releases from Units 2 and 3 would be made in

accordance with duly issued permits and are not expected to measurably affect the resources.

10.2.2 IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irretrievable commitments of resources during construction of Units 2 and 3 generally would be similar to that of any major, multiyear construction project. Unlike the earlier nuclear plants, asbestos and other materials considered hazardous would not be used, or would be used sparingly and in accordance with safety regulations and practices. SCE&G estimates that, for a single AP1000 unit, which includes the reactor, turbine, annex, radiological waste, and diesel buildings, approximately the following quantities and materials would be needed:

- 75,000 cubic yards of concrete
- 11,000 tons of rebar
- 12,000 tons of steel

In addition, each AP1000 unit would require approximately 6,500,000 linear feet of cable and 137,500 feet of piping greater than 2.5 inches (U.S. DOE 2004). Small quantities of aluminum, boron, titanium, tungsten, uranium, and other natural resources would also be needed.

While the amounts of these materials required would be large, the amounts would not be atypical of those of other types of power plants such as hydroelectric and coal-fired plants, nor of many large industrial facilities (*e.g.*, refineries and manufacturing plants) that are constructed throughout the United States. Use of construction materials in the quantities associated with those expected for a nuclear power plant, while irretrievable unless they are recycled at decommissioning, would have a SMALL impact, with respect to the availability of such resources.

During operations, the main resources that are irreversibly and irretrievably committed are the uranium that is used in fuel and the energy required to create the fuel. The World Nuclear Association studies supply and demand of uranium and states that a 70-year supply of uranium is available based on known deposits and current usage. Exploration for uranium deposits has increased since 2005 and it is expected to continue and lead to greater supplies as the demand increases (World Nuclear Association 2007). Therefore, the uranium that would be used to generate power by Units 2 and 3, while irretrievable, would have a SMALL impact with respect to the long-term availability of uranium worldwide.

Other irretrievable commitments of resources include those materials used for the normal industrial operations of the plant that cannot be recovered or recycled or that are consumed or reduced to unrecoverable forms, including elemental materials that would become radioactive.

Section 10.2 References

1. U.S. DOE 2004, *Application of Advanced Construction Technologies to New Nuclear Power Plants,* MPR-2610, Revision 2, September 24. Published as part of *Study of Construction Technologies and Schedules, O&M Staffing and Cost, Decommissioning Costs and Funding Requirements for Advanced Reactor Designs*, prepared by Dominion Energy Inc., Bechtel Power Corporation, TLG, Inc., and MPR Associates under Contract DE-AT01-020NE23476, May 27, 2004.

2. World Nuclear Association 2005. *Supply of Uranium,* Available at http://www.world-nuclear.org/info/inf75.html, accessed May 16, 2007.

10.3 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE HUMAN ENVIRONMENT

This environmental report has focused on the analyses and resulting conclusions associated with the environmental and socioeconomic impacts arising from activities during the construction and operation of VCSNS Units 2 and 3. These activities are considered to be short-term uses for purposes of this section. In this section, the long term is considered to start with the conclusion of decommissioning of the new units at the VCSNS site. This section includes an evaluation of the extent to which the short-term uses preclude any options for future use of the VCSNS site.

10.3.1 CONSTRUCTION OF UNITS 2 AND 3 AND LONG-TERM PRODUCTIVITY

Subsection 10.1.1 summarizes the potential unavoidable adverse environmental impacts of construction of Units 2 and 3 and the measures proposed to reduce those impacts. Some adverse environmental impacts would remain after all practical measures to avoid or mitigate the impacts have been taken. However, none of these impacts represent a long-term effect that would preclude any options for future use of the VCSNS site.

Units 2 and 3 would be constructed at the VCSNS site, which is property selected and acquired for power generation. The acreage disturbed during construction of the new units would be larger than that required for the actual structures and other ancillary facilities because of the need for construction laydown and support areas and a parking area for the construction workforce. The clearance of this acreage, plus the noise of the construction, would displace some wildlife and destroy vegetation. Once the construction activities are completed, the disturbed areas would be restored. Wildlife would be expected to return to the restored area.

Noise emitted during some construction activities would increase the ambient noise levels in the vicinity of the site. However, upon completion of these activities, the ambient levels would return to the levels associated with the operation of Unit 1. The workforce would be protected by adherence to the Occupational Safety and Health Administration’s requirements for noise levels. There would be no effects on the long-term productivity of the VCSNS site as a result of these impacts.

Construction traffic has the potential to impact traffic in the vicinity of the VCSNS site, but the impact would be reduced once construction is completed.

The construction of Units 2 and 3 would be beneficial to the local area through the generation of new construction-related jobs, local spending by the construction workforce, and payment of taxes to the area. Some socioeconomic impacts that occur as a result of increased population due to construction would cease once construction is complete and the workforce leaves the area, but changes incurred because of increased tax revenues would persist into the foreseeable future. In those cases, construction would have some positive impact on the long-term

economic productivity of the area, particularly for Fairfield and Newberry Counties.

Construction would not affect long-term productivity of the environment.

10.3.2 OPERATION OF THE NEW UNITS AND LONG-TERM PRODUCTIVITY

Subsection 10.1.2 summarizes the potential unavoidable adverse environmental impacts of operation of Units 2 and 3 and the measures proposed to reduce or eliminate those impacts. Some adverse environmental impacts could remain after all practical measures to avoid or mitigate them have been taken. However, none of these impacts represent long-term effects that would preclude any options for future use of the VCSNS site.

The VCSNS site has been developed as a location for major energy generation facilities. Therefore, the operation of Units 2 and 3 represents a continuation of the current and planned use of the land. However, once the reactors cease to operate and are decommissioned to NRC standards, the land would be available for other industrial or nonindustrial uses.

Units 2 and 3 would require cooling water withdrawn from the Monticello Reservoir, which is maintained with water from the Broad River. Some of the water would be lost to evaporation, but the impacts would be SMALL. After the reactors cease to operate and are decommissioned, the water withdrawal would cease.

The operation of Units 2 and 3 would slightly increase air emissions because of diesel generators that would be operated intermittently. This equipment would be operated in accordance with applicable federal, state, and local regulations and they would not create any measurable impacts on regional air quality. Additionally, no long-term impacts would result from salt deposition arising from salt drift from the cooling towers as the analysis has determined the amount deposited would be less than levels at which ecological impacts might occur. Normal maintenance activities and precipitation would prevent the buildup of salt in the soil at the cooling towers. No future issues for the long-term uses of the site would result from the impacts of increased air emissions or salt deposition. Once the reactors cease to operate and are decommissioned, impacts to air would cease.

Chemicals and thermal pollution would be released to the Parr Reservoir, in compliance with state and federal regulations. The releases would not adversely affect the Parr Reservoir and the Broad River water quality during the operation of the plant. After decommissioning, releases to surface waters would cease.

Impacts because of radiological emissions would be SMALL, because the operation of the new units would be in accordance with state and federal regulations and a radiological monitoring program would be used to monitor emissions and their impact of land, flora, fauna, and air. Data would be analyzed against previous results to identify any concerns. Radiological emissions are expected to be at levels that would not contaminate VCSNS property or the

surrounding land or surface waters. Once the reactors cease to operate and are decommissioned, radiological releases would cease. No future issues associated with the radiological emissions from operation of the new units would affect the long-term uses of the VCSNS site.

Socioeconomic changes brought about by the operation of the plant would likely continue after the plant is decommissioned. Property taxes and fees paid by SCE&G and Santee Cooper to Fairfield County would provide significant revenues to the county for the foreseeable future, and would support greater county infrastructure and social services improvements than taxes on other land uses would. The Fairfield County population increases during the life of the plant would use the services provided as a result of VCSNS-related tax revenues. Taxes paid to Fairfield County would have a long-term effect on the productivity of the county. The economic impacts to Fairfield County from VCSNS would be considered by many people to be a benefit. Newberry County would experience long-term economic benefits from VCSNS workers taking up residence in the county and paying property, sales, and use taxes and spending income at local businesses. Lexington and Richland Counties would also realize long-term economic benefits as a result of VCSNS workers paying taxes and spending income in those counties; however, the affects would be less noticeable due to the larger economies in these counties.

10.3.3 SUMMARY OF RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The impacts resulting from the construction and operation of Units 2 and 3 would result in some adverse short-term impacts. The principal short-term benefit is the production of electrical energy. The economic benefit of VCSNS and the associated workforce is large compared with the economic benefit from forestry or other likely uses for the site. The economic benefits are expected to be the kind that would continue even after the completion of decommissioning, including the continuation of commercial establishments that arose as a result of VCSNS' service of electricity production and its retired and former workforce as well as leaving a well-trained and educated workforce for the benefit of subsequent employers. Because the site would eventually be restored by decommissioning, there would be no impacts to long-term productivity.

10.4 BENEFIT-COST BALANCE

10.4.1 BENEFITS

10.4.1.1 Need for Power

VCSNS Units 2 and 3 would each generate approximately 1,107 MWe net, for a total of 2,214 MW. Assuming a reasonably low capacity factor of 85%, the 2-unit plant average annual electrical energy generation would be more than 16,000,000 MW-hours. A reasonably high capacity factor of 93% would result in slightly more than 18,000,000 MW-hours of electricity.

As discussed in Chapter 8, the SCE&G need for this benefit (*i.e.*, need for power) is subject to a two-step Public Service Commission of South Carolina approval process that involves preparation of integrated resource plans and certificates of public convenience and necessity. The SCE&G 2007 integrated resource plan identifies a need for an addition of 1,200 MW of SCE&G baseload capacity by 2020 and indicates that SCE&G and Santee Cooper plan to build nuclear capacity to meet baseload capacity needs (SCE&G 2007). The integrated resource plan analysis is augmented in an application for a certificate of public convenience and necessity with a facility-specific statement explaining the need for power. SCE&G is planning to submit to the Public Service Commission its application for a certificate of public convenience and necessity for Units 2 and 3 in February 2008, and expects to have a final Public Service Commission order within 9 months of the submittal date. If SCE&G fails to adequately demonstrate a need for the units, the Public Service Commission would refuse to issue the certificate of public convenience and necessity and SCE&G would not begin construction.

As discussed in Chapter 8, Santee Cooper is required to submit an integrated resource plan triennially, with annual updates during intervening years. The 2006 update of the Santee Cooper integrated resource plan identifies an additional 1,764 MW of baseload capacity by 2020, which includes a 45% ownership share of two 1,107 MW-class nuclear units located at the VCSNS site to meet some of its baseload capacity needs (Santee Cooper 2006).

10.4.1.2 Fuel Diversity and Natural Gas Alternative

Fuel diversity is the key to affordable and reliable electricity. A diverse fuel mix protects electric companies and consumers from contingencies such as fuel unavailability, price fluctuations, and changes in regulatory practices (EEI 2007). History has taught the utility industry that it is risky to develop an overreliance on any one energy source. In fact, a balanced energy portfolio has been the key to providing America with a growing supply of affordable electricity for the past 30 years (CEED 2007).

The SCE&G fuel mix is made up of approximately 44% coal, 11% nuclear, 14% hydroelectric, and 30% natural gas and oil. The SCE&G projection for 2021 assumes the addition of 200 MW of peaking or intermediate load capacity, some of which may be supplied as purchased power, and 1,200 MW of baseload

generation. The baseload additions represent the addition of the SCE&G portions of Unit 2 in 2016 and Unit 3 in 2019. (SCE&G 2007)

The Santee Cooper fuel mix is made up of approximately 62% coal, 7% nuclear, 3% hydroelectric, and 28% natural gas and oil. The Santee Cooper projection for 2021 assumes the addition of 168 MW of peaking or intermediate load capacity, some of which would be supplied as purchased power, 600 MW of coal-fired capacity, and approximately 995 MW of nuclear generation. The nuclear additions represent the addition of the Santee Cooper portions of Unit 2 in 2016 and Unit 3 in 2019. (Santee Cooper 2006)

The projected SCE&G and Santee Cooper future reliance on gas is considerably higher than the U. S. Energy Information Administration projection that natural gas will provide 22% of the nation's electricity by 2015 and 16% by 2030 (EIA 2007).

Closely intertwined with the issue of fuel diversity is the issue of using natural gas to generate electricity. Maintaining fuel diversity is a matter of maintaining a balance of fuel mixes. Relying heavily on gas is a matter of choosing a limited resource over more abundant fuels.

High prices for natural gas and the intense, recurring periods of price volatility experienced over the last 4 years are influenced partly by demand for natural gas in the electric generation sector. Electric sector demand for natural gas is being driven by the large amounts of new gas-fired electric generating capacity built in the United States during the last decade. More than 90% of all new electric generating capacity added over the past 5 years is fueled with natural gas. Natural gas has many desirable characteristics and should be part of the fuel mix, but "overreliance on any one fuel source leaves consumers vulnerable to price spikes and supply disruptions." New nuclear plants provide forward price stability that is not available from generating plants fueled with natural gas. The intense volatility in natural gas prices experienced over the last several years is likely to continue and leaves the U.S. economy vulnerable. Although nuclear plants are capital-intensive to build, the operating costs are stable and dampen the volatility elsewhere in the electricity market. (NEI 2005)

Natural gas has uses that are not readily served by other fuel choices, such as many manufacturing processes. This led the U. S. House of Representatives to prepare a majority staff report that included the following findings (USHR 2006):

To enhance competitiveness and protect American jobs, natural gas must not be used for baseload electricity generation or for new generating capacity. Natural gas should be reserved for industries that use it as a feedstock or for primary energy and cannot substitute for it by fuel-switching.

Nuclear energy must become the primary generator of baseload electricity, thereby relieving the pressure on natural gas prices and dramatically improving atmospheric emissions.

For South Carolina, Units 2 and 3 represent a step towards maintaining what has been a successful mix of fuel types for generating electricity. The new units would help maintain the state's fuel diversity while meeting state and national goals of creating new baseload generation that would not use natural gas as a fuel.

10.4.1.3 Emissions Reduction

Nuclear generation contributes considerable air quality benefits to the nation. Unlike electricity generated from coal and natural gas, nuclear energy does not result in any emissions of air pollutants associated with global warming and climate change (*e.g.*, nitrogen oxides, sulfur dioxide, carbon dioxide) or mercury. Fossil fuel-fired power plants are responsible for 67% of the nation's sulfur dioxide emissions, 23% of nitrogen oxide emissions, and 40% of man-made carbon dioxide emissions. Most of the industry's emissions are from coal-fired plants. (U.S. EPA 2006)

Subsections 9.2.3.1 and 9.2.3.2 analyze coal and gas-fired alternatives to Units 2 and 3, respectively. Air emissions from these alternatives and nuclear power are summarized in Table 10.4-1.

Regardless of which reasonable alternative one compares to nuclear power, Units 2 and 3 would represent a substantial benefit in emission reduction, or emission avoidance, assuming that fossil fuel plants would be constructed if Units 2 and 3 were not.

10.4.1.4 Advantages of Nuclear Power

Concerns about global warming and climatic change make it reasonable to expect that, eventually, the United States may have to strictly curb emissions from fossil-fuel electric generation plants, conceivably to the point of displacing coal and gas-fired electricity generation. If environmental policies greatly restrict carbon emissions in the future, the cost of building and operating fossil-fired plants could increase by 50% to 100%. Nuclear power is the only technology currently available that is a viable alternative to fossil-fired plants for baseload generation. In view of the time that it takes to gear up the nuclear industry, the prospect of needing nuclear power to displace fossil-fuel power is one of the reasons for national concern with maintaining a nuclear energy capability. (UC 2004)

10.4.1.5 Tax Payments

The VCSNS owners would pay property taxes on the new units for the duration of the 40-year operating licenses. As discussed in Subsection 5.8.2.2.2, SCE&G has negotiated a fee-in-lieu-of-taxes agreement with Fairfield County for the construction of Units 2 and 3 at the VCSNS site that includes an assessment ratio of 4.0% and a special revenue credit of 20.0% of the fee-in-lieu-of-taxes payments on the project during the first 20 years that fee-in-lieu-of-taxes payments are made. Over the 40-year period of operation, SCE&G estimates annual fee-in-lieu-of-taxes payments for Units 2 and 3 at VCSNS would range from $6.4 million to $24.6 million in 2005 dollars (Table 5.8-1). Generally, moderate to large tax

payments are a benefit to the taxing entity because they support the development of infrastructure which supports further economic development.

10.4.1.6 Local Economy

Units 2 and 3 would require an operations workforce of about 800 people. The multiplier effect would create additional indirect jobs. In total, 2,500 new jobs within approximately 50 miles of the plant (Subsection 5.8.2.2.1) would be created by the startup of the new units and would be maintained throughout the life of the plant. Many of these jobs would be in the service sector and could be filled by unemployed local residents, lessening demands on social service agencies in addition to strengthening the economy. The economic multiplier effect of the increased spending by the direct and indirect labor force, created as a result of two new units, would increase the economic activity in the region, most noticeably in rural Fairfield and Newberry Counties.

Nuclear plants such as VCSNS generate approximately $350 million in total output for the local community and roughly $60 million in total labor income[a]. These figures include direct effects, which reflect expenditures for goods, services, and labor, and secondary effects, which include subsequent spending in the community. The economic multiplier effect is one way of measuring secondary effects and means that every dollar spent by nuclear plants results in the creation of an additional $1.13 in the community. (SSEB 2006)

10.4.1.7 Benefit Summary

Table 10.4-2 includes a benefit-cost summary of the proposed project.

In Subsection 9.3.3, Alternative Site Review, SCE&G evaluated environmental impacts of construction and operation of the proposed project at three alternative sites (Savannah River Site, Cope Generating Station, and the Saluda greenfield site). Table 10.4-3 provides a comparison of the benefits of construction and operation of the project as proposed to those at the three alternative sites.

a. The Southern States Energy Board reference (SSEB 2006) does not provide specific years for the $350 and $60 million figures, nor does it specifically identify the studies done by the NEI to support this statement. However, the Southern States Energy Board is considered a reliable source of data. SCE&G believes that the Southern States Energy Board's interpretation of NEI's data is correct, somewhat current (within the late 1990s to early 2000s), and useful for this analysis, even if the exact years of the data cannot be determined.

10.4.2 COSTS

10.4.2.1 Monetary – Construction

In evaluating the Units 2 and 3 monetary cost, SCE&G reviewed published literature, vendor information, internally generated general information, and internally generated site-specific information. There are many cost studies available in the literature with a wide range of cost estimates. SCE&G found four studies to be most authoritative due to the breadth and depth of their analyses and the fact that other studies tend to be based on them. These re the following:

- *The Future of Nuclear Power; An Interdisciplinary Study*(MIT 2003)
- *The Economic Future of Nuclear Power; A Study Conducted at The University of Chicago* (UC 2004)
- *Energy Information Administration, Annual Energy Outlook 2004* (EIA 2004)
- *Projected Costs of Generating Electricity; 2005 Update* (OECD/IEA 2005)

The phrase commonly used to describe the monetary cost of constructing a nuclear plant is “overnight capital cost.” The capital costs are those incurred during construction, when the actual outlays for equipment and construction and engineering are expended. Overnight costs are exclusive of interest and include engineering, procurement, and construction costs, owner’s costs, and contingencies.

Estimates of overnight capital costs in 2003 dollars range from $1,100 per kilowatt to $2,300 per kilowatt, with $1,500 to $2,000 per kilowatt being the most representative range. Many factors account for the range; the specific technology and assumptions about the number of like-units built, allocation of first-of-a-kind costs, site location and parity adjustments to allow comparison between countries, and allowances for contingencies are some examples. The estimates are not based on nuclear plant construction experience in this country, which is more than 20 years old. Actual construction costs overseas have been less than most recent domestic construction, suggesting that the industry has learned from the domestic experience. There is an assumption that the overseas experience can be applied domestically and the studies have found the overseas experience to be most applicable to estimating the cost of new domestic nuclear plant construction.

The four studies tend to support $2,000 per kilowatt as a reasonable high-end overnight capital cost estimate. The $2,300 value is based on construction in Japan. While no explanation is offered as to why this is higher, it is reasonable to assume that contributing factors are the high cost of living in Japan (labor accounts for more than 20% of costs) and difficulties associated with construction on an island. For the purposes of analysis in this environmental report, SCE&G has chosen to use the $2,000 per kilowatt value. Together with an installed

capacity of 2,214 MWe, $2,000 per kilowatt results in a Units 2 and 3 construction cost of approximately $4.4 billion in 2003 dollars.

10.4.2.2 Monetary – Operation

As for construction costs, the four studies show a wide range of operation cost estimates. Operation costs are frequently expressed as levelized cost of electricity, which is the price at the busbar needed to cover operating costs and annualized capital costs. Overnight capital costs account for a third of the levelized cost, and interest costs on the overnight costs account for another 25% (UC 2004). Levelized cost estimates in 2003 dollars range from $36 to $83 per MW-hour (3.6 to 8.3 cents per kilowatt-hour). Factors affecting the range include choices for discount rate, construction duration, plant lifespan, capacity factor, cost of debt and equity and split between debt and equity financing, depreciation time, tax rates, and premium for uncertainty. Estimates include decommissioning but, due to the effect of discounting a cost that would occur as much as 40 years in the future, decommissioning costs have relatively little affect on the levelized cost. Using the same criteria as for construction costs, SCE&G has concluded that $65 per MW-hour (6.5 cents per kilowatt-hour) in 2003 dollars is a reasonably high-end levelized cost of electricity for nuclear generation. This compares well with preliminary cost information that SCE&G has filed with the PSC (SCE&G 2004).

In addition to nuclear plant costs, the four studies provide coal and gas-fired generation costs for comparison to nuclear generation costs. One study (OECD/IEA 2005) shows nuclear costs competitive with coal and gas. The other studies show nuclear costs that exceed those of coal and gas. One study (MIT 2003) indicates that new nuclear power is not economically competitive but goes on to suggest steps that the government could take to improve nuclear economic viability. Since the study, the government has undertaken those steps as follows:

- U.S. DOE has provided financial support for plants testing the U.S. NRC licensing processes for early site permits and combined operating licenses.
- The U.S. government has endorsed nuclear energy as a viable carbon-free generation option.
- The Energy Policy Act of 2005 instituted a production tax credit for the first advanced reactors brought on line in the U.S.

SCE&G has concluded that the government steps have negated the MIT study's conclusion that new nuclear power is not economically competitive.

10.4.2.3 Environmental and Material

Section 10.1 identifies unavoidable adverse impacts of the proposed action (*i.e.*, impacts after consideration of proposed mitigation actions), and Section 10.2

identifies irretrievable commitments of resources. Table 10.4-2 includes these costs.

In Subsection 9.3.3, Alternative Site Review, SCE&G evaluated environmental impacts of construction and operation of the proposed project at three alternative sites (Savannah River Site, Cope Generating Station and the Saluda greenfield site). Table 10.4-4 describes the impacts of construction and operation of the proposed project at the three alternative sites, and provides details regarding potential mitigation and the unavoidable adverse impacts after mitigation has been considered.

Consistent with Regulatory Guide 4.2, each site was evaluated using preliminary reconnaissance level information. Consequently, the costs of mitigation are not easy to determine at this time. Many would be built into the project design (*e.g.*, scheduling to ensure that construction is completed in the shortest possible time; using construction best management practices to limit erosion, fugitive dust, runoff, spills and air emissions; providing first aid stations at the construction site). Others would rely on a communication plan of early/frequent communication between SCE&G and the affected communities, and thus the costs would be minimal.

10.4.3 SUMMARY

Table 10.4-2 summarizes benefits and costs of the proposed action. Costs that are environmental impacts are those anticipated after implementation of proposed mitigation measures.

Section 10.4 References

1. CEED (Center for Energy and Economic Development) 2007, *Fuel Diversity.* Available at www.ceednet.org/ceed/index.cfm?cid=7500,7583, accessed June 12, 2007.

2. EEI (Edison Electric Institute) 2007, *Fuel Diversity.* Available at http://www.eei.org/industry_issues/energy_infrastructure/fuel_diversity/index.htm, accessed June 12, 2007.

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7. NEI (Nuclear Energy Institute) 2005, *Nuclear Energy's Role in Reducing Demand for Natural Gas Through Diversification of Energy Sources Used for Electricity Generation,* January 24, responding to questions posed by the Senate Energy and Natural Resource Committee for its Natural Gas Supply and Demand Conference, Quotation from Report of the President's National Energy Policy Development Group, May 2001, Available at http://www.nei.org/documents/White_Paper_Reducing_Demand_Natural_Gas_1-24-05.pdf, accessed June 12, 2007.

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9. OECD/IEA (Nuclear Energy Agency, Organization for Economic Co-operation and Development and International Energy Agency) 2005, *Projected Costs of Generating Electricity; 2005 Update.* Available at http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1472, accessed June 12, 2007.

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11. SCE&G 2007b, *Integrated Resource Plan,* Letter, Burgess (SCANA) to Terreni (PSC), April 30, 2007. Available at http://dms.psc.sc.gov/attachments/48231FFA-0623-3B04-1068A194A3FB1494.pdf. Accessed May 10, 2007. Note: PSC assigned Docket Number 2006-103-E to its action regarding this submittal.

12. SSEB (Southern States Energy Board) 2006, *Nuclear Energy: Cornerstone of Southern Living, Today and Tomorrow*, Norcross GA, Available at http://www.sseb.org/publications/nucleardocument.pdf, accessed June 12, 2007.

13. UC (The University of Chicago) 2004, *The Economic Future of Nuclear Power; A Study Conducted at The University of Chicago*, August. Available at http://np2010.ne.doe.gov/reports/NuclIndustryStudy.pdf, accessed June 12, 2007.

14. USHR (U. S. House of Representatives) 2006, *Securing America's Energy Future, Majority Staff Report to Committee on Government Reform and Subcommittee on Energy and Resources*. May 8. Available at http://www.nei.org/documents/House_Energy_Report_5-8-06.pdf, accessed June 12, 2007.

Table 10.4-1
Avoided Air Pollutant Emissions

Pollutant	Coal Emissions (tons per year)[a]	Gas Emissions (tons per year)[a]	Nuclear Emissions (tons per year)[b]
Sulfur dioxide	7,044	34	0
Nitrogen oxides	1,495	558	0
Carbon monoxide	1,495	116	0
Carbon dioxide	16,500,000	5,630,000	0
Mercury	0.25	0	0
Particulates having a diameter of less than 10 microns	67	97	0
Particulates having a diameter of less than 2.5 microns	17	97	0

a) Based on constructing three units to replace the power produced by Units 2 and 3 (see Section 9.2).
b) Nuclear power plants have emergency and auxiliary equipment that is fossil-fuel-fired and emits pollutants. The equipment is generally operated only for testing purposes for less than 250 hours per year. As such, the emissions are considered de minimus and are excluded here.

Table 10.4-2 (Sheet 1 of 2)
Benefit-Cost Summary

Benefit-Cost Category	Description
BENEFITS	
Electricity generated	16,000,000 to 18,000,000 MW-hours per year
Generating capacity	2,214 MW
Fuel diversity and natural gas alternative	Nuclear option to coal- and gas-fired baseload generation
Emissions reduction	Avoidance of 34 to 7,044 tons per year sulfur dioxide
	Avoidance of 558 to 1,495 tons per year nitrogen oxides
	Avoidance of 116 to 1,495 tons per year carbon monoxide
	Avoidance of 5,630,000 to 16,500,000 tons per year carbon dioxide
	Avoidance of up to 0.25 tons per year mercury
	Avoidance of 67 to 97 tons per year particulates
Advanced Light Water Reactor development	Maintaining domestic nuclear technology capability as hedge against possible need to control global warming
Tax payments	Payments in 2005 dollars could range from approximately $6,400,000 to $24,600,000 annually over the life of the units.
Local economy	Add 2,500 jobs to the local economy
Cultural resources	Mitigative work adding to local historic and pre-historic knowledge base
COSTS	
Construction cost	$4.4 billion in 2003 dollars (overnight capital cost)
Operating cost	6.5 cents per kilowatt-hour in 2003 dollars (levelized cost of electricity)
Land use	240 acres occupied on long-term basis by nuclear plant and associated infrastructure. On-site landfill may restrict future uses of that land.
	Portion of new transmission line corridor that is wooded would be converted to open scrub or grassland.

Table 10.4-2 (Sheet 2 of 2)
Benefit-Cost Summary

Benefit-Cost Category	Description
COSTS (continued)	
Cultural resources	Potential for destruction of historical, cultural, or paleontological resources
Groundwater use	During the construction period, dewatering of shallow, water-table aquifer would have only small, local effect.
Surface water use	During the 40-year operation period, approximately 37,200 gpm will be withdrawn from Monticello Reservoir and 9,400 gpm will be discharged to Parr and Monticello Reservoirs. The balance, approximately 27,700 gpm, would be lost through evaporation.
Material[a]	150,000 yds concrete 22,000 tons rebar 24,000 tons structural steel 13,000,000 linear feet cable 275,000 feet of piping having diameter > 2.5 inches 1,960 metric tons of uranium
Radiological	Operation worker dose: 134 person-rem[b] Maximally exposed individual (public) dose: 1.0 millirem per year (total body) during operation Collective dose to the public: 6.8 person-rem per year (total body) during operation

a) Includes materials for the reactor, turbine, annex, radiological waste, and diesel-generator buildings
b) Average dose for AP1000 from DCD Section 12.4 (doubled for two units)

Table 10.4-3 (Sheet 1 of 3)
Benefits of the Proposed Project

Benefit Category	Project as Proposed	With Option 1	With Option 2	With Option 3
Description of Project	As Proposed	Proposed Project at Savannah River Site	Proposed Project at Cope Generating Station	Proposed Project at Saluda Site (greenfield)
Monetary Benefits				
Net Electrical Generating Benefits				
Electricity Generated	16,000,000 to 18,000,000 MW-hours per year	16,000,000 to 18,000,000 MW-hours per year	16,000,000 to 18,000,000 MW-hours per year	16,000,000 to 18,000,000 MW-hours per year
Generating Capacity	2,214 MW	2,214 MW	2,214 MW	2,214 MW
State and Local Tax Payments				
During Construction	Property taxes would not be due during construction.	SRS, a federally owned property, pays an annual fee in lieu of taxes to the jurisdictional counties. While the exact amount of the fees paid to Aiken and Barnwell Counties cannot be known, they would represent a small increase in annual revenues for the two counties during the construction period.	Property taxes would not be due during construction.	Property taxes would not be due during construction.
During Operations	SCE&G has negotiated a fee-in-lieu-of-taxes agreement with Fairfield County that includes an assessment ratio of 4.0%. Payments in 2005 dollars could range from approximately $6,400,000 to $24,600,000 annually over the life of the units.	SRS, a federally owned property, pays an annual fee in lieu of taxes. While the exact amount of the fees paid to Aiken and Barnwell Counties cannot be known, they would represent a small increase in annual revenues for the two counties over the life of the units.	SCE&G would negotiate a fee-in-lieu-of-taxes agreement with Orangeburg County. While the exact amount of the fees paid to Orangeburg County cannot be known, they could represent 15% to 24% of the county's total tax revenue over the life of the units.	SCE&G would negotiate a fee-in-lieu-of-taxes agreement with Saluda County. While the exact amount of the fees paid to Saluda County cannot be known, they could represent 58% to 71% of the county's total tax revenue over the life of the units.

Table 10.4-3 (Sheet 2 of 3)
Benefits of the Proposed Project

Benefit Category	Project as Proposed	With Option 1	With Option 2	With Option 3
Description of Project	As Proposed	Proposed Project at Savannah River Site	Proposed Project at Cope Generating Station	Proposed Project at Saluda Site (greenfield)
Effects on Regional Productivity				
During Construction	3,600 direct jobs and 2,446 indirect jobs added to local economy	3,600 direct jobs and 1,760 indirect jobs added to local economy	3,600 direct jobs and 785 indirect jobs added to local economy	3,600 direct jobs and 2,380 indirect jobs added to local economy
During Operations	800 direct jobs and 1,700 indirect jobs added to local economy	800 direct jobs and 1,310 indirect jobs added to local economy	930 direct jobs and 655 indirect jobs added to local economy	930 direct jobs and 2,180 indirect jobs added to local economy
Technical and Other Nonmonetary Benefits				
Advanced Light Water Reactor Development	Maintaining domestic nuclear technology capability as hedge against possible need to control global warming	Maintaining domestic nuclear technology capability as hedge against possible need to control global warming	Maintaining domestic nuclear technology capability as hedge against possible need to control global warming	Maintaining domestic nuclear technology capability as hedge against possible need to control global warming
Improvements to Local Facilities	Minor road repairs and improvements in the vicinity of VCSNS	Minor road repairs and improvements in the vicinity of SRS	Minor road repairs and improvements in the vicinity of Cope Generating Station	Minor road repairs and improvements in the vicinity of the Saluda Site
Fuel Diversity	Nuclear option to coal- and gas-fired baseload generation	Nuclear option to coal- and gas-fired baseload generation	Nuclear option to coal- and gas-fired baseload generation	Nuclear option to coal- and gas-fired baseload generation

Table 10.4-3 (Sheet 3 of 3)
Benefits of the Proposed Project

Benefit Category	Project as Proposed	With Option 1	With Option 2	With Option 3
Description of Project	As Proposed	Proposed Project at Savannah River Site	Proposed Project at Cope Generating Station	Proposed Project at Saluda Site (greenfield)
Emissions Reduction	Avoidance of 34 to 7,044 tons per year sulfur dioxide; 558 to 1,495 tons per year nitrogen oxides; 116 to 1,495 tons per year carbon monoxide; 5,630,000 to 16,500,000 tons per year carbon dioxide; up to 0.25 tons per year mercury; and 67 to 97 tons per year particulates.	Avoidance of 34 to 7,044 tons per year sulfur dioxide; 558 to 1,495 tons per year nitrogen oxides; 116 to 1,495 tons per year carbon monoxide; 5,630,000 to 16,500,000 tons per year carbon dioxide; up to 0.25 tons per year mercury; and 67 to 97 tons per year particulates.	Avoidance of 34 to 7,044 tons per year sulfur dioxide; 558 to 1,495 tons per year nitrogen oxides; 116 to 1,495 tons per year carbon monoxide; 5,630,000 to 16,500,000 tons per year carbon dioxide; up to 0.25 tons per year mercury; and 67 to 97 tons per year particulates.	Avoidance of 34 to 7,044 tons per year sulfur dioxide; 558 to 1,495 tons per year nitrogen oxides; 116 to 1,495 tons per year carbon monoxide; 5,630,000 to 16,500,000 tons per year carbon dioxide; up to 0.25 tons per year mercury; and 67 to 97 tons per year particulates.
Cultural Resources	Mitigative work adding to local historic and pre-historic knowledge base	Mitigative work adding to local historic and pre-historic knowledge base	Mitigative work adding to local historic and pre-historic knowledge base	Mitigative work adding to local historic and pre-historic knowledge base

Table 10.4-4 (Sheet 1 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
	Construction-Related		
Land Use	Adverse Impact — Approximately 500 acres of land would be disturbed during construction, with the potential for erosion. Land would not be available for other uses. Mitigation Measure — Implement storm water management systems, groundwater monitoring wells, and spill containment controls. Permanently disturbed locations would be stabilized and contoured in accordance with design specifications. Follow South Carolina Storm Water Management Best Management Practices handbook and industry guidance. Locate all structures but intake and discharge structures outside of 500-year floodplains. Restrict construction activities to the Construction and Operating License site. Incorporate recommendations of federal and state agencies. Unavoidable Adverse Environmental Impacts — 240 acres of land occupied on a long-term basis by nuclear plant and associated infrastructure.	Adverse Impact — Approximately 500 acres of land would be disturbed during construction, with the potential for erosion. Land would not be available for other uses. Mitigation Measure — Implement storm water management systems, groundwater monitoring wells, and spill containment controls. Permanently disturbed locations would be stabilized and contoured in accordance with design specifications. Follow South Carolina Storm Water Management Best Management Practices handbook and industry guidance. Locate all structures but intake and discharge structures outside of 500-year floodplains. Restrict construction activities to the Construction and Operating License site. Incorporate recommendations of federal and state agencies. Unavoidable Adverse Environmental Impacts — 240 acres of land occupied on a long-term basis by nuclear plant and associated infrastructure.	Adverse Impact — Potential for erosion from clearing approximately 500 acres of land for construction of the new plant and temporary facilities and from clearing additional acreage for construction of roads, parking lots, and switchyard. Land would not be available for other uses. Mitigation Measure — Implement storm water management systems, groundwater monitoring wells, and spill containment controls. Permanently disturbed locations would be stabilized and contoured in accordance with design specifications. Follow South Carolina Storm Water Management Best Management Practices handbook and industry guidance. Locate all structures but intake and discharge structures outside of 500-year floodplains. Restrict construction activities to the Construction and Operating License site. Incorporate recommendations of federal and state agencies. Unavoidable Adverse Environmental Impacts — 240 acres of land occupied on a long-term basis by nuclear plant and associated infrastructure. 850 acres would be excluded from future agricultural and recreational use.

Table 10.4-4 (Sheet 2 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Land Use (continued)	Adverse Impact — Construction of transmission corridor across approximately 80 linear miles of central South Carolina. Mitigation Measure — Conduct siting study that takes into account environmental impacts. Incorporate recommendations of federal and state agencies into route selections. Site new corridors to avoid critical or sensitive habitats or species as much as possible. Restrict construction activities to transmission corridors and access roads. Restrict access points to corridors. Before site disturbance, conduct archaeological and ecological surveys and determine site-specific erosion control measures. Comply with all applicable laws, regulations, permits, sound engineering, environmental management, and construction practices. Unavoidable Adverse Environmental Impacts — Land use on some land would change from woodland or agriculture to open scrub or grassland.	Adverse Impact — Construction of 55 linear miles of new transmission lines in existing corridors in central South Carolina. Mitigation Measure — Conduct siting study that takes into account environmental impacts. Incorporate recommendations of federal and state agencies into route selections. Site new corridors to avoid critical or sensitive habitats or species as much as possible. Restrict construction activities to transmission corridors and access roads. Restrict access points to corridors. Before site disturbance, conduct archaeological and ecological surveys and determine site-specific erosion control measures. Comply with all applicable laws, regulations, permits, sound engineering, environmental management, and construction practices. Unavoidable Adverse Environmental Impacts — Land use on some land would change from woodland or agriculture to open scrub or grassland.	Adverse Impact — Construction of transmission corridor across approximately 18 linear miles of central South Carolina. Mitigation Measure — Conduct siting study that takes into account environmental impacts. Incorporate recommendations of federal and state agencies into route selections. Site new corridors to avoid critical or sensitive habitats or species as much as possible. Restrict construction activities to transmission corridors and access roads. Restrict access points to corridors. Before site disturbance, conduct archaeological and ecological surveys and determine site-specific erosion control measures. Comply with all applicable laws, regulations, permits, sound engineering, environmental management, and construction practices. Unavoidable Adverse Environmental Impacts — Land use on some land would change from woodland or agriculture to open scrub or grassland.

Table 10.4-4 (Sheet 3 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Land Use (continued)	Adverse Impact — Potential to disturb buried historic, archaeological, or paleontological resources.	Adverse Impact — Potential to disturb buried historic, archaeological, or paleontological resources.	Adverse Impact — Potential to disturb buried historic, archaeological, or paleontological resources.
	Mitigation Measure — Select transmission routes to avoid historical properties. Consult State Historic Preservation Office (South Carolina Department of Archives & History). Before site disturbance, conduct archaeological surveys. Develop and implement procedure for construction activities that includes actions to protect cultural, historic, or paleontological resources.	Mitigation Measure — Select transmission routes to avoid historical properties. Consult State Historic Preservation Office (South Carolina Department of Archives & History). Before site disturbance, conduct archaeological surveys. Develop and implement procedure for construction activities that includes actions to protect cultural, historic, or paleontological resources.	Mitigation Measure — Select transmission routes to avoid historical properties. Consult State Historic Preservation Officer (South Carolina Department of Archives & History). Before site disturbance, conduct archaeological surveys. Develop and implement procedure for construction activities that includes actions to protect cultural, historic, or paleontological resources.
	Unavoidable Adverse Environmental Impacts — Potential for destruction of unanticipated historic, cultural, or paleontological resources.	Unavoidable Adverse Environmental Impacts — Potential for destruction of unanticipated historic, cultural, or paleontological resources.	Unavoidable Adverse Environmental Impacts — Potential for destruction of unanticipated historic, cultural, or paleontological resources.
	Adverse Impact — Construction debris would be disposed in offsite landfills. Mitigation Measure — Use waste minimization to reduce volume of debris.	Adverse Impact — Construction debris would be disposed in offsite landfills. Mitigation Measure — Use waste minimization to reduce volume of debris.	Adverse Impact — Construction debris would be disposed in offsite landfills. Mitigation Measure — Use waste minimization to reduce volume of debris.
	Unavoidable Adverse Environmental Impacts — Landfill space would be consumed for disposal of construction debris and would not be available for disposal of other wastes.	Unavoidable Adverse Environmental Impacts — Landfill space would be consumed for disposal of construction debris and would not be available for disposal of other wastes.	Unavoidable Adverse Environmental Impacts — Landfill space would be consumed for disposal of construction debris and would not be available for disposal of other wastes.

Table 10.4-4 (Sheet 4 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Hydrology and Water Use	Adverse Impact — Construction would require up to 420 gpm of groundwater.	Adverse Impact — Construction would require up to 420 gpm of groundwater.	Adverse Impact — Construction would require up to 420 gpm of surface water.
	Mitigation Measure — Practice water conservation as practical. No other measures or controls would be necessary.	Mitigation Measure — Practice water conservation as practical. No other measures or controls would be necessary.	Mitigation Measure — Practice water conservation as practical. No other measures or controls would be necessary.
	Unavoidable Adverse Environmental Impacts — Use of groundwater as source for all water used for construction.	Unavoidable Adverse Environmental Impacts — Use of groundwater as source for all water used for construction.	Unavoidable Adverse Environmental Impacts — Use of water from Saluda Arm of Lake Murray as source for all water used for construction.
	Adverse Impact — Potential need to dewater excavation areas.	Adverse Impact — Potential need to dewater excavation areas.	Adverse Impact — Potential need to dewater excavation areas.
	Mitigation Measure — Install drainage system to divert dewatering runoff to settling basin before discharge through a permitted NPDES outfall. Follow best management practices for erosion control.	Mitigation Measure — Install drainage system to divert dewatering runoff to settling basin before discharge through a permitted NPDES outfall. Follow best management practices for erosion control.	Mitigation Measure — Install drainage system to divert dewatering runoff to settling basin before discharge through a permitted NPDES outfall. Follow best management practices for erosion control.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 5 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Hydrology and Water Use (continued)	Adverse Impact — Construction along riverbanks or stream banks (in the case of the transmission line) could introduce sediments into the river or stream. Mitigation Measure — Develop and implement a construction Storm Water Pollution Prevention Plan; conduct monitoring as required by the storm water general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, reseed the areas. Follow South Carolina Forestry Commission best management practices manual and South Carolina Department of Health and Environmental Control handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance. Avoid wetlands and water bodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and waterbodies that must be crossed; use equipment specifically designed for work around wetlands and streams, and install erosion controls. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Construction along riverbanks or stream banks (in the case of the transmission line) could introduce sediments into the river or stream. Mitigation Measure — Develop and implement a construction Storm Water Pollution Prevention Plan; conduct monitoring as required by the storm water general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, reseed the areas. Follow South Carolina Forestry Commission Best Management Practices manual and South Carolina Department of Health and Environmental Control handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance. Avoid wetlands and water bodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and water bodies that must be crossed; use equipment specifically designed for work around wetlands and streams, and install erosion controls. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Construction along Lake Murray shoreline or stream banks (in the case of the transmission line) could introduce sediments into the reservoir or stream. Mitigation Measure — Develop and implement a construction Storm Water Pollution Prevent Plan; conduct monitoring as required by the stormwater general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, reseed the areas. Follow South Carolina Forestry Commission Best management practices manual and South Carolina Department of Health and Environmental Control handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance. Avoid wetlands and water bodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and waterbodies that must be crossed; use equipment specifically designed for work around wetlands and streams, and install erosion controls. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 6 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Hydrology and Water Use (continued)	Adverse Impact — Use of heavy equipment introduces the possibility of petroleum spills that could enter surface water. Mitigation Measure — Use good maintenance practices to maintain equipment, and prevent spills and leaks. Prepare and implement Spill Prevention Control and Countermeasure Plan for construction activities. Restrict activities using petroleum products and solvents to designated areas that are equipped with spill containment. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Use of heavy equipment introduces the possibility of petroleum spills that could enter surface water. Mitigation Measure — Use good maintenance practices to maintain equipment, and prevent spills and leaks. Prepare and implement Spill Prevention Control and Countermeasure Plan for construction activities. Restrict activities using petroleum products and solvents to designated areas that are equipped with spill containment. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Use of heavy equipment introduces the possibility of petroleum spills that could enter surface water. Mitigation Measure — Use good maintenance practices to maintain equipment, and prevent spills and leaks. Prepare and implement Spill Prevention Control and Countermeasure Plan for construction activities. Restrict activities using petroleum products and solvents to designated areas that are equipped with spill containment. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 7 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Aquatic Ecology	Adverse Impact — Construction at river's edge would cause the loss of some organisms, and temporary degradation of habitat. Transmission line construction across streams would cause the loss of some organisms and temporary degradation of habitat.	Adverse Impact — Construction at river's edge would cause the loss of some organisms, and temporary degradation of habitat. Transmission line construction across streams would cause the loss of some organisms and temporary degradation of habitat.	Adverse Impact — Construction on Lake Murray shoreline would cause the loss of some organisms, and temporary degradation of habitat. Transmission line construction across streams would cause the loss of some organisms and temporary degradation of habitat.
	Mitigation Measure — Install cofferdam and store excavated sediment and soils in spoils area designed to prevent loading in wetlands and watercourses, use storm water retention basins as needed; reseeding of spoils area after construction. Develop and implement a construction Storm Water Pollution Protection Plan; conduct monitoring as required by the storm water general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, reseed the areas.	Mitigation Measure — Install cofferdam and store excavated sediment and soils in spoils area designed to prevent loading in wetlands and watercourses, use storm water retention basins as needed; reseeding of spoils area after construction. Develop and implement a construction Storm Water Pollution Protection Plan; conduct monitoring as required by the stormwater general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, re-seed the areas.	Mitigation Measure — Install cofferdam and store excavated sediment and soils in spoils area designed to prevent loading in wetlands and watercourses, use stormwater retention basins as needed; re-seeding of spoils area after construction. Develop and implement a construction Storm Water Pollution Protection Plan; conduct monitoring as required by the stormwater general permit. Stabilize upslope areas and adjacent to shoreline construction sites with erosion control devices and after construction, reseed the areas.
	Follow South Carolina Forestry Commission Best Management Practices manual and South Carolina Department of Health and Environmental Control handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance. Avoid wetlands and waterbodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and waterbodies that must be crossed; use equipment specifically designed for work around wetlands and streams, install erosion controls, and implement best management practices to minimize impacts to aquatic ecosystems.	Follow South Carolina Forestry Commission Best Management Practices manual and South Carolina Department of Health and Environmental Control handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance. Avoid wetlands and waterbodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and water bodies that must be crossed; use equipment specifically designed for work around wetlands and streams, install erosion controls, and implement best management practices to minimize impacts to aquatic ecosystems.	Follow South Carolina Forestry Commission Best Management Practices manual and South Carolina Department of Health and Environmental Control handbook and field manual best management practices to prevent sediment loading and minimize soil disturbance. Avoid wetlands and waterbodies and sensitive areas when possible, plan transmission routes to minimize impacts to wetlands and waterbodies that must be crossed; use equipment specifically designed for work around wetlands and streams, install erosion controls, and implement best management practices to minimize impacts to aquatic ecosystems.

Table 10.4-4 (Sheet 8 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Aquatic Ecology (continued)	Before transmission line construction, conduct ecological surveys and determine site-specific erosion control measures. If there is potential for construction of a new transmission line to degrade habitat of a listed aquatic species, work closely with the state agency to develop a construction schedule and construction techniques that are protective of the habitat and species in question. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Before transmission line construction, conduct ecological surveys and determine site-specific erosion control measures. If there is potential for construction of a new transmission line to degrade habitat of a listed aquatic species, work closely with the state agency to develop a construction schedule and construction techniques that are protective of the habitat and species in question. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Before transmission line construction, conduct ecological surveys and determine site-specific erosion control measures. If there is potential for construction of a new transmission line to degrade habitat of a listed aquatic species, work closely with the state agency to develop a construction schedule and construction techniques that are protective of the habitat and species in question. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
Terrestrial Ecology	Adverse Impact — Habitat loss, but no threatened or endangered plants or animals are at the site or in the vicinity. Displacement of animals from the construction site. Loss of less mobile individual animals. Potential degradation of wetlands. Mitigation Measure — Land clearing would be conducted according to federal and state regulations and permits, SCE&G procedures, good construction practices, and established best management practices. Schedule equipment maintenance procedures to minimize emission and spills. Minimize fugitive dust by watering. Delineate wetlands and determine impacts and mitigation prior to beginning construction activities Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Habitat loss, but no threatened or endangered plants or animals are at the site or in the vicinity. Displacement of animals from the construction site. Loss of less mobile individual animals. Potential degradation of wetlands. Mitigation Measure — Land clearing would be conducted according to federal and state regulations and permits, SCE&G procedures, good construction practices, and established best management practices. Schedule equipment maintenance procedures to minimize emission and spills. Minimize fugitive dust by watering. Delineate wetlands and determine impacts and mitigation prior to beginning construction activities Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Habitat loss, but no threatened or endangered plants or animals are at the site or in the vicinity. Displacement of animals from the construction site. Loss of less mobile individual animals. Potential degradation of wetlands. Mitigation Measure — Land clearing would be conducted according to federal and state regulations and permits, SCE&G procedures, good construction practices, and established best management practices. Schedule equipment maintenance procedures to minimize emission and spills. Minimize fugitive dust by watering. Delineate wetlands and determine impacts and mitigation prior to beginning construction activities Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 9 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic	Adverse Impact — Temporary and localized noise, fugitive dust, and exhaust emissions during construction. Mitigation Measure — Train and appropriately protect construction workers to reduce the risk of potential exposure to noise, dust and exhaust emissions. Make public announcements or prior notification of atypically loud construction activities. Regularly inspect and maintain equipment to include exhaust and noise aspects. Phase construction to minimize daily emissions. Restrict extreme noise-related activities to daylight hours. Restrict delivery times to daylight hours. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc. Unavoidable Adverse Environmental Impacts — Temporary and localized noise, fugitive dust, and exhaust emissions during construction.	Adverse Impact — Temporary and localized noise, fugitive dust, and exhaust emissions during construction. Mitigation Measure — Train and appropriately protect construction workers to reduce the risk of potential exposure to noise, dust and exhaust emissions. Make public announcements or prior notification of atypically loud construction activities. Regularly inspect and maintain equipment to include exhaust and noise aspects. Phase construction to minimize daily emissions. Restrict extreme noise-related activities to daylight hours. Restrict delivery times to daylight hours. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc. Unavoidable Adverse Environmental Impacts — Temporary and localized noise, fugitive dust, and exhaust emissions during construction.	Adverse Impact — Temporary and localized noise, fugitive dust, and exhaust emissions during construction. Mitigation Measure — Train and appropriately protect construction workers to reduce the risk of potential exposure to noise, dust and exhaust emissions. Make public announcements or prior notification of atypically loud construction activities. Regularly inspect and maintain equipment to include exhaust and noise aspects. Phase construction to minimize daily emissions. Restrict extreme noise-related activities to daylight hours. Restrict delivery times to daylight hours. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc. Unavoidable Adverse Environmental Impacts — Temporary and localized noise, fugitive dust, and exhaust emissions during construction.

Table 10.4-4 (Sheet 10 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic (continued)	Adverse Impact — Construction workers could experience occupational illnesses, injuries, or death.	Adverse Impact — Construction workers could experience occupational illnesses, injuries, or death.	Adverse Impact — Construction workers could experience occupational illnesses, injuries, or death.
	Mitigation Measure — Train contractors on safety requirements. Require construction contractors and subcontractors to develop and implement safety procedures. Provide onsite services for emergency first aid; conduct regular health and safety monitoring.	Mitigation Measure — Train contractors on safety requirements. Require construction contractors and subcontractors to develop and implement safety procedures. Provide onsite services for emergency first aid; conduct regular health and safety monitoring.	Mitigation Measure — Train contractors on safety requirements. Require construction contractors and subcontractors to develop and implement safety procedures. Provide onsite services for emergency first aid; conduct regular health and safety monitoring.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impact.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impact.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impact.
	Adverse Impact — Increased traffic on local roads in Aiken, Barnwell and Richmond Counties.	Adverse Impact — Increased traffic on local roads in Orangeburg and Bamberg Counties, approaching and exceeding capacity.	Adverse Impact — Increased traffic on local roads in Saluda and Newberry Counties, approaching and exceeding capacity.
	Mitigation Measure — Develop construction management traffic plan prior to the start of construction. Add turn lanes at construction entrance. Post signs near construction entrances and exits to make the public aware of potentially high construction traffic areas.	Mitigation Measure — Develop construction management traffic plan prior to the start of construction. Add turn lanes at construction entrance. Post signs near construction entrances and exits to make the public aware of potentially high construction traffic areas.	Mitigation Measure — Develop construction management traffic plan prior to the start of construction. Add turn lanes at construction entrance. Post signs near construction entrances and exits to make the public aware of potentially high construction traffic areas.
	Unavoidable Adverse Environmental Impacts — Increased traffic on local roads.	Unavoidable Adverse Environmental Impacts — Increased traffic on local roads.	Unavoidable Adverse Environmental Impacts — Increased traffic on local roads.

Table 10.4-4 (Sheet 11 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic (continued)	Adverse Impact — Increase in demand for housing in Aiken, Barnwell, Richmond, and Columbia Counties. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Builders and developers would meet the demand for additional housing, and because the project has a long lead time, and the construction workforce would build gradually, it is likely that if the community anticipates the increase in population, adequate affordable housing would always be available. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Initially sufficient housing to support the influx of construction workforce may be unavailable in Bamberg County. Increased demand for housing could make housing unaffordable for some low income populations. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Builders and developers would meet the demand for additional housing, and because the project has a long lead time, and the construction workforce would build gradually, it is likely that if the community anticipates the increase in population, adequate affordable housing would always be available. Unavoidable Adverse Environmental Impacts — Potential short-term shortage of affordable housing in Bamberg County.	Adverse Impact — Increase in demand for housing in Saluda, Newberry, Lexington, and Richland Counties. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Builders and developers would meet the demand for additional housing, and because the project has a long lead time, and the construction workforce would build gradually, it is likely that if the community anticipates the increase in population, adequate housing would always be available. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 12 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic (continued)	Adverse Impact — Increase in demand for classroom space from in-migration of construction workers families. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Increased tax revenues as a result of the large construction project would fund additional school resources. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Initially there may be insufficient classroom space for the influx of construction workers families. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Increased tax revenues as a result of the large construction project would fund additional school resources. Because the project has a long lead time, and the construction workforce would build gradually, it is likely that if the community anticipates the increase in population, adequate classroom space would always be available. Unavoidable Adverse Environmental Impacts — In the short-term there could be school crowding in Bamberg County.	Adverse Impact — Initially there may be insufficient classroom space for the influx of construction workers families. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Increased tax revenues as a result of the large construction project would fund additional school resources. Because the project has a long lead time, and the construction workforce would build gradually, it is likely that if the community anticipates the increase in population, adequate classroom space would always be available. Unavoidable Adverse Environmental Impacts — In the short-term there could be school crowding in Saluda County.
	Adverse Impact — Increase in demand for public services in Aiken, Barnwell, Columbia and Richmond Counties. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Increased tax revenues after construction begins could be used to purchase additional facilities/equipment and hire/train additional staff, if necessary. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Increase in demand for public services in Bamberg County. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Increased tax revenues after construction begins could be used to purchase additional facilities/equipment and hire/train additional staff, if necessary. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Increase in demand for public services in Saluda and Newberry Counties. Mitigation Measure — Discuss construction plans and anticipated influx of workers with community leaders. Increased tax revenues after construction begins could be used to purchase additional facilities/equipment and hire/train additional staff, if necessary. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts

Table 10.4-4 (Sheet 13 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Radiological	Adverse Impact — Construction workers would be exposed to small doses of radiation from the existing Savannah River Site facilities. Mitigation Measure — None required. All doses would be well within regulatory limits. Unavoidable Adverse Environmental Impacts — Small radiation exposure to construction workers.	Adverse Impact — None. Because Cope Generating Station is a nonnuclear facility construction workers would not be exposed to radiation. Mitigation Measure — No mitigation required. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — None. Because the site is undeveloped construction workers would not be exposed to radiation. Mitigation Measure — No mitigation required. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
Atmospheric and Meteorological	Adverse Impact — Temporary and localized noise, fugitive dust, and exhaust emissions during construction Mitigation Measure — Regularly inspect and maintain equipment. Phase construction to minimize daily emissions. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc. Unavoidable Adverse Environmental Impacts — Temporary and localized noise, fugitive dust, and exhaust emissions during construction.	Adverse Impact — Temporary and localized noise, fugitive dust, and exhaust emissions during construction Mitigation Measure — Regularly inspect and maintain equipment. Phase construction to minimize daily emissions. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc. Unavoidable Adverse Environmental Impacts — Temporary and localized noise, fugitive dust, and exhaust emissions during construction.	Adverse Impact — Temporary and localized noise, fugitive dust, and exhaust emissions during construction Mitigation Measure — Regularly inspect and maintain equipment. Phase construction to minimize daily emissions. Develop and implement a dust control plan that includes mitigation measures such as watering unpaved roads, stabilizing construction roads, phasing grading activities and ceasing them during high winds, etc. Unavoidable Adverse Environmental Impacts — Temporary and localized noise, fugitive dust, and exhaust emissions during construction.
Environmental Justice	Adverse Impact — No disproportionately high or adverse impacts on minority or low-income populations from construction of the proposed new units have been identified. Mitigation Measure — None required. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — No disproportionately high or adverse impacts on minority or low-income populations resulting from construction of the proposed new units have been identified. Mitigation Measure — None required. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — No disproportionately high or adverse impacts on minority or low-income populations resulting from construction of the proposed new units have been identified. Mitigation Measure — None required. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 14 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
	Operations-Related		
Land Use	Adverse Impact — Operating the new units would generate radioactive and non-radioactive wastes that are required to be disposed in permitted disposal facilities or permitted landfills. Generation of spent fuel requiring disposal in a geologic repository.	Adverse Impact — Operating the new units would generate radioactive and non-radioactive wastes that are required to be disposed in permitted disposal facilities or permitted landfills. Generation of spent fuel requiring disposal in a geologic repository.	Adverse Impact — Operating the new units would generate radioactive and non-radioactive wastes that are required to be disposed in permitted disposal facilities or permitted landfills. Generation of spent fuel requiring disposal in a geologic repository.
	Mitigation Measure — Practice waste minimization to minimize the volume of wastes.	Mitigation Measure — Practice waste minimization to minimize the volume of wastes.	Mitigation Measure — Practice waste minimization to minimize the volume of wastes.
	Unavoidable Adverse Environmental Impacts — Some land would be dedicated to permitted landfills or licensed disposal facilities and would not be available for other uses.	Unavoidable Adverse Environmental Impacts — Some land would be dedicated to permitted landfills or licensed disposal facilities and would not be available for other uses.	Unavoidable Adverse Environmental Impacts — Some land would be dedicated to permitted landfills or licensed disposal facilities and would not be available for other uses.
	Adverse Impact — Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.	Adverse Impact — Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.	Adverse Impact — Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.
	Mitigation Measure — No mitigation would be required	Mitigation Measure — No mitigation would be required	Mitigation Measure — No mitigation would be required
	Unavoidable Adverse Environmental Impacts — Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.	Unavoidable Adverse Environmental Impacts — Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.	Unavoidable Adverse Environmental Impacts — Permanent commitment of 17 acres of land per year for each AP1000 unit due to the fuel cycle.

Table 10.4-4 (Sheet 15 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Hydrology and Water Use	Adverse Impact — Operations would result in discharge of small amounts of chemicals to the Savannah River.	Adverse Impact — Operations would result in discharge of small amounts of chemicals to the South Fork Edisto River.	Adverse Impact — Operations would result in discharge of small amounts of chemicals to Lake Murray.
	Mitigation Measure — All discharges would comply with NPDES permit and applicable water quality standards. Prepare and implement a Storm Water Pollution Prevention Plan to avoid/ minimize releases of contaminated storm water. Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills.	Mitigation Measure — All discharges would comply with NPDES permit and applicable water quality standards. Prepare and implement a Storm Water Pollution Prevention Plan to avoid/ minimize releases of contaminated storm water. Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills.	Mitigation Measure — All discharges would comply with NPDES permit and applicable water quality standards. Prepare and implement a Storm Water Pollution Prevention Plan to avoid/ minimize releases of contaminated storm water. Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Maintenance activities at the site and along the transmission line could result in small petroleum spills	Adverse Impact — Maintenance activities at the site and along the transmission line could result in small petroleum spills.	Adverse Impact — Maintenance activities at the site and along the transmission line could result in small petroleum spills.
	Mitigation Measure — Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills.	Mitigation Measure — Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills.	Mitigation Measure — Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 16 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Hydrology and Water Use (continued)	Adverse Impact — Maximum surface water consumptive use would be less that 8.3% of the lowest annual mean flow. Mitigation Measure — Design and operate intake structures based on best available technology. Monitor hydrological impacts as required by NDPES permit. No other mitigation required. Unavoidable Adverse Environmental Impacts — Water lost through evaporation would not be available for other uses.	Adverse Impact — Maximum groundwater consumptive use of 93.6 mgd could drawdown the aquifer. Mitigation Measure — Design and operate plant systems to minimize water use. Consider use of dry cooling towers. Monitor hydrological impacts. Unavoidable Adverse Environmental Impacts — Water lost through evaporation would not be available for other uses.	Adverse Impact — Maximum surface water consumptive use would represent 2.7% of the annual mean inflow to Lake Murray. Mitigation Measure — Design and operate intake structures based on best available technology. Monitor hydrological impacts as required by NDPES permit. No other mitigation required. Unavoidable Adverse Environmental Impacts — Water lost through evaporation would not be available for other uses.
	Adverse Impact — Operations would result in a small thermal plume discharged to the Savannah River. Mitigation Measure — The differences between plume temperature and ambient water temperature would be maintained within limits set in the NPDES permit. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Operations would result in a small thermal plume discharged to the South Fork Edisto River. Mitigation Measure — The differences between plume temperature and ambient water temperature would be maintained within limits set in the NPDES permit. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Operations would result in a small thermal plume discharged to Lake Murray. Mitigation Measure — The differences between plume temperature and ambient water temperature would be maintained within limits set in the NPDES permit. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Water consumption and discharges during fuel cycle activities. Mitigation Measure — No mitigation would be required. Unavoidable Adverse Environmental Impacts — Water loss from process cooling would be 210 million gallons per year for each AP1000 unit. Mine drainage discharges would be 170 million gallons per year for each AP1000 unit due to the fuel cycle.	Adverse Impact — Water consumption and discharges during fuel cycle activities. Mitigation Measure — No mitigation would be required. Unavoidable Adverse Environmental Impacts — Water loss from process cooling would be 210 million gallons per year for each AP1000 unit. Mine drainage discharges would be 170 million gallons per year for each AP1000 unit due to the fuel cycle.	Adverse Impact — Water consumption and discharges during fuel cycle activities. Mitigation Measure — No mitigation would be required. Unavoidable Adverse Environmental Impacts — Water loss from process cooling would be 210 million gallons per year for each AP1000 unit. Mine drainage discharges would be 170 million gallons per year for each AP1000 unit due to the fuel cycle.

Table 10.4-4 (Sheet 17 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Aquatic Ecology	Adverse Impact — Operations would result in discharge of small amounts of chemicals to the Savannah River. Mitigation Measure — The NPDES permit limits are set to ensure that discharges do not significantly affect aquatic populations or water quality. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Operations would result in discharge of small amounts of chemicals to the South Fork Edisto River. Mitigation Measure — The NPDES permit limits are set to ensure that discharges do not significantly affect aquatic populations or water quality. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Operations would result in discharge of small amounts of chemicals to Lake Murray. Mitigation Measure — The NPDES permit limits are set to ensure that discharges do not significantly affect aquatic populations or water quality. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Routine maintenance activities could result in petroleum spills near water. Mitigation Measure — Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Routine maintenance activities could result in petroleum spills near water. Mitigation Measure — Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Routine maintenance activities could result in petroleum spills near water. Mitigation Measure — Prepare and implement a Spill Prevention, Control, and Countermeasure Plan to avoid/minimize contamination from spills. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Impingement, entrainment and thermal discharges. Mitigation Measure — Cooling towers. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Thermal discharges. Mitigation Measure — Cooling towers. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Impingement, entrainment and thermal discharges. Mitigation Measure — Cooling towers. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 18 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Terrestrial Ecology	Adverse Impact — Deposition of low concentrations of solids on plant property from operation of the cooling towers.	Adverse Impact — Deposition of low concentrations of solids on plant property from operation of the cooling towers.	Adverse Impact — Deposition of low concentrations of solids on plant property from operation of the cooling towers.
	Mitigation Measure — Design cooling towers to ensure the rate of deposition would be less than that expected to cause leaf damage. No other mitigation is necessary.	Mitigation Measure — Design cooling towers to ensure the rate of deposition would be less than that expected to cause leaf damage. No other mitigation is necessary.	Mitigation Measure — Design cooling towers to ensure the rate of deposition would be less than that expected to cause leaf damage. No other mitigation is necessary.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Episodic loud noises at the site or along transmission lines could frighten animals.	Adverse Impact — Episodic loud noises at the site or along transmission lines could frighten animals.	Adverse Impact — Episodic loud noises at the site or along transmission lines could frighten animals.
	Mitigation Measure — None necessary.	Mitigation Measure — None necessary.	Mitigation Measure — None necessary.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 19 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Terrestrial Ecology (continued)	Adverse Impact — Vegetation growth in corridors would be kept in check, including eliminating woody growth, by periodic maintenance including mowing and applying herbicides. Mitigation Measure — Implement existing procedures for transmission line maintenance designed to protect flora and fauna. Train personnel in the handling of fuel and lubricants and the cleanup and reporting of any incidental spills. Have adequate spill response equipment on hand during maintenance activities in the corridors. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Vegetation growth in corridors would be kept in check, including eliminating woody growth, by periodic maintenance including mowing and applying herbicides. Mitigation Measure — Implement existing procedures for transmission line maintenance designed to protect flora and fauna. Train personnel in the handling of fuel and lubricants and the cleanup and reporting of any incidental spills. Have adequate spill response equipment on hand during maintenance activities in the corridors. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Vegetation growth in corridors would be kept in check, including eliminating woody growth, by periodic maintenance including mowing and applying herbicides. Mitigation Measure — Implement existing procedures for transmission line maintenance designed to protect flora and fauna. Train personnel in the handling of fuel and lubricants and the cleanup and reporting of any incidental spills. Have adequate spill response equipment on hand during maintenance activities in the corridors. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
Socioeconomic	Adverse Impact — The plants emit low noise. Mitigation Measure — Noise levels would normally not be above background at the site boundary. No mitigation is necessary. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — The plants emit low noise. Mitigation Measure — Noise levels would normally not be above background at the site boundary. No mitigation is necessary. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — The plants emit low noise. Mitigation Measure — Noise levels would normally not be above background at the site boundary. No mitigation is necessary. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Episodic loud noises could annoy nearby residents. Mitigation Measure — Handle incidents on a case-by-case basis. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Episodic loud noises could annoy nearby residents. Mitigation Measure — Handle incidents on a case-by-case basis. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Episodic loud noises could annoy nearby residents. Mitigation Measure — Handle incidents on a case-by-case basis. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 20 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic (continued)	Adverse Impact — New transmission lines have potential to induce electric shock in people standing near the line. Mitigation Measure — Build transmission lines to NESC code to minimize noise and electric shock. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — New transmission lines have potential to induce electric shock in people standing near the line. Mitigation Measure — Build transmission lines to NESC code to minimize noise and electric shock. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — New transmission lines have potential to induce electric shock in people standing near the line. Mitigation Measure — Build transmission lines to NESC code to minimize noise and electric shock. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Additional cooling towers and plumes would impact existing viewscape. Mitigation Measure — No mitigation needed. Cooling towers would not be visible from offsite areas. Plumes would resemble clouds when seen from a distance. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Additional cooling towers and plumes would impact existing viewscape. Mitigation Measure — No mitigation needed. Cooling towers are consistent with the industrial nature of the site. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Cooling towers and plumes would impact existing viewscape. Mitigation Measure — Consider landscaping to hide towers. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Operation of two units would increase the traffic on local roads during shift change. Outages at the Savannah River Site would increase traffic even further. Mitigation Measure — None required. Local roads are designed to handle the increased volume of traffic. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Two additional units would increase the traffic on local roads during shift change. More frequent outages at Cope Generating Station would increase traffic even further. Mitigation Measure — Consider staggering outage shifts to reduce plant-associated traffic on local roads during shift changes. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Adverse Impact — Operation of two units would increase the traffic on local roads during shift change. Outages at the Saluda site would increase traffic even further. Mitigation Measure — Consider staggering outage shifts to reduce plant-associated traffic on local roads during shift changes. Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 21 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic (continued)	Adverse Impact — Emissions from diesel generators.	Adverse Impact — Emissions from diesel generators.	Adverse Impact — Emissions from diesel generators.
	Mitigation Measure — No mitigation needed. Emission would be within limits established in certificates of operation.	Mitigation Measure — No mitigation needed. Emission would be within limits established in certificates of operation.	Mitigation Measure — No mitigation needed. Emission would be within limits established in certificates of operation.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Potential for occupational injuries and illnesses.	Adverse Impact — Potential for occupational injuries and illnesses.	Adverse Impact — Potential for occupational injuries and illnesses.
	Mitigation Measure — Implement existing SCE&G industrial safety program.	Mitigation Measure — Implement existing SCE&G industrial safety program.	Mitigation Measure — Implement existing SCE&G industrial safety program.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Consumption of fossil fuels during the fuel cycle process would be small relative to the power production.	Adverse Impact — Consumption of fossil fuels during the fuel cycle process would be small relative to the power production.	Adverse Impact — Consumption of fossil fuels during the fuel cycle process would be small relative to the power production.
	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Fuel cycle activities would have liquid discharges.	Adverse Impact — Fuel cycle activities would have liquid discharges.	Adverse Impact — Fuel cycle activities would have liquid discharges.
	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 22 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Socioeconomic (continued)	Adverse Impact — Potential for occupational injuries and illnesses.	Adverse Impact — Potential for occupational injuries and illnesses.	Adverse Impact — Potential for occupational injuries and illnesses.
	Mitigation Measure — Implement existing SCE&G industrial safety program.	Mitigation Measure — Implement existing SCE&G industrial safety program.	Mitigation Measure — Implement existing SCE&G industrial safety program.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
Radiological	Adverse Impact — Potential doses to members of the public from releases to air and surface water.	Adverse Impact — Potential doses to members of the public from releases to air and surface water.	Adverse Impact — Potential doses to members of the public from releases to air and surface water.
	Mitigation Measure — All releases would be well below regulatory limits. No mitigation required.	Mitigation Measure — All releases would be well below regulatory limits. No mitigation required.	Mitigation Measure — All releases would be well below regulatory limits. No mitigation required.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
Atmospheric and Meteorological	Adverse Impact — Entrained particles in plume from cooling towers would contribute to particulate emissions.	Adverse Impact — Entrained particles in plume from cooling towers would contribute to particulate emissions.	Adverse Impact — Entrained particles in plume from cooling towers would contribute to particulate emissions.
	Mitigation Measure — Cooling towers would be designed to minimize plume. No mitigation required.	Mitigation Measure — Cooling towers would be designed to minimize plume. No mitigation required.	Mitigation Measure — Cooling towers would be designed to minimize plume. No mitigation required.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

Table 10.4-4 (Sheet 23 of 23)
Unavoidable Adverse Environmental Impacts of Proposed Project at Alternative Sites

Category	Proposed Project at Savannah River Site (SRS)	Proposed Project at Cope Generating Station (CGS)	Proposed Project at Saluda Site (greenfield)
Atmospheric and Meteorological (continued)	Adverse Impact — Diesels would contribute to air emissions.	Adverse Impact — Diesels would contribute to air emissions.	Adverse Impact — Diesels would contribute to air emissions.
	Mitigation Measure — Comply with permit limits and regulations for installing and operating air emission sources.	Mitigation Measure — Comply with permit limits and regulations for installing and operating air emission sources.	Mitigation Measure — Comply with permit limits and regulations for installing and operating air emission sources.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
	Adverse Impact — Relatively small quantities of air pollutants would be result from the fuel cycle.	Adverse Impact — Relatively small quantities of air pollutants would be result from the fuel cycle.	Adverse Impact — Relatively small quantities of air pollutants would be result from the fuel cycle.
	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.
Environmental Justice	Adverse Impact — No disproportionately high or adverse impacts on minority or low-income populations resulting from operation of the proposed new units have been identified.	Adverse Impact — No disproportionately high or adverse impacts on minority or low-income populations resulting from operation of the proposed new units have been identified.	Adverse Impact — No disproportionately high or adverse impacts on minority or low-income populations resulting from operation of the proposed new units have been identified.
	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.	Mitigation Measure — No mitigation needed.
	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.	Unavoidable Adverse Environmental Impacts — No unavoidable adverse impacts.

10.5 CUMULATIVE IMPACTS

This section discusses cumulative adverse impacts to the region's environment that could result from the construction and operation of VCSNS Units 2 and 3. A cumulative impact is defined in Council of Environmental Quality regulations (40 CFR 1508.7) as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

To determine cumulative impacts during the duration of preconstruction and construction activities, the environmental impacts presented in Chapter 4 for constructing Units 2 and 3 were "added" to the existing environment described in Chapter 2. Cumulative impacts anticipated during preconstruction and construction are discussed in Subsection 10.5.1. To determine cumulative impacts during the much longer operational period of 40 years, the environmental impacts presented in Chapter 5 for operating Units 2 and 3 were "added" to the existing conditions (Chapter 2). Discussion of these cumulative impacts is included in Subsection 10.5.2.

10.5.1 CUMULATIVE IMPACTS FROM CONSTRUCTION

Construction activities at the VCSNS site would use some surface water withdrawn from the Monticello Reservoir, which is maintained with water from the Broad River. As presented in Subsection 2.3.2, the 7Q10 value at the closest downstream gauging station, the Alston station, is 382,800 gpm. The construction activities for Units 2 and 3 would withdraw up to 420 gpm from the Monticello Reservoir. Unit 1 consumes approximately 5,800 gpm of water from the Monticello Reservoir, which is approximately 1.5% of the 7Q10 flow of the Broad River. The additional withdrawal for Units 2 and 3 would modify this percentage to approximately 1.6%.

The sole significant downstream water user before the Broad River flows into the Congaree River is the City of Columbia, which withdraws about 32.5 million gpd (24,000 gpm) from the Broad River. The cumulative impact on the water supply of the Broad River from the VCSNS site water usage would be SMALL.

As described in Subsection 4.2.3, the water quality impacts from construction of Units 2 and 3 that incorporate required erosion control and spill prevention and control measures would be small and localized. Therefore, cumulative impacts to water quality are not expected.

Units 2 and 3 would be constructed on a portion of the 2,560-acre VCSNS site. Construction would disturb approximately 500 acres, which includes approximately 435 acres of forest. The 6-mile vicinity has approximately 56,700 acres in forest land. The construction area is less than 1% of the forested area. SCE&G did not identify any other large construction projects planned for the vicinity. The construction of Unit 1 did not spur a great amount of growth in Fairfield County or the portions of the Counties of Lexington, Newberry, and

Richland that lie near VCSNS. SCE&G expects the impacts of Units 2 and 3 to be similar. Therefore, no land use cumulative impacts in the vicinity of VCSNS are expected.

New transmission lines would be constructed from the VCSNS outward across several counties. Figure 2.2-4 shows the relative locations of transmission substations that would be termination points for new transmission lines. The substations and transmission lines would require relatively narrow strips of land many miles long. As indicated in Section 4.1.2, the impact expected to land use would be SMALL to MODERATE. Given that the land area needed for the construction of the transmission infrastructure would be small in any given area, cumulative impacts with other construction projects occurring in the county/area would be SMALL.

During construction, noise levels will increase above those now experienced at Unit 1; however, the noise levels would return to those expected for a power generation facility after construction ceases. No other large construction activities are planned in the vicinity, and so noise from construction will not be cumulative with other industrial sources. The impacts from the environmental noise of construction activities would be SMALL.

Construction will result in increased air emissions from commuter traffic and the construction equipment. However, as noted, this is the only large construction project planned for the area and the air quality in the vicinity is in attainment with National Ambient Air Quality standards. No adverse cumulative impacts to air quality are expected.

The peak construction workforce will be approximately 3,600 people and the percentage of the workforce that would live in the four-county area of influence (Fairfield, Lexington, Newberry, and Richland Counties) is expected to have SMALL impacts on the housing market, schools, and public and social services. The impacts to the local roads in Fairfield and Newberry Counties would be MODERATE after implementing mitigation measures designed to ease traffic congestion. SCE&G did not identify other large construction projects that would lead to cumulative impacts in air quality, noise level, traffic and transportation, and other population-related impacts.

10.5.2 CUMULATIVE IMPACTS OF OPERATIONS

After operations begin, Units 2 and 3 would use greater quantities of surface water than during the construction activities. Units 2 and 3 are estimated to consume approximately 27,800 gpm to 31,100 gpm for normal and maximum use operations, respectively (Subsection 5.2.1). Unit 1 consumes approximately 5,800 gpm of water from the Monticello Reservoir, which is approximately 1.5% of the 7Q10 flow of the Broad River at Alston. The cumulative consumptive water use for Units 1, 2, and 3 using the maximum operations estimate would be approximately 9.6% of the 7Q10 flow.

As stated in Section 5.2, consumptive losses due to operation of Units 2 and 3 would, under normal circumstances (typical annual flows), be barely discernible on the flow of the Broad River. The additional consummation of water by Unit 1 would not significantly change this assessment. During low-flow periods, the impact of this consumptive use on the availability of water downstream of the plant would be mitigated by the reservoirs from which SCE&G could remove water instead of directly removing water from the Broad River.

SCE&G identified one other planned significant water consumer, Duke Energy's proposed Lee Nuclear Station (Section 2.8 and Figure 2.8-1), which would be upstream of Units 2 and 3. Lee Nuclear is proposed to consist of two AP1000 units with 2,200 MW capacity that would be operational by 2016 (Duke Energy 2007a). Lee Nuclear would be comparable to Units 2 and 3 in design, capacity, and construction and operational timeframes. Duke Energy is conducting safe yield analyses for the Upper Broad River Basin and may also conduct the analyses for the Lower Broad River Basin, which includes the Monticello and Parr Reservoirs (Duke Energy 2007b). The safe yield analyses would enable Duke Energy to design water supply reserves as necessary to operate Lee Nuclear within safe water yield parameters. Therefore, cumulative impacts of the operation of VCSNS (3 units) and Lee Nuclear with any necessary water supply features and mitigation measures are expected to have a SMALL impact on water usage in the Lower Broad River Basin.

As discussed in Subsections 5.2.3, 5.3.1.2, and 5.3.2.2, the water quality and aquatic ecology impacts from operations would be small and localized. Cumulative impacts are not expected.

Units 2 and 3 are expected to result in permanent land use impacts to approximately 240 acres at the VCSNS site. As stated above, SCE&G did not identify other large industrial projects planned for the vicinity and based on its experience with Unit 1, does not expect Units 2 and 3 to spur development in the vicinity. Therefore, cumulative land use impacts are expected to be SMALL.

From Subsection 5.4.5, the occupational radiation doses from Units 2 and 3 are estimated to be 67 rem for each of the two units. This is similar to the dose received by workers on Unit 1. Table 2.9-1 gives the annual occupational doses from Unit 1 for 2003 through 2005 to be 71, 10, and 73 person-rem, respectively. The average annual dose is 51 person-rem. On this basis, the cumulative occupational dose from the three units would be approximately 185 person-rem.

During operations, Units 2 and 3 would have small amounts of liquid and gaseous releases. These releases would be cumulative to Unit 1's releases and are presented in Table 5.4-7. Because of distance and dilution, Lee Nuclear releases contribute a trivially small increase to the doses presented in Table 5.4-7. Unirradiated fuel transportation would also contribute to radioactivity doses to the public. As indicated in Section 2.8, fuel rods are assembled in Columbia, South Carolina. Therefore, unirradiated fuel intended for Units 2 and 3 and Lee Nuclear, both north of Columbia along I-77, could add to the dose to members of the public along the route. Using Table 5.11-6, the cumulative dose per reactor year from

four AP1000 reactor units plus Unit 1 (using the LWR reference reactor dosage) would be 0.0042 person-rem to people along the route.

Shipments of spent fuel from Units 2 and 3, Lee Nuclear, and the other 24 reactor units for which NRC expects to receive applications for licensure by 2009 (U.S. NRC 2007) would contribute to radiation doses to transportation crews and the public. Using the doses presented in Table 5.11-9 for the AP1000, the additional doses in person-rem per year are estimated as follows:

Population	Units 2 & 3	Proposed South Carolina Units	Proposed U.S. Units (including South Carolina)
Crew	4.2	8.4	58.8
Onlookers	26	52	364
Along the route	0.64	1.28	8.96

Assuming a dose conversion factor of 6 fatal cancers per 1×10^4 person-rem, the total dose associated with all the proposed reactor units in the United States (approximately 432 person-rem) would result in less than one cancer death. For comparison and perspective, DOE estimated that transporting the spent nuclear fuel from the existing reactors across the United States to Yucca Mountain in Nevada (52,786 shipments) could result in three cancer death in persons residing along the route. About 2.3 million cancer deaths would likely result from all other causes not associated with the transportation of spent nuclear fuel. (U.S. DOE 2002)

The radioactive waste from nuclear reactors in South Carolina, Connecticut, and New Jersey could be disposed of at the radioactive waste disposal site operated by Energy Solutions in Barnwell, South Carolina (Section 2.8). The estimated landfill space for the years 2008 to 2023 is approximately 1,000,000 cubic feet (The State 2007). The facility would close to all other states in 2008 and close completely in 2023. Using the expected annual waste shipment rate of 1,964 cubic feet as presented in Table 3.5-3 per AP1000 unit for an estimation basis, the 13 existing reactor units in the three states would generate approximately 400,000 cubic feet of waste from 2008 to 2023. The proposed units in South Carolina, VCSNS Units 2 and 3, and Lee Nuclear would generate approximately 57,000 cubic feet of waste from 2016 to 2023. The cumulative total is expected to be approximately 470,000 cubic feet, 47% of the available capacity.

The fuel cycle specific to new units at VCSNS and the other reactor units in the planning stages in the United States would contribute to the cumulative impacts of fuel production, storage, and disposal of all nuclear units in the United States, but the cumulative impacts of the fuel cycle for the existing reactors is SMALL and the addition of the impacts of up to 28 new units would not change that conclusion when examining impacts across the United States.

As stated above, 28 new reactor units are in the planning stage, including two other units in South Carolina. Each unit would require hundreds of workers trained to work with and around radiological materials. The United States could face a significant shortage of trained workers to fill these positions**.** SCE&G is working with Midlands Technological College in South Carolina to develop a degree program in Radiation Protection and a cooperative agreement to recruit students from the school's Science Department for the purpose of training Auxiliary Operator positions. Existing cooperative agreements with Midlands Technical College and other South Carolina technical colleges recruit students for training for electricians, instrument mechanics, and mechanics positions at VCSNS. SCE&G is also a member of the New Carolina Council (Carolina Nuclear Cluster). This organization has members from North Carolina and South Carolina nuclear utilities, vendors, and universities. One goal of the Cluster is to identify and provide resolution for education and training needs for new nuclear plant construction and operation. In addition, SCE&G has a Nuclear Training Group that manages specialized training in craft, technical, and nuclear operations. Through these efforts to develop its needed workforce rather than relying on the worker population with the specialized skills and experience of working at a nuclear generating plant, VCSNS would not have to recruit trained workers from nuclear generating facilities nor draw graduates from specialized training programs operated by other public or private training or educational institutes. Therefore, any VCSNS contributions to cumulative impacts in the area of worker shortages would be minimized. The contribution would be SMALL and primarily stem from trained workers and non-SCE&G training program graduates entering the job market and seeking employment opportunities with VCSNS.

The operations workforce replacing the larger construction workforce would continue the increased traffic (over current conditions) on the local roads in Fairfield and Newberry Counties, but the impact would be characterized as SMALL to MODERATE. The impact would increase during outages when the workforce increases; however, mitigation measures to minimize traffic congestion would be implemented and the impact would remain SMALL to MODERATE.

Other socioeconomic impacts, including increased tax revenues to Fairfield County, would be cumulative with socioeconomic changes brought about through the construction and operation of Unit 1, and changes due to normal population growth. Taxes from VCSNS would continue to compose a large portion of the tax revenues collected by Fairfield County. The infrastructure of Fairfield, Lexington, Newberry, and Richland Counties is adequate to support new operations employees. No other projects that would involve in-migration of a large workforce have been identified in the vicinity. Cumulative adverse socioeconomic impacts other than traffic impacts would be SMALL.

Section 7.2 presents severe accident dose-risk for Units 2 or 3 as 0.052 person-rem per reactor year. The environmental report for license renewal of Unit 1 (SCE&G 2002) reports a dose-risk of 0.95 person-rem per reactor year. Because these risks are frequency-weighted, they are summable yielding a total VCSNS site dose-risk of 1.0 person-rem per reactor year.

The remaining impacts from the construction and operation of Units 2 and 3 at the VCSNS site as summarized in Table 10.1-2 are SMALL and would not contribute significantly to existing or future cumulative impacts to the vicinity or the region.

Section 10.5 References

1. Duke Energy 2007a, *First Quarter Earnings Review,* May 8, Available at http://www.duke-energy.com/pdfs/1Q07_Slides.pdf. Accessed May 31, 2007.

2. Duke Energy 2007b, *Water Quantity Model for the Upper Broad River Basin and Appendix A, Water Quantity Model for the Lower Broad River Basin,* March 5, 2007.

3. SCE&G 2002, *Environmental Report for V. C. Summer Nuclear Station*. Available at http://www.nrc.gov/reactors/operating/licensing/renewal/applications/summer.html.

4. The State 2007, *"Legislators Slam Door to Nuclear Waste Site,"* March 29, Available at http://hps.org/govtrelations/documents/barnwell_billvoteddown_newsarticle.pdf. Accessed May 21, 2007.

5. U.S DOE 2002, *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*. Page 6-40 and Table J-1. DOE/EIS-0250, February. Available at http://www.eh.doe.gov/nepa/eis/eis0250/eis0250index.html.

6. U.S. NRC 2007, *Expected New Nuclear Power Plant Applications,* Updated April 27, 2007, Available at http://www.nrc.gov/reactors/new-licensing/new-licensing-files/expected-new-rx-applications.pdf. Accessed May 21, 2007.