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United States Nuclear Regulatory Commission
Protecting People and the Environment

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Draft Environmental Impact Statement for Combined Licenses for Virgil C. Summer Nuclear Station Units 2 and 3

Draft Report for Comment

U.S. Nuclear Regulatory Commission
Office of New Reactors
Washington, DC 20555-0001

Regulatory Division
Special Projects Branch
Charleston District
U.S. Army Corps of Engineers
Charleston, SC 29403-5107

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Abstract

This environmental impact statement (EIS) has been prepared to satisfy the requirements of the National Environmental Policy Act of 1969, as amended (NEPA). The EIS has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by South Carolina Electric and Gas (SCE&G), acting for itself and for Santee Cooper (the State-owned electric and water utility, formally called the South Carolina Public Service Authority) for combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the SCE&G application are (1) NRC issuance of COLs for two new nuclear power reactor units (Units 2 and 3) at the V.C. Summer Nuclear Station (VCSNS) site in Fairfield County, South Carolina, and (2) U.S. Army Corps of Engineers (USACE) permit action on a Department of the Army (DA) Individual Permit application to perform certain activities on the site. The USACE is participating with the NRC in preparing this EIS as a cooperating agency and participates collaboratively on the review team.

This EIS includes the analysis by the NRC and USACE staff that considers and weighs the environmental impacts of building and operating two new nuclear units at the VCSNS site and at alternative sites, and mitigation measures available for reducing or avoiding adverse impacts. The EIS also addresses Federally listed species, cultural resources, and essential fish habitat issues.

The EIS includes the evaluation of the proposed project's impacts to waters of the United States pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. The USACE will base its evaluation of the DA Individual Permit application on the requirements of USACE regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the USACE public interest review process.

After considering the environmental aspects of the proposed NRC action, the staff's preliminary recommendation to the Commission[(a)] is that the COLs be issued as requested. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by SCE&G; (2) consultation with Federal, State, Tribal, and local agencies; (3) the staff's independent review; (4) the staff's consideration of comments related to the environmental review that were received during the public scoping process; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. The USACE permit decision will be made following issuance of the final EIS.

(a) The Commission is the NRC body of up to five commissioners that formulates policies, develops regulations governing nuclear reactor and nuclear material safety, issues orders to licensees, and adjudicates legal matters.

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Executive Summary

By letter dated March 27, 2008, the U.S. Nuclear Regulatory Commission (NRC or the Commission) received an application from South Carolina Electric and Gas (SCE&G), acting for itself and for Santee Cooper (the State-owned electric and water utility, formally called the South Carolina Public Service Authority) for combined construction permits and operating licenses (combined licenses or COLs) for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 to be located adjacent to the existing Unit 1 in Fairfield County, South Carolina. The NRC staff's review is based on Revision 1 of the Environmental Report (ER), received February 13, 2009, responses to requests for additional information, and supplemental letters.

On March 2, 2010, SCE&G submitted a joint Federal/State Application for the Department of the Army Individual Permit to the U.S. Army Corps of Engineers (USACE). The USACE application number is SAC 2007-1852-SIR.

The proposed actions related to the VCSNS Units 2 and 3 application are (1) NRC issuance of COLs for construction and operation of two new nuclear units at the VCSNS site, and (2) USACE permit action on a Department of the Army (DA) Individual Permit application pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. The U.S. Environmental Protection Agency has the authority to review and veto USACE decisions of Section 404 permits. The USACE is participating collaboratively on the review team. The reactors specified in the application are Westinghouse Electric Company, LLC (Westinghouse) Advanced Passive 1000 (AP1000) pressurized water reactors. The application references Revision 17 of the AP1000 certified design.

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA), directs that an EIS be prepared for major Federal actions that significantly affect the quality of the human environment. The NRC has implemented Section 102 of NEPA in Title 10 of the Code of Federal Regulations (CFR) Part 51. Further, in 10 CFR 51.20, the NRC has determined that the issuance of a COL under 10 CFR Part 52 is an action that requires an environmental impact statement (EIS).

The purpose of SCE&G's requested NRC action is to obtain COLs to construct and operate two baseload nuclear power plants. These licenses are necessary but not sufficient for construction and operation of the units. A COL applicant must obtain and maintain the necessary permits from other Federal, State, and local agencies and permitting authorities. Therefore, the purpose of the NRC's environmental review of the SCE&G application is to determine if two new nuclear power plants of the proposed design can be constructed and operated at the VCSNS site without unacceptable adverse impacts on the human environment. The SCE&G permit

application to the USACE is for work to prepare the site and facilities for a nuclear power-generation station at the existing VCSNS site.

The NRC began the environmental review process described in 10 CFR Part 51 by publishing in the *Federal Register* on January 5, 2009, a Notice of Intent to prepare an EIS and conduct scoping. Two scoping meetings were held to obtain public input on the scope of the environmental review. The first meeting was held in Winnsboro, South Carolina, on January 27, 2009. The second meeting was held in Blair, South Carolina, on January 28, 2009. In addition, NRC held a public informational meeting for the local community on March 28, 2009. The NRC staff reviewed the comments received during the scoping process and contacted Federal, State, Tribal, regional, and local agencies to solicit comments.

To gather information and to become familiar with the sites and their environs, the NRC and its contractor, Pacific Northwest National Laboratory, visited the VCSNS site and four alternative sites in March 2009. During the site visits, the NRC staff and its contractor met with SCE&G staff, public officials, and the public. Included in this EIS are (1) the results of the review team's analyses, which consider and weigh the environmental effects of the proposed actions; (2) potential mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's recommendation regarding the proposed action.

To guide its assessment of the environmental impacts of a proposed action or alternative actions, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels – SMALL, MODERATE, and LARGE:

> SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Potential mitigation measures were considered for each resource category and are discussed in the appropriate sections of the EIS.

In preparing this EIS, the NRC staff, its contractor staff, and USACE staff, referred to collectively as the review team, evaluated the applications, including the ER submitted by SCE&G; consulted with Federal, State, Tribal, and local agencies; and followed the guidance set forth in

NUREG-1555, *Environmental Standard Review Plan* (ESRP; NRC 2000). In addition, the review team considered the public comments related to the environmental review received during the scoping process. Comments within the scope of the environmental review are included in Appendix D of this EIS.

The NRC staff's preliminary recommendation to the Commission related to the environmental aspects of the proposed action is that the COLs be issued as requested. This recommendation is based on (1) the application, including the ER submitted by SCE&G; (2) consultation with other Federal, State, Tribal, and local agencies; (3) the staff's independent review; (4) the staff's consideration of comments related to the environmental review that were received during the scoping process; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. The USACE will base its evaluation of the DA Individual Permit application on the requirements of USACE regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the USACE public interest review process. The USACE's permit decision will be made after issuance of the final EIS.

A 75-day comment period will begin on the date of publication of the EPA Notice of Availability of the filing of the draft EIS to allow members of the public and agencies to comment on the results of the environmental review. During this period, the NRC and USACE staff will conduct a public meeting near the VCSNS site to describe the results of the environmental review, provide members of the public with information to assist them in formulating comments on this EIS, respond to questions, and accept public comment. The public meeting also serves as the USACE public hearing, which means a public proceeding conducted for the purpose of acquiring information or evidence that will be considered in evaluating a proposed DA permit action and that affords the public an opportunity to present their views, opinions, and information on such permit actions or Federal projects. After the comment period, the review team will consider all the comments received during the comment period. These comments and review team responses will be included in the final EIS.

The NRC staff's evaluation of the site safety and emergency preparedness aspects of the proposed action will be addressed in the NRC's final Safety Evaluation Report.

Abbreviations/Acronyms

7Q10	lowest flow for 7 consecutive days expected to occur once per decade
AADT	annual average daily traffic
ac	acre(s)
ACE	Ashepoo, Combahee, Edisto (river basin)
ac-ft	acre feet
ACHP	Advisory Council on Historic Preservation
A.D.	Anno Domini
ADAMS	Agencywide Documents Access and Management System
AIS	(South Carolina) Aquatic Invasive Species (Task Force)
ALARA	as low as reasonably achievable
AP1000	Advanced Passive 1000 pressurized water reactor
APE	Area of Potential Effect
ASTM	American Society for Testing and Materials
AQCR	Air Quality Control Region
AQI	Air Quality Index
BA	biological assessment
BACT	Best Available Control Technologies
BEA	Bureau of Economic Analysis
BEIR	Biological Effects of Ionizing Radiation
BGEPA	Bald and Golden Eagle Protection Act
BLS	Bureau of Labor Statistics
BMP	best management practice
BOD	biochemical oxygen demand
BP	Before Present
Bq	becquerel(s)
BRWMA	Broad River Wildlife Management Area
Btu	British thermal unit(s)
°C	degree(s) Celsius
C&D	construction and demolition debris
CAA	Clean Air Act
CBS	Carnagey Biological Services
CDC	U.S. Centers for Disease Control and Prevention
CDF	core damage frequency
CEDE	committed effective dose equivalent
CEQ	Council on Environmental Quality
CFL	compact fluorescent light

CFR	Code of Federal Regulations
cfs	cubic foot/feet per second
CGS	Cope Generating Station
Ci	curie(s)
cm	centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
COL	combined construction permit and operating license
COLA	combined license application
CORMIX	Cornell Mixing Zone Expert System
CPCN	Certificate of Environmental Compatibility and Public Convenience and Necessity
CWA	Clean Water Act (aka Federal Water Pollution Control Act)
CWIS	cooling-water intake structure
CWS	circulating-water system
CY	calendar year
d	day(s)
DA	Department of the Army
DAR	Daughters of the American Revolution
dB	decibel(s)
dBA	decibel(s) on the A-weighted scale
DBA	design basis accident
DCD	Design Control Document
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
D/Q	deposition factor(s); annual normalized total surface concentration rate(s)
DSM	demand-side management
DTS	demineralized water treatment
EA	environmental assessment
EAB	exclusion area boundary
EDE	effective dose equivalent
EE/DSM	energy efficiency/demand-side management
EIA	Energy Information Administration
EIS	environmental impact statement
ELF	extremely low frequency
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
EPACT	Energy Policy Act
EPC	Engineer, Procure, Construct (contract)

EPRI	Electric Power Research Institute
EPT	Ephemeroptera, Plecoptera, and Trichoptera (Index)
ER	Environmental Report
ESA	Endangered Species Act
ESP	Early Site Permit
ESRP	Environmental Standard Review Plan
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FES	Final Environmental Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FP&S	Facilities Planning & Siting
FPC	Federal Power Commission
fps	foot (feet) per second
FPSF	Fairfield Pumped Storage Facility
FR	*Federal Register*
FSAR	Final Safety Analysis Report
FSER	Final Safety Evaluation Report
ft	foot/feet
ft^2	square foot/feet
ft^3	cubic foot/feet
FWS	U.S. Fish and Wildlife Service
µg	microgram(s)
g	gram(s)
gal	gallon(s)
GCRP	U.S. Global Change Research Council
GEIS	Generic Environmental Impact Statement
GHG	greenhouse gas
GI-LLI	gastrointestinal lower large intestine
GIS	geographic information system
gpd	gallon(s) per day
gpm	gallon(s) per minute
HLW	high-level waste
hr	hour(s)
HUC	Hydrologic Unit Code
Hz	hertz
I	U.S. Interstate

IAEA	International Atomic Energy Agency
IEA	International Energy Agency
ICRP	International Commission on Radiological Protection
IEA	International Energy Agency
IGCC	integrated gasification combined cycle
in.	inch(es)
IRP	Integrated Resource Plan
IRWST	in-containment refueling water storage tank
ISFSI	independent spent-fuel storage installation
kg	kilogram(s)
km	kilometer(s)
km^2	square kilometer(s)
km/hr	kilometer(s) per hour
kV	kilovolt(s)
kW	kilowatt(s)
kW(e)	kilowatt(s) electric
kWh	kilowatt-hour(s)
L	liter(s)
Ldn	day night average sound level
LEDPA	least environmentally damaging practicable alternative
lb	pound(s)
LFG	landfill-based gas
LLC	Limited Liability Company
LLW	low-level waste
LOCA	loss-of-coolant accident
LOS	level of service
LPZ	low-population zone
LTRA	Long-Term Reliability Assessment
LWA	Limited Work Authorization
LWD	large woody debris
LWR	light water reactor
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
m^3/s	cubic meter(s) per second
mA	milliampere(s)
mg	milligram(s)
MEI	maximally exposed individual

Mgd	million gallon(s) per day
mGy	milligray(s)
MHW	mean high water
mi	mile(s)
mi^2	square mile(s)
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
mm	millimeter
MMTCE	million metric tons of carbon equivalent
MOU	Memorandum of Understanding
MOX	mixed oxides
mpg	mile(s) per gallon
mph	mile(s) per hour
mrad	millirad
mrem	millirem
msl	mean sea level
mSv	millisievert(s)
MT	metric ton(nes)
MTU	metric ton(nes) uranium
MW	megawatt(s)
MW(e)	megawatt(s) electric
MWh	megawatt-hour(s)
MW(t)	megawatt(s) thermal
MWd	megawatt-day(s)
NA	not applicable
NAAQS	National Ambient Air Quality Standard
NAVD	Northern American Vertical Datum
NCBI	North Carolina Biotic Index
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection and Measurements
NCW&SA	Newberry County Water & Sewer Authority
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide

NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSA	New South Associates
NSPS	new source performance standard
NTU	Nephelometric Turbidity Units
NUREG	U.S. Nuclear Regulatory Commission technical document
NWI	National Wetlands Inventory
O_3	ozone
ODCM	Offsite Dose Calculation Manual
OECD	Organization for Economic Cooperation and Development
OL	operating license
OSHA	Occupational Safety and Health Administration
OW	observation well
p.	page
PAM	primary amoebic meningoencephalitis
PARS	Publicly Available Records System
PBA	powerblock area
pCi	picocurie(s)
pH	measure of acidity or basicity in solution
PIR	Public Interest Review
PIRF	Public Interest Review Factor
PK–12	preschool through 12th grade
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter 2.5 microns or less
pp.	pages
ppm	part(s) per million
PRA	probabilistic risk assessment
PSC	Public Service Commission
PSCSC	Public Service Commission of South Carolina
PSD	Prevention of Significant Deterioration (Permit)
PURPA	Public Utility Regulatory Policies Act
PV	photovoltaic
QL	quantification limit

rad	radiation absorbed dose
RAI	Request(s) for Additional Information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
RFP	Request for Proposal
RIMS II	Regional Input-Output Modeling System
ROI	region of interest
RRS	(SERC's) Reliability Review Subcommittee
Ryr	reactor year
μS/cm	microsievert(s) per centimeter
s or sec	second(s)
SACTI	Seasonal/Annual Cooling Tower Impact (prediction code)
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
Santee Cooper	The State-owned electric and water utility, formally called South Carolina Public Service Authority.
SC	South Carolina
SCBCB	South Carolina Budget and Control Board
SCDAH	South Carolina Department of Archives and History
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDOT	South Carolina Department of Transportation
SCE&G	South Carolina Electric and Gas
SCFC	South Carolina Forestry Commission
SCIAA	South Carolina Institute of Archaeology and Anthropology
SCORS	South Carolina Office of Research and Statistics
SCR	selective catalytic reduction
SCS	Santee-Cooper System
SER	Safety Evaluation Report
SERC	Southeastern Electric Reliability Council
SHPO	State Historic Preservation Office (or Officer)
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SR	Savannah River (alternative site)
SRP	Savannah River Plant
SRS	Savannah River Site
SSC	structures, systems, or components
SU	Standard Unit(s)
Sv	sievert(s)

SWPPP	stormwater pollution prevention plan
SWS	service-water system
T	ton(s)
TBD	to be determined
T&E	threatened and endangered
TDEC	Tennessee Department of Environment and Conservation
TDS	total dissolved solids
TEDE	total effective dose equivalent
THPO	Tribal Historic Preservation Officer
TLD	thermoluminescent dosimeters
TRC	TRC Companies, Inc.
UC	University of Chicago
UF_6	uranium hexafluoride
UMTRI	University of Michigan Transportation Research Institute
UO_2	uranium dioxide
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFA	U.S. Fire Administration
USGS	U.S. Geological Survey
US	U.S. (State Highway)
VACAR	Virginia-Carolinas (subregion)
VCSNS	Virgil C. Summer Nuclear Station
VEGP	Vogtle Electric Generating Plant
VOC	volatile organic compound
Webb	R.S. Webb and Associates
Westinghouse	Westinghouse Electric Company, LLC
WHO	World Health Organization
WWTP	wastewater-treatment plant
WY	water year (October 1 through September 30)
χ/Q	atmospheric dispersion factor(s); annual average normalized air concentration value(s)

yd	yard(s)
yd^3	cubic yard(s)
yr	year(s)
yr^{-1}	per year

Appendix A

Contributors to the Environmental Impact Statement

Appendix A

Contributors to the Environmental Impact Statement

The overall responsibility for the preparation of this environmental impact statement was assigned to the Office of New Reactors, U.S. Nuclear Regulatory Commission (NRC). The statement was prepared by members of the Office of New Reactors with assistance from other NRC organizations, the Pacific Northwest National Laboratory, and the U.S. Army Corps of Engineers.

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(a) Pacific Northwest National Laboratory is operated by Battelle for the U.S. Department of Energy.

Appendix B

Organizations Contacted

Appendix B

Organizations Contacted

The following Federal, State, regional, Tribal, and local organizations were contacted during the course of the U.S. Nuclear Regulatory Commission staff's review of potential environmental impacts from the construction and operation of two new nuclear units (Units 2 and 3) at the Virgil C. Summer Nuclear Station in Fairfield County, South Carolina:

Advisory Council on Historic Preservation, Office of Federal Agency Programs, Washington, D.C.

Catawba Indian Nation, Rock Hill, South Carolina

Central SC Alliance, Columbia, South Carolina

Cherokee Nation, Tahlequah, Oklahoma

Clemson University Agricultural Extension Office, Winnsboro, South Carolina

Clemson University Cooperative Extension Service, Sandhill Institute, Columbia, South Carolina

Eastern Band of the Cherokee Nation, Cherokee, North Carolina

Fairfield County Council, South Carolina

Fairfield County Economic Development Office, Winnsboro, South Carolina

Fairfield County School District, Winnsboro, South Carolina

Fairfield County, South Carolina (offices of administrator, sheriff, tax assessor)

Federal Energy Regulatory Commission, Washington, D.C.

Gethsemane Baptist Church, Blair, South Carolina

Midlands Workforce Development Board, Columbia, South Carolina

Midlands Workforce Development Board, Fairfield Workforce Office, Winnsboro, South Carolina

National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, Florida

Newberry County, South Carolina

South Carolina Department of Archives & History, Columbia, South Carolina

South Carolina Department of Health and Environmental Control, Columbia, South Carolina

South Carolina Department of Natural Resources, Columbia, South Carolina

South Carolina Department of Transportation (Planning Department), Columbia, South Carolina

South Carolina Institute of Archaeology and Anthropology, Columbia, South Carolina
South Carolina State Historic Preservation Office, Columbia, South Carolina
Town of Jenkinsville, South Carolina
Town of Peak, South Carolina
Town of Winnsboro, South Carolina
U.S. Army Corps of Engineers, Charleston District, Charleston, South Carolina
U.S. Fish and Wildlife Service, Southeast Region 4, Charleston, South Carolina
United Keetoowah Band of Cherokee Indians, Tahlequah, Oklahoma
United Way of the Midlands, Columbia, South Carolina
White Hall African Methodist Episcopal Church, Jenkinsville, South Carolina

Appendix C

Chronology of NRC and USACE Environmental Review Correspondence

Appendix C

Chronology of NRC and USACE Environmental Review Correspondence

This appendix contains a chronological list of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and South Carolina Electric & Gas (SCE&G) and other correspondence related to the NRC staff's environmental review, under Title 10 of the Code of Federal Regulations (CFR) Part 51, for SCE&G's application for combined licenses (COLs) at the Virgil C. Summer Nuclear Station site in Fairfield County, South Carolina. This appendix also includes correspondence between the U.S. Army Corps of Engineers (USACE) and SCE&G related to SCE&G's request for a Department of the Army permit to conduct construction activities that result in alteration of waters of the United States, including wetlands.

All documents, with the exception of those containing proprietary information, are available through the Commission's Public Document Room, at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, and are available electronically from the Public Electronic Reading Room found on the Internet at the following web address: http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents in the component of ADAMS. The ADAMS accession numbers for each document are included below.

March 27, 2008	Letter from Mr. Stephen A. Byrne, SCE&G, to NRC transmitting the application for Combined Licenses for Virgil C. Summer Nuclear Station Units 2 and 3 (Accession No. ML081300460).
June 26, 2008	Letter from NRC to Mr. Stephen Byrne, SCE&G, acknowledging receipt of the Combined License Application for Virgil C. Summer Nuclear Station Units 2 and 3 and transmitting associated Federal Register Notice (Accession No. ML082310602).
July 9, 2008	Federal Register Notice of Receipt and Availability of Application for Combined Licenses for Virgil C. Summer Nuclear Station, Units 2 and 3 (73 FR 39339).

July 31, 2008	Letter from NRC to Mr. Stephen Byrne, SCE&G, regarding the acceptance review for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application and associated Federal Register Notice of acceptance for docketing of SCE&G's application for combined licenses (Accession No. ML082310607).
August 1, 2008	Federal Register Notice of SCE&G Acceptance for Docketing of an Application for a Combined License for the Virgil C. Summer Nuclear Station (Accession No. ML082100597).
August 6, 2008	Federal Register Notice of Acceptance for Docketing of an Application for a Combined License for the Virgil C. Summer Nuclear Station (73 FR 45792).
September 24, 2009	Letter from NRC to Ms. Laura McMaster, Fairfield County Library, Regarding Maintenance of Reference Materials for the Environmental Review of the Virgil C. Summer Nuclear Station Combined License application (Accession No. ML082490363).
September 26, 2008	Letter from NRC to Mr. Ronald B. Clary, SCE&G, Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application Review Schedule (Accession No. ML082800232).
January 7, 2009	Notice of Public Meeting to Discuss Environmental Scoping Process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application (Accession No. ML083520289).
January 12, 2009	Letter from NRC to Mr. Michell Hicks, Eastern Band of the Cherokee, Regarding Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License application (Accession No. ML083380737).
January 12, 2009	Letter from NRC to Mr. Donald Rogers, Catawba Indian Nation, regarding notification and request for consultation and participation in the scoping process for the environmental review of the Virgil C. Summer Nuclear Station Combined License application (Accession No. ML083380556).

January 12, 2009	Letter from NRC to Mr. Chad 'Corntassel' Smith, Cherokee Nation, regarding notification and request for consultation and participation in the scoping process for the environmental review of the Virgil C. Summer Nuclear Station Combined License application (Accession No. ML083380585).
January 12, 2009	Letter from NRC to Mr. George Wickliffe, United Keetoowah Band of Cherokee, regarding notification and request for consultation and participation in the scoping process for the environmental review of the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application (Accession No. ML083380614).
January 12, 2009	Letter from NRC to Ms. Lora Zimmerman, U.S. Fish and Wildlife Service, regarding request for participation in the scoping process for the environmental review for Virgil C. Summer Nuclear Station Combined License Application (Accession No. ML083380411).
January 12, 2009	Letter from NRC to Mr. David Bernhart, National Marine Fisheries Service, regarding request for participation in environmental scoping process and a list of protected species within the area under evaluation for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License application review (Accession No. ML083370604).
January 12, 2009	Letter from NRC to Mr. Don Klima, Advisory Council on Historic Preservation, Regarding Request for Participation in the Scoping Process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License application review (Accession No. ML083370280).
January 12, 2009	Letter from NRC to Ms. Caroline Wilson, South Carolina Department of Archives & History, Regarding Request for Participation in the Scoping Process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application Review (Accession No. ML083380728).
January 12, 2009	Letter from NRC to Mr. George Taylor, Federal Energy Regulatory Commission, Regarding Request for Participation in the Scoping Process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application Review (Accession No. ML083659305).

January 12, 2009	Letter from NRC to Ms. Vivianne Vejdani, South Carolina Department of Natural Resources, Regarding Request for Participation in Environmental Scoping Process and List of Protected Species for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application (Accession No. ML083380682).
January 22, 2009	Letter from Mr. Timothy Hall, U.S. Fish and Wildlife Service, to NRC regarding request for participation in the scoping process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application review (Accession No. ML090330702).
February 10, 2009	Letter from Mr. Richard Jordan, III, USACE, to NRC requesting that the Charleston District be a cooperating agency in the Virgil C. Summer environmental review (Accession No. ML090650712).
February 17, 2009	Letter from Ms. Charlene Dwin Vaughn, U.S. Advisory Council on Historic reservation, to NRC, regarding request for participation in the scoping process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application review (Accession No. ML090860436).
March 3, 2009	Summary of public scoping meeting related to the environmental scoping process for Virgil C. Summer Nuclear Station, Units 2 and 3 combined license application (Accession No. ML090620448).
March 6, 2009	Letter from Ms. Vivianne Vejdani, South Carolina Department of Natural Resources, to NRC regarding request for participation in the scoping process for the Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application review (Accession No. ML090840384).
May 5, 2009	Summary of open house public meeting related to the environmental scoping process for Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application (Accession No. ML091140422).
May 20, 2009	Letter from NRC to USACE regarding the USACE request to be a cooperating agency for the Virgil C. Summer environmental review (Accession No. ML091200404).
June 22, 2009	Letter from NRC to Mr. Ronald Clary, SCE&G, transmitting requests for additional information in regards to Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application (Accession No. ML091340600).

June 29, 2009	Letter from Dr. Richard Darden, USACE, to SCE&G providing an approved jurisdictional determination (Accession No. ML093380013).
July 13, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting responses to NRC Environmental Report (ER) Requests for Additional Information (RAI): CR-1 and 11, AqEco-5, 6, and 8, TerEco-2 and 3, GW-4, 5, 7, and 8, LU-2, SEcon-1, 5, and 7, and BenCost-2 and 3, NND-09-0183 (Accession No. ML092020357).
July 13, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Response to NRC Environmental Report (ER) Requests for Additional Information (RAI): Alt-3, AqEco-7, CR-3, GW-6, Met-1, SEcon-6, and SW-2, NND-09-0184 (Accession No. ML092010266).
July 15, 2009	Scoping Summary Report related to the environmental scoping process for Virgil C. Summer Nuclear Station, Units 2 and 3 Combined License Application (Accession No. ML091960341).
July 20, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Response to NRC Environmental Report (ER) Requests for Additional Information (RAI): TLine-2 and 3, NND-09-0198 (Accession No. ML092030443).
July 20, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting responses to NRC environmental report (ER) requests for additional information (RAI): AqEco-2, 3, 4, and 9, NND-09-0202 (Accession No. ML092040428).
July 21, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Response to NRC Environmental Report (ER) Requests for Additional Information (RAI): CR-4, 5, 7, 8, 9, and 10, and TLine-1, NND-09-0204 (Accession No. ML092040676).
July 21, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Completion Schedule for Responses to NRC Environmental Report (ER) Requests for Additional Information (RAI), NND-09-0206 (Accession No. ML092040586).
July 30, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Response to NRC Environmental Report (ER) Requests for Additional Information (RAI): CR-2 and 6, LU-1, and AqEco-1, NND-09-0209 (Accession No. ML092150358).

July 30, 2009	Letter from Mr. Ronald Clary, SCE&G, to USACE transmitting Response to Environmental Report (ER) Requests for Additional Information (RAI): USACE-1, NND-09-0210 (Accession No. ML09 2160218).
August 6, 2009	Letter from Mr. Ronald Clary, SCE&G, to USACE transmitting Response to Environmental Report (ER) Requests for Additional Information (RAI): USACE- 2, 3, 4, and 5, NND-09-0236 (Accession No. ML092230165).
August 6, 2009	E-mail from Jennifer Davis, NRC, to SCE&G, Santee Cooper, and South Carolina Department of Archives & History, and review team members concerning the process for completing Section 106 consultation (Accession No. ML092400382).
August 7, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting response to NRC environmental report (ER) requests for additional information (RAI): BenCost-1 and SEcon-4, NND-09-0237 (Accession No. ML092230230).
August 17, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting response to NRC environmental report (ER) requests for additional information (RAI): Met-3, NND-09-0247 (Accession No. ML092310682).
August 25, 2009	E-mail from Tamsen Dozier, NRC to April Rice, SCE&G, concerning clarification of response to Environmental RAI GW-2 (Accession No. ML092370525).
August 28, 2009	E-mail from Tamsen Dozier, NRC to April Rice, SCE&G, concerning clarification of response to Environmental RAI CR-3 (Accession No. ML092400161).
September 16, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Revision to ER Section 2.7 to Incorporate Two Years of Meteorological Data, NND-09-0270 (Accession No. ML092670578).
September 24, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting additional information to support the environmental report review of the Virgil C. Summer Nuclear Station, Units 2 & 3 - Combined License Application, NND-09-0276 (Accession No. ML092930042).
September 30, 2009	Letter from Mr. Stephen Byrne, SCE&G, to NRC transmitting responses to NRC environmental report (ER) requests for additional information (RAI): AqEco-2 Final Report, NND-09-0280 (Accession No. ML092750412).

October 8, 2009	Letter from Mr. Stephen Byrne, SCE&G, to NRC transmitting Response to NRC Environmental Report (ER) Requests for Additional Information (RAI): BenCost-1 and GW-2 Supplemental Response, NND-09-0285 (Accession No. ML092860135).
October 20, 2009	Letter from Ms. Caroline Wilson, South Carolina Department of Archives & History, to NRC regarding a V.C. Summer Nuclear Plant archaeological site (Accession No. ML093080369).
October 22, 2009	Letter from Mr. Al Paglia, SCE&G, to the South Carolina Department of Archives & History regarding an archaeological survey of approximately 7.7 Acres in the vicinity of the proposed water treatment plant, NND-09-0294.
November 19, 2009	E-mail from Tamsen Dozier, NRC, to April Rice, SCE&G, concerning clarification of responses to information need G-5 and RAI Gen-3 (Accession No. ML093270350).
November 20, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Supplemental Response to NRC Environmental Report (ER) Information Needs NP-1, AQ-11 and AQ-13, NND-09-0320 (Accession No. ML093310245).
December 1, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Response to NRC Environmental Report (ER) Request for Additional Information (RAI) Met-3 Revision 1, NND-09-0326 (Accession No. ML093420121).
December 2, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Revised Response to NRC Environmental Report (ER) Request for Additional Information (RAI) GW-3, NND-09-0333 (Accession No. ML093380302).
December 3, 2009	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting Supplemental Response to NRC Environmental Report (ER) Request for Additional Information (RAI) Gen-3 and Information Need G-5, NND-09-0334 (Accession No. ML093410516).
December 28, 2009	Letter from Mr. Ronald Clary, SCE&G, to USACE transmitting Supplemental Response to Request for Additional Information (RAI) USACE-3, NND-09-0346 (Accession No. ML093650260).

January 19, 2010	Letter from Mr. Ronald Clary, SCE&G, to USACE transmitting Response to Request for Additional Information (RAI) USACE-2 Revision 1, NND-10-0022 (Accession No. ML100700542).
January 19, 2010	Letter from Mr. Ronald Clary, SCE&G, to NRC transmitting the Santee Cooper 2009 Integrated Resource Plan, NND-10-0027(Accession No. ML100321529).
February 23, 2010	Letter from NRC to Mr. Ronald Clary, SCE&G, Regarding the Combined License Environmental Review Schedule (Accession No. ML100541130).
March 8, 2010	Summary of Conference Calls Held to Discuss NRC's Section 106 Consultation Process and the Environmental Review for the Combined License for the Virgil C Summer Nuclear Station Units 2 and 3 (Accession No. ML100660003).
March 18, 2010	Summary of the Environmental Site Audit and Alternative Site Visit Related to the Review of the Combined License Application for Virgil C. Summer Nuclear Station, Units 2 and 3 (Accession No. ML1004800082).

Appendix D

Scoping Comments and Responses

Appendix D

Scoping Comments and Responses

On January 5, 2009, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process in the *Federal Register* (74 FR 323). The Notice of Intent notified the public of the staff's intent to prepare an environmental impact statement (EIS) and conduct scoping for the application for combined construction permit and operating licenses (COLs) received from South Carolina Electric & Gas (SCE&G) for two new nuclear power reactors at its Virgil C. Summer Nuclear Station (VCSNS) in Fairfield County, South Carolina, identified as VCSNS Units 2 and 3. The NRC invited the SCE&G; Federal, Tribal, State, and local government agencies; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meeting and/or submitting written suggestions and comments no later than March 6, 2009. In early March, in response to a request from the mayor of Jenkinsville, South Carolina, the NRC extended the scoping comment period to April 6, 2009.

D.1 Overview of the Scoping Process

The scoping process provides an opportunity for public participants to identify issues to be addressed in the EIS and highlight public concerns and issues. Two public scoping meetings were held in Fairfield County: one on January 27, 2009, at Fairfield Central High School in Winnsboro, South Carolina, and one on January 28, 2009, at McCrorey-Liston Elementary School in Blair, South Carolina. At the Winnsboro meeting, 32 attendees provided oral or written comments that were recorded and transcribed by a certified court reporter; at the Blair meeting, 25 attendees provided comments. The meeting summary and transcripts of both meetings are available electronically in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agency Document Access and Management System (ADAMS), which is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams/web-based.html (the Public Electronic Reading Room; note that the URL is case-sensitive). The ADAMS accession numbers for the meeting summary, Winnsboro meeting transcript, and Blair meeting transcript are ML090610244, ML090410393, and ML090410326, respectively.

On March 2, 2009, the NRC published a notice of an extension to the environmental scoping period by 30 days to April 6, 2009 (74 FR 9112). The extension was granted in response to a request from the mayor of the town of Jenkinsville, South Carolina, which is the community closest to the VCSNS. The NRC also held a public informational meeting for the local community on March 28, 2009, at McCrorey-Liston Elementary School in Blair, South Carolina.

The March 28 meeting was an informal open house at which members of the public could engage NRC staff and ask questions about the NRC's environmental review process. A meeting summary is available electronically from ADAMS (accession number ML091140076).

In addition to the oral comments and written statements submitted at the public meetings, the NRC received 11 emails and 39 letters (including letters attached to emails) containing comments during the scoping period. The NRC also received copies of a survey questionnaire originated by a member of the Jenkinsville community and completed by nearly 200 community members. Written comments or concerns expressed by the survey respondents were transcribed and captured as comments in the *Scoping Process Summary Report, V.C. Summer Nuclear Station Units 2 and 3 Combined License* (ML091960347), for consideration by the NRC staff in the same manner as comments and suggestions received during the scoping meeting or in writing afterwards.

Preparation of the EIS has taken into account the relevant issues raised during the scoping process. The comments related to this environmental review are included in this appendix. They were extracted from the *Scoping Process Summary Report, V.C. Summer Nuclear Station Units 2 and 3 Combined License* (ML091960347), and are provided for the convenience of those interested specifically in the scoping comments applicable to this environmental review. The comment categories that are outside the scope of the environmental review for the proposed VCSNS Units 2 and 3 are not included in this Appendix. These categories include comments related to:

- Safety
- Emergency Preparedness
- NRC Oversight for operating plants
- Security and Terrorism
- Support or Opposition to the licensing action, licensing process, nuclear power, hearing process, or the existing plant

To maintain consistency with the Scoping Summary Report, the correspondence identification (ID) number along with the name of the commenter used in that report is retained in this appendix.

Table D-1 identifies in alphabetical order the individuals who provided comments during the scoping period, their affiliations, if given, and the ADAMS accession number that can be used to locate the correspondence. Although all commenters are listed, the comments presented in this appendix are limited to those within the scope of the environmental review. Table D-2 lists the comment categories in alphabetical order and commenter names and comment numbers for each category. The balance of this appendix presents the comments themselves with NRC staff responses organized by topic category.

Table D-1. Individuals Providing Comments During Scoping Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Archie, Jeff	VC Summer Nuclear Station Unit 1	Meeting Transcript (ML090410326)	0011
Barnes, Jenifer		Letter (ML091100407) Meeting Transcript (ML090410326)	0041 0049
Barrett, J. Gresham	South Carolina	Letter (ML090410393)	0003
Beaman, Charles, Jr.	Greater Columbia Chamber of Commerce	Letter (ML090540444) Letter (ML090840370) (duplicate)	0031 0031
Benjamin, Steve	Greater Columbia Chamber of Commerce	Letter (ML090540444) Letter (ML090840370) (duplicate)	0031 0031
Berg, Michael	Carolina Peace Resource Center	Meeting Transcript (ML090410393)	0010
Brendell, Julie		Letter (ML091100407)	0041
Brown, Henry E.	South Carolina	Letter (ML090410393)	0003
Brown, Laura		Email (ML090840356)	0023
Brown, R. David	Fairfield County Council	Letter (ML090410393) Meeting Transcript (ML090410393)	0005 0010
Byrd, William A.	Privacom Ventures, Inc.	Email (ML090270892)	0001
Byrne, Stephen	South Carolina Electric & Gas	Meeting Transcript (ML090410393)	0010
Calcaterra, Ron	Central Electricity Power Cooperative	Meeting Transcript (ML090410393)	0010
Campbell, Paul G., Jr.	South Carolina State Senate	Letter (ML090780111) Letter (ML090840385) (duplicate)	0017 0017
Cincotta, Jill	Fairfield County School District	Meeting Transcript (ML090410326)	0011
Clary, C. Douglas, Jr.	Greater Chapin Chamber of Commerce	Letter (ML090410326) Meeting Transcript (ML090410326)	0007 0011
Clements, Tom	Friends of the Earth	Meeting Transcript (ML090410393) Meeting Transcript (ML090410326)	0010 0011

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Clyburn, James E.	South Carolina	Letter (ML090410393)	0003
Coahran, Franklin		Email (ML090840359)	0025
Coleman, Creighton	State of South Carolina Senate	Meeting Transcript (ML090410393)	0010
Combie, Joan	Montana Polysaccharides	Email (ML090840366)	0030
Cooper, Elaine		Meeting Transcript (ML090410393)	0010
Corbett, Susan		Meeting Transcript (ML090410393)	0010
		Meeting Transcript (ML090410326)	0011
Cromer, Allen and Dee		Email (ML090840364)	0029
DeMint, Jim	South Carolina	Letter (ML090410393)	0003
Dennis, Dan		Meeting Transcript (ML090410326)	0049
Duncan, Jeff	State of South Carolina House of Representatives	Letter (ML090720069)	0017
Ferguson, David	Fairfield County Council	Meeting Transcript (ML090410393)	0010
Gatson, Annette		Meeting Transcript (ML091070261)	0052
Gatson, Viola		Meeting Transcript (ML091070261)	0052
Ginyard, Betty		Letter (ML091070328)	0043
Ginyard, Gregrey	Town of Jenkinsville	Meeting Transcript (ML090410326)	0011
Graham, Lindsey	South Carolina	Letter (ML090410393)	0003
Greenlaw, Pamela		Meeting Transcript (ML090410393)	0010
Gregorie, Jim	Home Builders Association of South Carolina	Letter (ML090840373)	0032
Guild, Robert	Sierra Club, Friends of the Earth	Meeting Transcript (ML090410393)	0010
Gunter, Deborah		Meeting Transcript (ML090410326)	0011
Hager, Richard		Meeting Transcript (ML090410326)	0011

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Hall, Timothy N.	U. S. Fish and Wildlife Service	Letter (ML090540396)	0012
Harrison, James H.	SC House of Representatives Judiciary Committee	Letter (ML090840392)	0017
Harrison, Tiffany	Fairfield County	Meeting Transcript (ML090410326)	0049
Hartmeier, Gina		Meeting Transcript (ML090410326)	0049
Hartz, John	SC Chapter of Sierra Club	Meeting Transcript (ML090410393)	0010
Hendrix, Clifton		Meeting Transcript (ML090410393)	0010
		Meeting Transcript (ML090410326)	0049
Hendrix, Samuel H.	Carolinas Associated General Contractors	Letter (ML090750701)	0046
Hentz, Darryl	Town of Pomaria	Letter (ML090420178)	0045
Hill, Carol		Meeting Transcript (ML090410326)	0011
Hope, Leslie B.	Carolinas Associated General Contractors	Letter (ML090750701)	0046
Inglis, Bob	South Carolina	Letter (ML090410393)	0003
Kinley, Mary Lynn	Fairfield County Council	Meeting Transcript (ML090410393)	0010
Knight, Travis		Meeting Transcript (ML090410393)	0010
Kosko, Jim		Email (ML090840358)	0024
Laffitte, Sterling	South Carolina Bankers Association	Letter (ML090840378)	0019
		Letter (ML090780109) (duplicate)	0019
Lanier, Hope	CASEnergy Coalition, MG&C Consulting	Letter (ML090840387)	0021
Lewis, Crosby		Letter (ML090860437)	0048
		Meeting Transcript (ML090410326)	0049
Lummus, John	South Carolina Economic Developers Association	Letter (ML090840382)	0017
		Letter (ML090840382)	0020
Mann, Deborah		Letter (ML091100407)	0041

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Marcharia, Kamau	Fairfield County Council	Meeting Transcript (ML090410393)	0010
		Meeting Transcript (ML090410326)	0011
Mason, Corry		Meeting Transcript (ML090410393)	0010
		Meeting Transcript (ML090410326)	0011
McDow, Charlie	South Carolina Congressional Delegation	Meeting Transcript (ML090410393)	0010
McLeese, Ike	Greater Columbia Chamber of Commerce	Letter (ML090540444)	0031
		Letter (ML090840370) (duplicate)	0031
McLeod, Rick	Savannah River Site Community Reuse Organization	Meeting Transcript (ML090410393)	0010
Merrill, Denver	Citizens for Sound Conservation	Letter (ML090840375)	0033
Moore, Robbie		Letter (ML091100407)	0041
Newton, Larry		Meeting Transcript (ML090410326)	0011
Novinger, Cathy	Greater Columbia Chamber of Commerce	Letter (ML090540444)	0031
		Letter (ML090840370) (duplicate)	0031
Ott, Harry L., Jr.	SC House of Representatives, Dist. 93	Letter (ML090840367)	0017
Pearson, Debra		Meeting Transcript (ML090410326)	0011
Pinson, Lewis E.	South Carolina House of Representatives	Letter (ML090750178)	0017
Powers, Theresa	Newberry County	Meeting Transcript (ML090410393)	0010
Rabb, Ernestine		Meeting Transcript (ML090410326)	0011
Ramsburgh, John	Sierra Club of South Carolina	Meeting Transcript (ML090410326)	0011
Rawl, Otis B.	South Carolina Chamber of Commerce	Letter (ML090720071)	0015
		Letter (ML090720071)	0017
Reed, Cyrus	Sierra Club	Meeting Transcript (ML091070262)	0051

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Respondent, Community Survey		Meeting Transcript (ML091070261)	0052
		Meeting Transcript (ML091070262)	0051
		Meeting Transcript (ML091100158)	0050
Rhodes, Suzanne	League of Women Voters	Letter (ML090410326)	0009
		Meeting Transcript (ML090410393)	0010
Robin, Ella		Meeting Transcript (ML091070261)	0052
Robinson, Bobby		Meeting Transcript (ML091070261)	0052
Robinson, Claude		Meeting Transcript (ML091070261)	0052
Robinson, Terria		Meeting Transcript (ML091070261)	0052
Rudnicki, Steve		Meeting Transcript (ML090410326)	0011
Rudolph, Gerald		Meeting Transcript (ML090410393)	0010
Rusche, Ben	SC Governor's Nuclear Advisory Council	Letter (ML090410326)	0008
		Meeting Transcript (ML090410393)	0010
Sandifer, Bill	State of South Carolina House of Representatives	Letter (ML090720073)	0017
Schaffer, Jeff		Meeting Transcript (ML090410326)	0011
Shealy, Lewis	Town of Peak	Letter (ML090840379)	0034
Sims, Raymond	Thermo Fisher Scientific	Email (ML090840361)	0026
Smith, J. Roland	State of South Carolina House of Representatives	Letter (ML090720072)	0017
Sottile, Mike	South Carolina House of Representatives	Letter (ML090750179)	0017
Speth, Charles Ted	Greater Columbia Chamber of Commerce	Letter (ML090540444)	0031
		Letter (ML090840370) (duplicate)	0031
Spratt, John M.	South Carolina	Letter (ML090410393)	0003
Survey Respondent, 174		Meeting Transcript (ML091100158)	0050
Tansey, Sara		Meeting Transcript (ML090410393)	0010

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Thomas, Ralph	South Carolina Power Team	Meeting Transcript (ML090410393)	0010
Thomas, Ruth		Letter (ML090840393)	0037
		Letter (ML090860670) (duplicate)	0037
		Letter (ML091100339)	0040
		Letter (ML091100482) (duplicate)	0040
Thordahl, Jeff		Letter (ML090840390)	0017
Todd, J. Richards	South Carolina Trucking Association	Letter (ML090720070)	0014
Toole, W.R. (Rick)	Savannah River Site Community Reuse Organization	Letter (ML090410393)	0006
		Meeting Transcript (ML090410393)	0010
Vasuki, N.T.		Meeting Transcript (ML090410393)	0010
Vejdani, Vivianne	SC Department of Natural Resources	Letter (ML090840384)	0036
Von Kaenel, Hoyt		Meeting Transcript (ML090410393)	0010
Whatley, Michael	Southeast Energy Alliance	Letter (ML090820082)	0047
Whetsell, David		Email (ML090840363)	0028
White, Sonny	Midlands Technical College	Meeting Transcript (ML090410393)	0010
Whitten, Robert	Showa Denko Carbon	Meeting Transcript (ML090410393)	0010
Wiggs, Rose Mary		Email (ML090840362)	0027
Wilder, Ronald	University of South Carolina	Letter (ML091100339)	0040
		Letter (ML091100482) (duplicate)	0040
Wilson, Joe	South Carolina	Letter (ML090410393)	0003
Winsor, Susan A.	Aiken Technical College	Letter (ML090410393)	0004
Wojcicki, Joe		Email (ML091100341)	0044
		Meeting Transcript (ML090410393)	0010
		Meeting Transcript (ML090410326)	0011

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession Number	Corres-pondence ID
Wolfe, Clint	Citizens for Technology Awareness	Meeting Transcript (ML090410326)	0011
		Meeting Transcript (ML090410393)	0010
Zia, Barbara	League of Women Voters of South Carolina	Email (ML090840383)	0035

Table D-2. Comment Categories with Associated Commenters and Comment IDs

Comment Category	Commenter (Comment ID)
Accidents-Severe	• Gatson, Viola (0052-24) • Guild, Robert (0010-186) • Respondent, Community Survey (0050-84) (0051-11) • Thomas, Ruth (0037-4) (0037-15)
Alternatives-Energy	• Barnes, Jenifer (0049-10) • Berg, Michael (0010-23) (0010-25) • Byrd, William A. (0001-2) (0001-3) • Byrne, Stephen (0010-100) • Clements, Tom (0010-46) (0011-75) • Corbett, Susan (0010-65) (0010-75) (0011-116) (0011-117) (0011-122) • Dennis, Dan (0049-20) (0049-21) (0049-23) • Greenlaw, Pamela (0010-136) • Guild, Robert (0010-130) • Knight, Travis (0010-178) • Mason, Corry (0011-97) • Merrill, Denver (0033-6) (0033-7) (0033-8) • Newton, Larry (0011-124) (0011-125) (0011-127) • Rhodes, Suzanne (0009-1) (0009-2) (0010-53) • Sims, Raymond (0026-2) (0026-6) • Thomas, Ralph (0010-148) • Thomas, Ruth (0037-7) (0037-14) • Von Kaenel, Hoyt (0010-95) (0010-96) • Whetsell, David (0028-2) • Wiggs, Rose Mary (0027-1) • Wojcicki, Joe (0010-92) (0044-23) • Wolfe, Clint (0011-53) (0011-54) (0011-56) • Zia, Barbara (0035-1) (0035-3)
Alternatives-Sites	• Wojcicki, Joe (0010-82) (0010-84) (0010-89) (0011-58) (0011-59) (0011-61) (0011-63) (0011-68) (0044-3) (0044-7) (0044-8) (0044-10) (0044-19)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Benefit-Cost Balance	• Berg, Michael (0010-24) • Clements, Tom (0010-47) (0010-49) (0011-70) • Cooper, Elaine (0010-119) • Corbett, Susan (0010-76) (0011-115) (0011-118) • Guild, Robert (0010-128) • Knight, Travis (0010-179) • Mason, Corry (0010-155) (0011-94) • Ramsburgh, John (0011-18) (0011-20) • Thomas, Ruth (0040-3) (0040-4) (0040-5) (0040-6) • Wilder, Ronald (0040-3) (0040-4) (0040-5) (0040-6) • Wolfe, Clint (0010-110)
Cumulative Impacts	• Clements, Tom (0010-51) • Gunter, Deborah (0011-90) • Hall, Timothy N. (0012-1) • Merrill, Denver (0033-2) • Sims, Raymond (0026-1) • Tansey, Sara (0010-58) • Thomas, Ruth (0037-16) • Wojcicki, Joe (0044-12) (0044-13) • Wolfe, Clint (0011-50)
Decommissioning	• Byrne, Stephen (0010-104)
Ecology-Aquatic	• Barnes, Jenifer (0041-2) (0041-3) (0041-5) (0049-2) (0049-3) • Brendell, Julie (0041-2) (0041-3) (0041-5) • Hall, Timothy N. (0012-2) (0012-3) (0012-4) (0012-5) (0012-13) • Mann, Deborah (0041-2) (0041-3) (0041-5) • Moore, Robbie (0041-2) (0041-3) (0041-5) • Respondent, Community Survey (0051-47) • Vejdani, Vivianne (0036-1) (0036-2) (0036-11) (0036-13) (0036-18) • Wojcicki, Joe (0011-67)
Ecology-Terrestrial	• Barnes, Jenifer (0041-4) (0049-4) • Brendell, Julie (0041-4) • Dennis, Dan (0049-26) • Hall, Timothy N. (0012-6) (0012-7) (0012-8) (0012-9) (0012-10) (0012-11) (0012-14) • Mann, Deborah (0041-4) • Moore, Robbie (0041-4) • Respondent, Community Survey (0050-61) • Vejdani, Vivianne (0036-3) (0036-14) (0036-15)
Environmental Justice	• Barnes, Jenifer (0041-15) (0041-17) • Brendell, Julie (0041-15) (0041-17)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Clements, Tom (0011-78) • Corbett, Susan (0010-64) (0010-66) (0011-114) • Gunter, Deborah (0011-92) • Hager, Richard (0011-108) • Hill, Carol (0011-85) • Mann, Deborah (0041-15) (0041-17) • Marcharia, Kamau (0010-34) (0010-36) (0011-24) (0011-33) • Mason, Corry (0010-152) (0010-156) • Moore, Robbie (0041-15) (0041-17) • Rabb, Ernestine (0011-82) • Respondent, Community Survey (0050-4) (0050-45) (0050-50) (0050-54) (0051-7) (0051-37) (0051-68) • Tansey, Sara (0010-61) • Wojcicki, Joe (0010-87) (0010-88)
Geology	• Barnes, Jenifer (0041-18) (0041-19) • Brendell, Julie (0041-18) (0041-19) • Mann, Deborah (0041-18) (0041-19) • Moore, Robbie (0041-18) (0041-19)
Health-Nonradiological	• Barnes, Jenifer (0041-21) • Brendell, Julie (0041-21) • Ginyard, Betty (0043-1) • Knight, Travis (0010-176) • Mann, Deborah (0041-21) • Moore, Robbie (0041-21) • Respondent, Community Survey (0050-2) (0050-63) • Whetsell, David (0028-1)
Health-Radiological	• Barnes, Jenifer (0041-16) • Berg, Michael (0010-18) • Brendell, Julie (0041-16) • Clements, Tom (0011-77) • Cooper, Elaine (0010-113) • Corbett, Susan (0010-68) (0010-70) (0010-72) (0011-120) (0011-121) • Gatson, Annette (0052-27) • Gatson, Viola (0052-23) • Ginyard, Betty (0043-2) • Gunter, Deborah (0011-91) • Knight, Travis (0010-177) • Mann, Deborah (0041-16) • Mason, Corry (0010-160) • Moore, Robbie (0041-16) • Respondent, Community Survey (0050-6) (0050-25) (0050-26) (0050-31)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	(0050-35) (0050-40) (0050-41) (0050-46) (0050-59) (0050-66) (0050-76) (0050-78) (0051-2) (0051-13) (0051-16) (0051-20) (0051-21) (0051-22) (0051-23) (0051-30) (0051-33) (0051-41) (0051-42) (0051-44) (0051-45) (0051-51) (0051-52) (0051-53) (0051-54) (0051-58) (0051-59) (0051-62) (0051-67) (0052-1) (0052-6) (0052-7) (0052-8) (0052-9) (0052-18) (0052-19) (0052-22) • Robin, Ella (0052-10) • Robinson, Bobby (0052-26) • Robinson, Claude (0052-14) • Robinson, Terria (0052-12) • Sims, Raymond (0026-4) • Tansey, Sara (0010-54) (0010-55) (0010-56) • Thomas, Ruth (0037-11) • Wolfe, Clint (0011-51) (0011-52)
Historic and Cultural Resources	• Lewis, Crosby (0049-28)
Hydrology-Groundwater	• Barnes, Jenifer (0041-6) (0049-6) • Brendell, Julie (0041-6) • Mann, Deborah (0041-6) • Moore, Robbie (0041-6) • Respondent, Community Survey (0050-42)
Hydrology-Surface Water	• Barnes, Jenifer (0041-1) (0041-7) (0041-8) (0049-5) • Berg, Michael (0010-22) • Brendell, Julie (0041-1) (0041-7) (0041-8) • Byrne, Stephen (0010-101) (0010-102) • Cooper, Elaine (0010-116) • Hartmeier, Gina (0049-40) • Hill, Carol (0011-84) • Mann, Deborah (0041-1) (0041-7) (0041-8) • Mason, Corry (0011-102) • Merrill, Denver (0033-3) • Moore, Robbie (0041-1) (0041-7) (0041-8) • Respondent, Community Survey (0050-58) (0051-17) (0052-17) • Thomas, Ruth (0037-2) (0037-9) (0037-13) • Vejdani, Vivianne (0036-4) (0036-6) (0036-7) (0036-8) (0036-9) (0036-10) (0036-12) (0036-16) (0036-17) (0036-19) • Wojcicki, Joe (0010-90) (0010-93) (0011-62) (0011-64) (0011-65) (0044-1) (0044-14) • Zia, Barbara (0035-9) (0035-10)
Land Use-Site and Vicinity	• Respondent, Community Survey (0050-69) (0051-74) • Wojcicki, Joe (0010-83)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Land Use-Transmission Lines	• Respondent, Community Survey (0051-1) • Vejdani, Vivianne (0036-5) • Wojcicki, Joe (0010-85) (0010-86) (0044-2)
Meteorology and Air Quality	• Barnes, Jenifer (0041-13) • Brendell, Julie (0041-13) • Knight, Travis (0010-175) • Mann, Deborah (0041-13) • Mason, Corry (0011-103) • Moore, Robbie (0041-13) • Powers, Theresa (0010-14) • Respondent, Community Survey (0050-9) (0052-16) • Robin, Ella (0052-11) • Robinson, Claude (0052-15) • Robinson, Terria (0052-13)
Need for Power	• Beaman, Charles, Jr. (0031-2) • Benjamin, Steve (0031-2) • Byrd, William A. (0001-4) • Campbell, Paul G., Jr. (0017-4) • Clary, C. Douglas, Jr. (0011-10) • Duncan, Jeff (0017-4) • Gatson, Viola (0052-25) • Gregorie, Jim (0032-2) • Guild, Robert (0010-129) (0010-131) • Harrison, James H. (0017-4) • Hendrix, Samuel H. (0046-4) • Hope, Leslie B. (0046-4) • Kinley, Mary Lynn (0010-45) • Laffitte, Sterling (0017-4) • Lanier, Hope (0021-4) • Lummus, John (0017-4) • McLeese, Ike (0031-2) • Newton, Larry (0011-123) (0011-126) • Novinger, Cathy (0031-2) • Ott, Harry L., Jr. (0017-4) • Pinson, Lewis E. (0017-4) • Powers, Theresa (0010-12) • Rawl, Otis B. (0017-4) • Respondent, Community Survey (0051-18) (0052-21) • Rudnicki, Steve (0011-42) • Sandifer, Bill (0017-4) • Smith, J. Roland (0017-4) • Sottile, Mike (0017-4)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Speth, Charles Ted (0031-2) • Tansey, Sara (0010-57) • Thomas, Ralph (0010-147) • Thordahl, Jeff (0017-4) • Toole, W.R. (Rick) (0010-183) • Whatley, Michael (0047-2) • White, Sonny (0010-4) • Whitten, Robert (0010-80) • Winsor, Susan A. (0004-2) • Wojcicki, Joe (0011-60) (0044-15) • Zia, Barbara (0035-4)
Process-COL	• Barnes, Jenifer (0049-1) • Clements, Tom (0010-52) • Ginyard, Gregrey (0011-5) (0011-7) (0011-8) • Greenlaw, Pamela (0010-133) (0010-139) (0010-141) • Guild, Robert (0010-121) (0010-123) (0010-124) • Hager, Richard (0011-109) • Hendrix, Clifton (0049-35) (0049-38) • Hill, Carol (0011-87) • Lewis, Crosby (0049-32) (0049-33) • Marcharia, Kamau (0010-39) • Ramsburgh, John (0011-14) (0011-15) (0011-21) • Thomas, Ruth (0037-6) (0037-8) (0037-10) (0037-17) • Wojcicki, Joe (0044-4) (0044-6) (0044-20) (0044-21)
Process-NEPA	• Clements, Tom (0011-72) • Guild, Robert (0010-122) (0010-125) (0010-127) (0010-132) • Hartz, John (0010-78) • Ramsburgh, John (0011-16) • Thomas, Ruth (0037-1) (0040-1) • Wilder, Ronald (0040-1)
Site Layout and Design	• Barnes, Jenifer (0041-14) • Brendell, Julie (0041-14) • Clements, Tom (0010-48) (0011-73) • Cooper, Elaine (0010-118) • Greenlaw, Pamela (0010-134) (0010-135) (0010-137) (0010-138) • Guild, Robert (0010-132) • Knight, Travis (0010-174) • Mann, Deborah (0041-14) • Moore, Robbie (0041-14) • Respondent, Community Survey (0051-4) • Rudnicki, Steve (0011-45)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Wojcicki, Joe (0010-94) (0011-66) • Wolfe, Clint (0010-108) • Zia, Barbara (0035-7) (0035-8)
Socioeconomics	• Archie, Jeff (0011-37) • Barnes, Jenifer (0041-9) (0041-20) (0041-22) (0041-23) (0049-9) (0049-11) • Beaman, Charles, Jr. (0031-3) • Benjamin, Steve (0031-3) • Brendell, Julie (0041-9) (0041-20) (0041-22) (0041-23) • Byrd, William A. (0001-6) • Campbell, Paul G., Jr. (0017-6) (0017-7) • Cincotta, Jill (0011-1) (0011-4) • Clements, Tom (0011-74) • Combie, Joan (0030-1) • Cooper, Elaine (0010-114) (0010-117) • Corbett, Susan (0011-113) • Dennis, Dan (0049-18) (0049-19) (0049-24) (0049-27) • Duncan, Jeff (0017-6) (0017-7) • Ginyard, Gregrey (0011-6) • Gregorie, Jim (0032-3) • Hall, Timothy N. (0012-12) • Harrison, James H. (0017-6) (0017-7) • Harrison, Tiffany (0049-14) (0049-15) (0049-16) • Hartz, John (0010-77) • Hendrix, Clifton (0010-163) (0010-167) (0049-36) (0049-37) • Hendrix, Samuel H. (0046-6) • Hill, Carol (0011-86) • Hope, Leslie B. (0046-6) • Laffitte, Sterling (0017-6) (0017-7) • Lanier, Hope (0021-6) • Lewis, Crosby (0048-4) (0048-5) • Lummus, John (0017-6) (0017-7) • Mann, Deborah (0041-9) (0041-20) (0041-22) (0041-23) • Marcharia, (0010-33) • Marcharia, Kamau (0010-28) (0010-29) (0010-30) (0010-31) (0010-37) (0010-38) (0011-22) (0011-23) (0011-25) (0011-26) (0011-27) (0011-29) (0011-30) (0011-31) • McLeese, Ike (0031-3) • Merrill, Denver (0033-9) (0033-12) • Moore, Robbie (0041-9) (0041-20) (0041-22) (0041-23) • Novinger, Cathy (0031-3) • Ott, Harry L., Jr. (0017-6) (0017-7)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Pinson, Lewis E. (0017-6) (0017-7) • Powers, Theresa (0010-15) (0010-17) • Rabb, Ernestine (0011-80) • Ramsburgh, John (0011-17) (0011-19) • Rawl, Otis B. (0017-6) (0017-7) • Reed, Cyrus (0051-48) • Respondent, Community Survey (0050-1) (0050-3) (0050-8) (0050-10) (0050-15) (0050-16) (0050-17) (0050-19) (0050-22) (0050-27) (0050-32) (0050-33) (0050-34) (0050-36) (0050-37) (0050-38) (0050-39) (0050-43) (0050-44) (0050-48) (0050-49) (0050-51) (0050-52) (0050-56) (0050-57) (0050-60) (0050-62) (0050-64) (0050-65) (0050-67) (0050-68) (0050-71) (0050-73) (0050-74) (0050-75) (0050-77) (0050-79) (0050-80) (0050-81) (0050-82) (0050-83) (0051-5) (0051-12) (0051-24) (0051-26) (0051-36) (0051-38) (0051-39) (0051-40) (0051-43) (0051-46) (0051-49) (0051-50) (0051-55) (0051-56) (0051-57) (0051-60) (0051-61) (0051-63) (0051-64) (0051-65) (0051-66) (0051-69) (0051-70) (0051-71) (0051-72) (0051-73) (0052-20) • Rudnicki, Steve (0011-48) • Rudolph, Gerald (0010-169) (0010-170) • Sandifer, Bill (0017-6) (0017-7) • Schaffer, Jeff (0011-89) • Sims, Raymond (0026-3) • Smith, J. Roland (0017-6) (0017-7) • Sottile, Mike (0017-6) (0017-7) • Speth, Charles Ted (0031-3) • Tansey, Sara (0010-60) • Thordahl, Jeff (0017-6) (0017-7) • Todd, J. Richards (0014-1) • Whatley, Michael (0047-4) • White, Sonny (0010-5) • Wojcicki, Joe (0010-91) (0044-17) (0044-22) • Zia, Barbara (0035-5)
Transportation	• Barnes, Jenifer (0041-11) • Brendell, Julie (0041-11) • Hall, Timothy N. (0012-15) • Mann, Deborah (0041-11) • Moore, Robbie (0041-11)
Uranium Fuel Cycle	• Archie, Jeff (0011-39) (0011-40) • Berg, Michael (0010-21) • Byrne, Stephen (0010-101) • Clements, Tom (0010-50) (0011-76) • Cooper, Elaine (0010-115)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Corbett, Susan (0010-73) (0010-74) (0011-119) • Hartmeier, Gina (0049-41) • Knight, Travis (0010-173) (0010-180) • Lewis, Crosby (0048-2) • Merrill, Denver (0033-11) • Respondent, Community Survey (0050-13) (0050-29) (0051-10) • Rudnicki, Steve (0011-47) • Rudolph, Gerald (0010-168) • Tansey, Sara (0010-59) • Thomas, Ruth (0037-3) (0037-12) • Wolfe, Clint (0010-109) • Zia, Barbara (0035-6)

D.2 In-Scope Comments and Responses

The in-scope comment categories are listed in Table D-3 in the order that they are presented in this EIS. The comments and responses for the in-scope categories are included below the table. Parenthetical numbers shown after each comment refer to the Comment Identification (ID) number (correspondence number-comment number) and the commenter name.

Table D-3. Comment Categories in Order as Presented in this Report

D.2.1 Comments Concerning the COL Process
D.2.2 Comments Concerning NEPA
D.2.3 Comments Concerning Site Layout and Design
D.2.4 Comments Concerning Land Use - Site and Vicinity
D.2.5 Comments Concerning Land Use - Transmission Lines
D.2.6 Comments Concerning Meteorology and Air Quality
D.2.7 Comments Concerning Geology
D.2.8 Comments Concerning Hydrology - Surface Water
D.2.9 Comments Concerning Hydrology - Groundwater
D.2.10 Comments Concerning Ecology - Terrestrial
D.2.11 Comments Concerning Ecology - Aquatic
D.2.12 Comments Concerning Socioeconomics
D.2.13 Comments Concerning Historic and Cultural Resources
D.2.14 Comments Concerning Environmental Justice

D.2.15 Comments Concerning Health - Non - Radiological
D.2.16 Comments Concerning Health - Radiological
D.2.17 Comments Concerning Accidents - Severe
D.2.18 Comments Concerning the Uranium Fuel Cycle
D.2.19 Comments Concerning Transportation
D.2.20 Comments Concerning Decommissioning
D.2.21 Comments Concerning Cumulative Impacts
D.2.22 Comments Concerning the Need for Power
D.2.23 Comments Concerning Alternatives - Energy
D.2.24 Comments Concerning Alternatives - Sites
D.2.25 Comments Concerning Benefit-Cost Balance

D.2.1 Comments Concerning the COL Process

Comment: And those are some of the concerns that people have, in our community, and we would like to know, who would you go to? Because I talked, earlier, folks couldn't answer those questions. So who can answer those questions for the community? (**0010-39** [Marcharia, Kamau])

Response: *For plant-specific safety and environmental questions related to new reactor applications, members of the public can contact the safety and/or environmental project manager assigned by the NRC for the license review for the specific plant. The name for each of the NRC safety and environmental project managers is given on the NRC website and their phone numbers can be obtained from the phone directory on the NRC website. In addition, contact information is provided in the appropriate Federal Register notices and at the public meetings. The NRC safety and environmental project managers can either answer questions or direct callers to the appropriate person at the NRC. In addition, many answers to questions that are not included in this document can be found on the NRC website at www.nrc.gov. The NRC has developed a number of "frequently asked questions" documents, as well as informational brochures and fact sheets, all of which can be accessed from http://www.nrc.gov/reading-rm/faqlist.html. Members of the public are also invited to plant-specific public meetings, where NRC staff members are available to answer both generic and site-specific questions.*

Comment: There were some discrepancies in the presentation about how the public was, or how notice has gone out about this hearing. Unfortunately SCE&G, and I feel this is very unfair, as a participant in the Public Service Commission process, they testified about these hearings tonight, and tomorrow night, in early December. They already knew about them.
The public was not notified until December 5th, in the notice that appeared in the Federal

Register. The company received, or was sent a letter, on December 24th, from the NRC, talking about the hearings tonight. But we, the public, didn't know about this, officially, until January 5th. They sent letters, the NRC sent letters to the Department of Natural Resources, Fish and Wildlife, and others, on January 12th. So I'm quite concerned that the NRC is giving the inside track, not only tonight, but possibly in other EIS, or other meetings, to the Applicant. That should not be the case. The public should be informed of these meetings at the same time the company is, and that did not take place for these meetings tonight. That is quite unfortunate, and I hope that there is some investigation of this, because this is not the way that the NRC should be conducting the public's business. (**0010-52** [Clements, Tom])

Response: *The public has the opportunity to become informed about upcoming licensing reviews for new nuclear power plants many months before licensing applications are received by NRC. The scoping period given in the NOI is for 60 days, which includes the opportunity to provide scoping comments following the public meeting. If additional time is desired, a request to extend the scoping period can be made to accommodate the needs of stakeholders. In fact, the scoping period was extended in this instance.*

Comment: We have sought to intervene in the licensing proceeding for the V.C. Summer units 2 and 3, before the Nuclear Regulatory Commission Licensing Boards, and have filed a petition to intervene, which raises a series of contentions challenging the adequacy of the environmental review submitted by SCE&G and Santee Cooper, in support of the Commission's compliance with the National Environmental Policy Act. Our contentions identify numerous deficiencies in the company's environmental report. (**0010-121** [Guild, Robert])

Comment: I'd like to let you know that the company, SCE&G company, that claims to be such good corporate neighbors, and the NRC staff that has insisted tonight that they are so open to hearing from the public, both of them have opposed every single issue raised by the Sierra Club, and Friends of the Earth, and our petition to intervene. (**0010-123** [Guild, Robert])

Comment: The NRC staff has opposed consideration of each and every environmental issue raised by the Sierra Club, and Friends of the Earth, and has insisted that the petitions to intervene be dismissed. (**0010-124** [Guild, Robert])

Response: *The hearing process is more formal than the scoping process and the process for submitting comments on the draft EIS. Petitions to intervene in the hearing can only be granted if the regulatory requirements for intervention have been met. An Atomic Safety and Licensing Board (ASLB) rules on each petition to intervene in the hearing. The NRC staff only provides to the ASLB its views on whether the requirements for intervention have been met.*

Comment: You are having the environmental hearing, but I didn't hear when you had or will have the safety set of hearings. Is that coming up, or has that already happened? (**0010-139** [Greenlaw, Pamela])

Response: *The public scoping meeting is not an environmental hearing. It is a meeting to receive information from the public to aid the staff in determining the scope of the EIS. A hearing will be held on both the environmental and the safety aspects of the review. There is no public scoping period for the safety review. During the safety review process, the staff holds meetings with the applicant to discuss the review of the application. The public is invited to observe and has the opportunity to comment at the conclusion of the technical portion of the meeting. The results of the staff's safety review are available to the public. However, the highly technical nature of the staff's safety review does not lend itself to a public involvement process such as that used for the environmental review. As a result, there is no notification in Federal Register notices related to an opportunity to comment on the safety review prior to its issuance. However, a safety evaluation report with open items will be available electronically from the Publicly Available Records System (PARS) component of the NRC's Agency-wide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible from the NRC website at http://www.nrc.gov/NRC/ADAMS/index.html. Additionally, the public can provide comments to the Advisory Committee on Reactor Safeguards (ACRS) on the staff's review of the application in advance of the ACRS meeting.*

Comment: If you are going through all this different construction, right now, pre-construction, we are going to start widening the roads, we are going to start putting up traffic lights, and things, at this one intersection, so that we can get prepared. If the final Environmental Impact Statement hasn't been done, then why are you going ahead and beginning any kind of construction? Because if for some reason, as your draft goes through, and as you take comments from people, and you are going back through, and you are weeding out what needs to be done, what needs to be taken out, what needs to be improved, why are you doing construction now? (**0011-87** [Hill, Carol])

Response: *Site preparation activities not related to nuclear safety, also termed pre-construction activities, may be performed by the applicant prior to the conclusion of the environmental review. The impacts of pre-construction activities will be addressed in Chapter 7 of the EIS. Applicants engaging in pre-construction activities do so at their own risk as NRC approval of an application for a COL is not a foregone conclusion. Safety issues as well as environmental issues will be evaluated before a decision on an application is reached.*

Comment: Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. (**0037-10** [Thomas, Ruth])

Response: *Section 102(2)(C)(v) of NEPA requires that an EIS include information on any irreversible and irretrievable commitments of resources that would occur if the proposed action (approval of the COL) is implemented. These issues will be discussed in Chapter 10 of the EIS.*

Comment: Those drafting the EIS should make use of the testimony of the intervenors, not merely that of SCE&G, in the South Carolina Public Service Commission hearings on the VCSNS, Docket 2008-196-E, held in December 2008. A careful and frankly worded statement about the environmental hazards of VCSNS Units 2 and 3 is very important in supporting a rational decision on this project by the Nuclear Regulatory Commission. (**0037-17** [Thomas, Ruth])

Response: *All scoping comments provided orally or submitted in writing are considered in the development of the EIS. Participation in hearings before the South Carolina Public Service Commission is a separate activity. Those participating in hearings before other agencies and those participating in the NRC hearing process are welcome to provide scoping comments as well.*

Comment: Any adverse environmental effects that cannot be avoided should the proposal be implemented. (**0037-6** [Thomas, Ruth])

Comment: The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. (**0037-8** [Thomas, Ruth])

Comment: Any of the environmental and economical solutions must have full technical supporting analysis. No longer should they ignore product (electricity) and distribution (network topology) system fundamental and initial studies. (**0044-20** [Wojcicki, Joe])

Comment: All my calculations must be considered, and, if necessary, be adjusted or redone. All suggestions accepted, or corrected. In the new USA in the XXI Century, transparency is so significant especially for one of the first big nuclear projects. Avoiding discussion or being silent in the process of reviewing the application on the above topics, fully documented by scientific calculations, will have serious consequences for the entire nation. (**0044-21** [Wojcicki, Joe])

Comment: An Initial set of documents and analysis is weak, unclear for serious discussions, and erroneous in their basic and fundamental Electric Energy Generation and Distribution part. It must be the set of inputs in starting an analysis to select a new reactors site. (**0044-4** [Wojcicki, Joe])

Comment: The PSC Order was issued a short time after the end of the hearing, and the lack of understanding of the above three aspects led to wrong approval of Jenkinsville location, instead

to force SCE&G to do the serious, professionally accurate rework on fundamental Electric Energy Generation and Distribution parts of their documentation. (**0044-6** [Wojcicki, Joe])

Response: *These comments provide general opinions about the NRC's COL process, the application, and the South Carolina PSC Order and do not provide any information that can be used for the EIS development. The NRC will carefully review the application against its regulations that are intended to protect public health and safety and the environment.*

Comment: And a lot of people have gotten up here and spoken for SCE&G, and a lot of them have interests in SCE&G. I'm so glad that the Congress set your organization [NRC] up. I think if we are going to review what is going on, we need an independent body to review that. I'm so glad that we have you, because we are not competent to asses SCE&G's special interest, that is their interest, they do that, that is what they do for a living, they manufacture electricity, and they sell it, and they do a good job at it. And I don't want anybody to think that I'm pointing a finger at SCE&G, I'm just saying that they have an interest in this matter. And we have a right to have someone look at it that is not -- that doesn't have an interest, somebody that doesn't have a chance of being biased. (**0049-33** [Lewis, Crosby])

Response: *This comment provides general information in support of the NRC review process for the COL. They do not provide any specific information related to the environmental effects of the proposed action and will not be evaluated in the EIS.*

Comment: We have some serious process problems. I understand that you want to do this in the community. However, the planning is very odd, in that this one was very reasonable, this is in Jenkinsville, this is a Tuesday night. But we are in the Bible belt. And so when is the next meeting they are planning? Thank you. That doesn't show sensitivity to the communities, at all. It does here, but for tomorrow night, who can come tomorrow night? I can't. And I doubt that other people who couldn’t come tonight will be able to make it tomorrow night, either. So I would like to see the NRC do a better job planning, and dealing with the actual culture of South Carolina, and meet the people's needs whom you are purporting to serve. (**0010-133** [Greenlaw, Pamela])

Comment: But first, until the NRC and SCE&G takes communication very seriously, I don't believe anything any of them are telling me. And the NRC, this goes for you as well. If we are going to have these meetings, please let us know. You know, if I knew there was an SCE&G kiosk, with information on it, down here at the park, at the Monticello Easy-Mart, I promise you I would stop and look for information being posted. It is not there. Now, folks, I'm not anti-nuclear power. But right now I'm anti-this, because I don't know what in the heck is going on, and I don't think we are being told fairly. (**0011-109** [Hager, Richard])

Comment: I would actually like to second the mayor's comments. Just generally, and I don't think there are any bad intentions here. But it seems so often, with respect to big decisions that impact our communities, that the public kind of gets included in the conversation, in the 11th hour. And so really I just want to emphasize that to whatever degree the NRC, our utilities, can start to reach out into the community, essentially go door to door, and hold community meetings, hold meetings in churches, other meetings here at the school that aren't so formally structured, and where you are asking people what they want, and what they need, before you come in with a big proposal. (**0011-14** [Ramsburgh, John])

Comment: I [John Ramsburgh, Sierra Club of SC] want to just say two things. That this process widen the parameters, make it as inclusive as possible; include as many topics as possible, especially topics brought here by people in the community. And that we get back to, I can't remember exactly how you said it, but you said it well, less formal, or more informal, and more informative, so that we really include the community in the process. (**0011-21** [Ramsburgh, John])

Comment: We the people of my community [Jenkinsville, SC], are not educated on nuclear impact. You [NRC] asked us to come in on the impacts. Well, we don't know what 52 is, and all of that, again. So to come here tonight, and to give you an intelligent response, without the education that we need to do this, it is not, you know -- I listened to the slide a minute ago, and I was trying to be very attentive, and trying to really get something out of it. But I guess it went by kind of fast for me, because I still don't know what you guys really want, what do you want us to say; what do you want from us; what do you want me to go back to my community, to my constituency and say that they want us to tell them what impact it is going to have on the environmental thing? .....So we need you guys [NRC] to explain to us what the environmental impact is, how do we go about to find out exactly what that is? My number one concern is for the people in the town of Jenkinsville, we are on the front lines. We have lived 25 years with a nuclear plant. As far as we know everything is just fine. Now, am I against the nuclear plant that is coming in? I don't know. Am I for them coming in? I don't know. My thing is that I need to be more educated on exactly what is going to happen. (**0011-5** [Ginyard, Gregrey])

Comment: You know, the issue is what is the impact, environmental, what is the safety factors? You know, you guys are the professionals. This is good, but it should be a little more informal, it should be a little more informative. It should be broken down into the layman terms, so that we can understand it. Because the slides that went by here, the lady up there stood up, and she spoke about it. But when I look back here, she wasn't the only one that didn't get it, because I didn't get it either. And she was sitting beside me. And she said, well, I want them to know that we didn't really get that. But she's into the environmental thing, so she has done this, so she has kind of given me a little more insight on what is going on. But I'm saying to you, educate us. (**0011-7** [Ginyard, Gregrey])

Comment: I live a mile, a mile and a half from the plant. That is by the highway. That is less than a half mile across the lake. We need to know. People in the area live closer than that to it. I'm their mayor, they are looking for me to be a voice for them, how can I be when I don't really know what we are doing? I really don't, I really don't know what we are doing. I can't support it, I can't not support it. And a lot of people are that way. This needs to be a little more informative, it needs to be a little more informed. There needs to be some really good information given to the people in layman terms, to understand, understand exactly what you guys are going to do. I understood, exactly, well you guys are the guys that check this out, do that, and you are going to send us a report back. But are we going to understand the report that you send back? We need some education to make us understand, so that we can understand. We are not slow, we can understand. But we need to be advised on what we are hearing. You know, we have other people here that have called me and said negative things. I've got people that call me saying positive things. I need to draw my own conclusions, so that I can talk to my people, my constituency, about it. So I say to you come back, and educate us in a better form, in a more relaxed atmosphere, and not in such a set slide show. Give us some -- break it down, tell us what we are doing. (**0011-8** [Ginyard, Gregrey])

Comment: The real reason I'm here tonight is that I'm not convinced that these people from Washington understand that the people in this community haven't got it. They don't understand what you are doing. And I agree with the Mayor. They don't understand how to respond. As Ms. Rabb said, maybe they ought to read. A lot of them can't read. Maybe they ought to, but they can't. And these people need to be protected.

What can they do? I submit, I read your -- the notice in the Federal Register just a while ago. And it talks about these public hearings. I submit to you that you haven't done your job, okay? You may have thought you did it, you may have gone through the steps, but it didn't get done. The bottom line, it didn't get done.

At the bottom line the people in this community didn't -- don't understand what is going on, and didn't understand what they could do to have a comment.

And they are entitled to have a comment. How do you resolve that? I'm not sure I know. I'm certainly not qualified to speak in that area, except to tell you that it would appear to me that there ought to be a series of discussions, pro and con, local discussions, informal as the Mayor said, where these people would hear both sides and have somebody say, well it is going to use up all the water in the river. And somebody comes back and says, it is not going to use up all the water in the river, it is only going to use X number of gallons, and we have these many gallons coming down.

There needs to be some pro and con, on a practical basis, so the people can understand what is going on, and can come to some conclusion. That is really why I'm here. I love this community, and I love the people in it. I think they have a right to understand what is going on. They may not agree with me, but they have a right to understand. (**0049-32** [Lewis, Crosby])

Comment: The educational aspect that Mr. Lewis talked about, I specifically said that last night, is that if we would just make it available, as to what is going on, in that facility, not only for us here to know tonight, but for our children that come along, if they had a method of just looking at that, and ascertaining what and how it works. That would go a long ways in making the people more understanding about what is going on. (**0049-35** [Hendrix, Clifton])

Response: *An additional information meeting was held on March 28, 2009 to address community concerns. Scheduling of this meeting was done in conjunction with local community and church leaders.*

Comment: First it has been stated that we, the local citizens, can go online and download information from this agency and others. The problem with this is we don't have access to high speed internet here. We cannot possibly download these large document files, when we don't have access to an equitable distribution of services from AT&T, even though we have fiber optic cables running down in front of our houses. (**0049-1** [Barnes, Jenifer])

Comment: But yet one lady talked about the internet, and I said that last night. Make sure that that be included as far as an impact to our people. Because if you can't access readily, and at a fast rate, as to what is going on around here, it is still going to be negative. She talked about AT&T, but on our end we have Verizon, and we can't get high speed internet up there, either. (**0049-38** [Hendrix, Clifton])

Response: *Copies of the SCE&G Environmental Report and other relevant documents are located at the Fairfield County Library in Winnsboro, SC.*

Comment: There are certain real environmental and health, and security, and costs concerns with this plan. And with the whole state of South Carolina, we are at an energy crossroads, and we are trying to decide kind of which path we are going to go down. (**0011-15** [Ramsburgh, John])

Response: *The NRC's responsibility is to regulate the nuclear industry to protect the public health and safety within existing policy. The NRC is not involved in establishing and administering energy policy.*

Comment: I don't have a lot of questions, except that this environmental review is a phantom, and it is kind of, like what they say, trying to nail Jello to a tree. Except this jello isn't even gelled yet, it is still liquid. (**0010-141** [Greenlaw, Pamela])

Response: *The comments did not provide information related to the environmental effects of the proposed action and will not be addressed in the EIS.*

D.2.2 Comments Concerning NEPA

Comment: And I'm here to, tonight, to challenge the NRC staff to live up to the mandate of the National Environmental Policy Act (**0010-122** [Guild, Robert])

Comment: And I suggest to you that there is an inherent contradiction between the claim by the NRC, that they intend to embark tonight on a full and open compliance with the National Environmental Policy Act, and that they really care what we think about the environmental costs and benefits of this project.
(**0010-125** [Guild, Robert])

Comment: I would like to remind the NRC staff that in the year 2003 the Commission rejected a rulemaking petition brought by this industry, the Nuclear Energy Institute, asking the NRC to permanently ban consideration of the need for power, and of alternative and renewable energy issues, from the NEPA review process for new nuclear power plants. The industry took the position that we should just get past the charade of the NRC even worrying about whether power plants are needed, and whether there are more cost effective environmentally benign alternatives to nuclear power plants, to just eliminate the entire charade and simply, by fiat, dictate that nuclear power plants are good, and we will always choose that alternative.
The Commission recognized, in 2003, that legally they could not do that, and they rejected the NEI petition. And they cautioned that when the Atomic Energy Commission, the NRC's predecessor, attempted to do this back in 1971, the Federal Courts mandated that the AEC and the NRC comply with the law. And I challenge you to do so again in 2009. (**0010-127** [Guild, Robert])

Comment: I will close by saying the National Environmental Policy Act is enforced by the courts of the United States against the NRC and its predecessor, mandate that we not artificially narrow the scope of alternatives to be considered, so as to favor the preferred alternative. Everything I have seen, from the NRC staff's behavior so far, in the licensing proceeding smacks of that precise failure. And I submit to you that if you simply ignore the alternatives, fail to consider, fully, the environmental costs and benefits of this project, then the result of this review will be foreordained, and we all are wasting our time here tonight. (**0010-132** [Guild, Robert])

Comment: In general terms I say it [EIS] should be broad, and it [EIS] should be deep. And I personally object to the fact that the first speaker, representing the Congressional Delegation, read a letter signed by all of them, that support the proposal to build nuclear power, they do not address the need for the NRC to conduct an objective analysis of the environmental impacts in accordance with both the spirit and the letter of the National Environmental Policy Act.
That is what we are going to hold NRC's feet to the fire on. We want to see an objective analysis, we want to see one that is not just biased towards the industry's perspective on the role of nuclear power. (**0010-78** [Hartz, John])

Comment: The information distributed at the scoping meeting in South Carolina in January 2009 indicated that the National Environmental Policy Act requires Federal agencies to use a

systematic approach to consider environmental impacts; that an Environmental Impact Statement (EIS) is required for major Federal actions that may significantly affect the quality of the human environment; and that issuing a combined license is considered a major Federal action. Based on the information discussed below, I believe that the VCSNS, if constructed and operated, would have significant negative effects on the quality of the human environment. Accordingly, I outline below what I believe to be the elements that should be included in the scope of the EIS, along with comments about some of these elements. The categories included below follow the wording of the National Environmental Policy Act. (**0037-1** [Thomas, Ruth])

Comment: In the leading court decision regarding the National Environmental Policy Act (NEPA), Calvert Cliffs' Coordinated Committee v. Atomic Energy Commission, 449 F.2d 1109 (D.C. Cir. 1971), cert. denied, 404 U.S. 942 (1972), the Court made clear that in making decisions on major federal actions such as the issuance of a COL, the agency is compelled, to take environmental values into account. Perhaps the greatest importance of NEPA is to require [all] agencies to consider environmental issues just as they consider other matters within their mandates. This interpretation of NEPA requires that the NRC must balance environmental costs against the specific economic and technical benefits of the COL decision. The Court's decision in Calvert Cliffs also faulted the Atomic Energy Commission in that case for relying on certifications by other state and federal agencies that the applicant was in compliance with environmental standards. I urge the Commission to make a serious, independent environmental impact statement (EIS) of the VCSNS in this docket. In order for the environmental impact statement to be independent, it should not rely primarily on earlier analyses prepared by the applicant, SCE&G. (**0040-1** [Thomas, Ruth] [Wilder, Ronald])

Response: *These comments are directed to the NRC licensing process with respect to NEPA for the VCSNS Units 2 and 3 COL, and provide no specific information for the NRC's associated environmental review. The licensing process for COL applications is specified in 10 CFR Part 52. The environmental review process associated with new reactor licensing includes a detailed review of an applicant's combined license application to determine the environmental effects of constructing and operating the nuclear power facility for up to 40 years. The NRC regulations implementing the National Environmental Policy Act (NEPA) are specified in 10 CFR Part 51. The NRC is an objective, independent regulator and is not biased toward the industry. After review of the application against the regulations and regulatory guidance, a hearing will be held on uncontested issues (and, if necessary, contested issues) to determine whether it is appropriate to grant the license. NRC approval of an application for a COL is not a foregone conclusion. Safety issues and environmental issues will be evaluated before a decision on an application is reached. As described in the regulations, the NRC can deny an application based on the finding of its review.*

Comment: The great thing about this process, and the great thing that is happening with a lot of our federal regulatory agencies, is that they are starting to widen the discussion, in terms of the parameters. And I know that on the slide show they were going to --the presentation is about the environmental impacts. But we don't have to think about the environmental impacts just in terms of the squirrels and the mice, we think about the human environmental impacts. (**0011-16** [Ramsburgh, John])

Response: *NRC has an obligation under NEPA to identify and disclose the socioeconomic impacts of major Federal actions it undertakes. Both environmental and socioeconomic impacts will be analyzed in the EIS.*

Comment: And I think this Environmental Impact Statement process, and maybe the NEPA regulations of the department need to take into account this new directive from our president. (**0011-72** [Clements, Tom])

Response: *These comments relate to how the NRC implements the requirements set forth within NEPA. They provide no specific information related to the current licensing action and will not be evaluated in the EIS.*

D.2.3 Comments Concerning Site Layout and Design

Comment: Lastly I would ask that you consider the true cost of the AP1000 reactor. As others have said, the reactor of that design has never been built. And, indeed, the NRC currently has -- Mr. Clements, of Friends of the Earth, stated that design certification is now in its 17th design revision, with no firm schedule by the NRC, for completion of that design review. That is, precisely, that lack of a certain design is precisely the dynamic that created the collapse of the nuclear industry 30 years ago, with massive cost overruns, and canceled plants, because each plant was designed as it was being built. And I submit that that is likely to happen here tonight. (**0010-132** [Guild, Robert])

Comment: LWVSC [League of Women Voters of South Carolina] agrees with expressions from our citizens that Scoping include the following: A fact-based analysis regarding estimated costs for the second and third plants proposed for Fairfield County, South Carolina. This analysis should consider likely future costs of raw materials (e.g., steel and concrete) that would be required for construction. (**0035-7** [Zia, Barbara])

Comment: LWVSC [League of Women Voters of South Carolina] agrees with expressions from our citizens that Scoping include the following: The number of attempts to date, their costs, and the status of proposals to construct plants of similar design. Because this particular design has not been constructed elsewhere, this must be a comprehensive report. (**0035-8** [Zia, Barbara])

Response: *The disclosure of the costs of the proposed action will rely on the best available estimate of financial costs with uncertainties noted. Associated costs that cannot be reliably quantified also will be discussed. Chapter 10 of the EIS will address the estimated overall internal and external benefits, costs, and associated environmental impacts of the proposed project.*

Comment: SCE&G has chosen a risky reactor design. The AP1000 has never been built anywhere, and the final design is years away from approval by the NRC. (**0010-118** [Cooper, Elaine])

Comment: But I have to say this, just common sense tells me that it is really difficult to have an environmental plan on something that doesn't exist. There is not even a demonstration model planned.....And if we are supposed to be analyzing the environmental impact of something that doesn't exist, would you give your child that kind of homework? This, to me, just seems insane. So we have an Environmental Impact Statement, or environmental study on theory. Okay, that is the best we can do. If that is the best we can do, what can we do to move forward? Well, the legislature decided that, okay, we are going to move forward with this, we are going to put in place the Baseload Review Act, and you only get an opportunity for one prudence review. And once the Public Service Commission decides to move forward, folks, there is no going back. The Legislature has said you will pay, you will pay, you will pay if PSC says let's go ahead. Now, I know that you are being told that you are going to pay interest only first. And then they are going to sock us with the capital after they got them built. Well, we are back to square one, with how do we know what the environmental impact is? I'm sorry, this just seems insane to me. So I have real problems with this process. (**0010-134** [Greenlaw, Pamela])

Comment: And so I really, I think if I were in the NRC, I would have to get people together and say, we have to stop, we have to slow some of this down and say, we need to have someone who will do a demonstration model for each of the new types of reactor designs that are coming out. There are basically three, I think; AP1000 is one of them. And let there be a prototype for developing these systems, these kinds of tests that we want, environmental and safety. (**0010-138** [Greenlaw, Pamela])

Comment: This talk about the design not existing, is a farce. The design is an evolutionary design, based on all the best lessons learned, and advances in technology, over the last 40-plus years. The design is based on an earlier design, the AP600, which received design approval in the early to mid-1990s. There were facilities built at Oregon State to test the evolutionary and new advances in the thermohydraulics for the AP600 design. So it is a proven design, it is an evolutionary design, again, built on the best technology that exists. The AP1000 received its own approval in 2005, and the comments they are making have to do with certain revisions to that design. But the fact that it is not based on good, existing technology, is utterly -- it is an utter farce. (**0010-174** [Knight, Travis])

Comment: As far as the AP1000 reactor design, there was a question if this is the same kind of reactors. These reactors do not exist, they are only on paper. The Nuclear Regulatory Commission has certified the design. That doesn't mean they are approved. It is not going to be until 2010, or 2011, that the reactor design if finalized. So we are looking at an EIS process where we don't even know what the reactor is, basically. There is a general design of it, but there are a lot of details that are being reviewed, and there is not even an established review schedule to finalize the reactor design. I don't think this EIS process should go forward until we know exactly what kind of reactor is going to be built at the site. (**0010-48** [Clements, Tom])

Comment: I wanted to make sure that people caught that this reactor has never been built anywhere in the world. The AP1000 reactors have never been built. It appears that SCE&G is on a fast track course, and may have some kind of special deal with the Westinghouse Company to build these reactors here. So this is a kind of a test project. And you that live close.....you are going to be guinea pigs for this project, and you need to be quite attentive as this whole thing is going on. (**0011-73** [Clements, Tom])

Comment: It is our understanding that the design of this facility has not been proven to be viable. The documentation regarding this provided by the NRC shows that the final design has not even been approved. (**0041-14** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Response: *NRC regulations do not require that applicants refer to a certified design in a COL application. However, the applicant must furnish sufficient information for NRC staff to independently evaluate the potential impacts of construction and operation of a new nuclear power plant at a given site. The level of detail required is illustrated in NRC Environmental and Siting Regulatory Guides 4.2 and 4.7, as well as in NUREG-1555 Environmental Standard Review Plans for Nuclear Power Plants (available on the NRC website). Regarding concerns over the viability of new reactor designs, their approval is contingent on the rigorous safety review of the design control document (DCD) and their construction is verified by inspections, tests, analyses and acceptance criteria (ITAAC) prior to initial testing and operation. These comments do not provide any information that can be used in the development of the EIS and will not be addressed further.*

Comment: It is time we rejected the fear and superstition that anti-nuclear activists have tried to thrust upon the public. Today's nuclear power plant designs are inherently safe, adding to an already perfect safety record established in the last six decades. (**0010-108** [Wolfe, Clint])

Comment: The V.C. Summer site was originally designed to accept more facilities, and with the existing power grid already there, the current operation, the expansion is natural, low-cost, and a low environmental impact to meeting the growing electrical need of South Carolina. The design of the new generating unit, the AP1000, which they have applied for, is a simplified plant design that standardizes and reduces the cost of building this facility. (**0011-45** [Rudnicki, Steve])

Comment: But because this is a very first project, they are going to apply very new generation of reactors, AP1000, designed by very good company called Westinghouse. (**0011-66** [Wojcicki, Joe])

Response: *These comments provide general information in support of the applicant's COL. They do not provide any specific information related to the environmental effects of the proposed action and will not be evaluated in the EIS.*

Comment: And there is no safety record on the AP1000 regardless of the safety record that they have on Summer 1. They can't possibly have a record on the AP1000. They have to develop that. (**0010-135** [Greenlaw, Pamela])

Comment: You know, this is based on theoretical models, it can't be tested. And so we are also supposed to have, from what I understand, a safety review, is that correct? How can you have a safety review on something that doesn't exist [AP1000 reactor]? (**0010-137** [Greenlaw, Pamela])

Comment: SR2 [My concern(s) about the two proposed reactors is/are] 2 reactors that have not been test [sic] Closing in of our property. (**0051-4** [Respondent, Community Survey])

Response: *The issues raised in these comments are safety issues, and as such, are outside the scope of the environmental review and will not be addressed in the EIS. A safety assessment for the proposed licensing action was provided as part of the application. The NRC is developing a safety evaluation report that analyzes all aspects of reactor and operational safety.*

Comment: They [Florida] are, already, trying to build exactly the same time two reactors AP1000, but they are located on the Gulf of Mexico. And they are going to use the seawater to the cooling, not the water from the people that need to drink, from the animals that they need to drink, and from the farmers that they need to plant and produce the food for the people. (**0010-94** [Wojcicki, Joe])

Response: *This comment refers to water use by AP1000 reactors proposed for a different location. Water use impacts of construction and operation the proposed Units 2 and 3 will be evaluated in Chapters 4 and 5 of the EIS, respectively. Cumulative impacts will be addressed in Chapter 7 of the EIS.*

Comment: But I'm very bothered by something he said tonight, that he had said earlier in the proceedings, and that is that, hopefully, if the AP1000 works as designed, which of course we still don't have the final revision of yet, they have sufficient water to run it for two months with drought or no drought. What happens after two months? I don't know. Okay, and I'm not sure they do either. It is a cool design, I have to say. Because it is not just water cooled, there is some liquid nitrogen involved in this. This is really unique. (**0010-135** [Greenlaw, Pamela])

Response: *The construction and operation of a nuclear plant involves the consumption of water. The staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population, and changes in water supply. While the NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively. Cumulative impacts will be addressed in Chapter 7 of the EIS. In addition, staff will evaluate system design alternatives, including cooling water system design, in Chapter 9.*

D.2.4 Comments Concerning Land Use - Site and Vicinity

Comment: Now, what are we going to expect here as the owners of the property, of the residents of this place? If you have to say that the property, the value of the property is going to be decreased, it is for sure. (**0010-83** [Wojcicki, Joe])

Comment: SR148 [My concern(s) about the two proposed reactors is/are] our community Dawkins will be history (**0050-69** [Respondent, Community Survey])

Comment: SR79 When the V.C. Summer plant was first built, SCE&G forced many property owners along the Broad River, under threat of condemnation, to sell their property. SCE&G's reasoning was that these properties would be flooded when the plant was built. Many of the deeds from these property owners to SCE&G even have the wording that the property owners giving up their property would be guranteed access to the water at all times. Many of these properites were as far as 12 miles north of the actual plant. The reality since the plant was built is that these properties are not flooded and flooding is actually not as much of a problem as before the plant was built. These properties now are nothing but huntiung club properties for employees, executives and guests of SCE&G. SCE&G has also made large profits from the harvesting of timber on these properties - profits that would rightfully have been made by the landowners if they had not been forced to sell their land. Are there any plans to rectify this situation and compensate these land owners by returning the properties to these owners or their heirs. (**0051-74** [Respondent, Community Survey])

Response: *Environmental justice impacts are those environmental impacts that disproportionately affect low-income and minority populations, or that impact subsistence practices or unusual resource dependencies. Environmental impacts include many physical, social, community, demographic, and economic impacts - including employment and tax revenue impacts. Chapters 4, 5, and 7 of the EIS will address all of these types of impacts. Redressing the grievances of participants in real estate transactions is outside the NRC's regulatory jurisdiction.*

D.2.5 Comments Concerning Land Use - Transmission Lines

Comment: The second, if we are going to move this location to this area, what are we going to do? We are going to save a lot of building of transmission lines. So this is distribution system for the protocol electricity. (**0010-85** [Wojcicki, Joe])

Comment: ...it was mentioned that it would be problem with building this transmission line here, because the line from Jenkinsville to the prospective huge load close to the Savannah, required about an extra 200 miles of the transmission line, and we need to find the corridors for this one. And it is almost impossible to find this place around Columbia. So there would be very big problem. (**0010-86** [Wojcicki, Joe])

Comment: The COL [Environmental Report] provides a broad overview of existing and proposed transmission line corridors. Final routes will be identified in the upcoming Phase 3 transmission line study. DNR requests consultation throughout Phase 3 and the final route selection process. (**0036-5** [Vejdani, Vivianne])

Comment: The Jenkinsville site location did not consider at least three aspects...Much higher distance from Jenkinsville to Charleston & AOL large load locations, that will require more MW base load (24/7) for the SE electric network / grid. To fulfill future needs of AOL, unnecessary and additional long distance transmission lines must be built from Jenkinsville to Charleston area and farther to JOT. (**0044-2** [Wojcicki, Joe])

Comment: SR1 [My concern(s) about the two proposed reactors is/are] The transmission of nuclear energy from the two new plants to customers (increase number of powerlines).. (**0051-1** [Respondent, Community Survey])

Response: *Potential land-use impacts to the site, vicinity, and off-site areas from construction and operations activities will be addressed in the Chapters 4, 5, and 7 of the EIS. Cumulative impacts related to transmission-line corridors, will also be addressed in the EIS.*

D.2.6 Comments Concerning Meteorology and Air Quality

Comment: Is there a possibility of condensation of vapor from the cooling towers posing a potential driving hazard on surrounding highways since the cooling towers will be located so closely to them? (**0041-13** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Response: *The NRC staff will evaluate the effects of the cooling tower plumes associated with the new units following the guidance described in NUREG-1555. The standard computer model used in this analysis is the Seasonal-Annual Cooling Tower Impact Prediction Code, which is explicitly designed to represent cooling tower plumes. Analysis results will be presented in Chapter 5 of the EIS.*

Comment:
SR88 [My concern(s) about the two proposed reactors is/are] I think it would be unsafe to the community if something would happen it may cause chemicals to spread in the air. (**0050-9** [Respondent, Community Survey])

Comment: SR182 [My concern(s) about the two proposed reactors is/are] air quality. (**0052-11** [Robin, Ella])

Comment: SR183 [My concern(s) about the two proposed reactors is/are] air quality. (**0052-13** [Robinson, Terria])

Comment: SR184 [My concern(s) about the two proposed reactors is/are] air quality. (**0052-15** [Robinson, Claude])

Comment: SR185 [My concern(s) about the two proposed reactors is/are] Air quality (**0052-16** [Respondent, Community Survey])

Response: *The airborne emissions from the proposed Units 2 and 3 will be considered in the evaluation of potential impacts. The impacts on air quality resulting from construction and operation of proposed Units 2 and 3 will be discussed in Chapters 4 and 5 of the EIS. The impacts of nuclear power generation on climate change will be addressed in Chapter 7 of the EIS.*

Comment: The meeting here tonight is about environmental aspects. And compared to other baseload generation, that is reliable, that being coal, it is important to note some important facts. Each of these plants will displace seven million tons of CO2 per year. In a carbon trading environment, should we have one, which was discussed in the last Congress, this is worth about 160 million dollars per year, at present value.
Also each plant will also displace 42,000 tons of sulphur dioxide per year, as well as 12,000 tons of nitrous oxide per year, improving air quality, helping us all breathe a little bit easier. (**0010-175** [Knight, Travis])

Response: *The comment provides general information about the potential offset of coal power plant emissions through the operation of a nuclear plant. Chapters 4 and 5 of the EIS will discuss air quality impacts, with the specific impacts of greenhouse gas emissions being addressed in Chapter 5. Alternative sources of energy (including environmental impacts of reasonable energy generation alternatives) will be discussed in Chapter 9 of the EIS.*

Comment: with the weather coming from the west, thunderstorms are strong, but they are small. And I believe that has added to our drought. Columbia has the bottom of Lake Murray splashing through the river, and it is 25 degrees warmer, and they get lots of thunderstorms we miss. The year before last they got two and a quarter inches of rain in six months. And this happens in the summer. And I think with two more nuclear power plants with these big ugly towers, and steam coming out, it may never rain here again in the summertime. (**0011-103** [Mason, Corry])

Response: *The NRC staff will examine both onsite and regional meteorological averages and extremes, including severe weather phenomena and air quality conditions, to establish whether the data used by the applicant are representative of site conditions and adequate for assessing*

the effects of station construction and operation on the environment. Results from the meteorological evaluation will be presented in Chapter 2 of the EIS.

Comment: As an economic developer, it is also important to me that nuclear power is clean, and generates electricity virtually emissions-free, maintaining Newberry County's attainment status with respect to air quality. (**0010-14** [Powers, Theresa])

Response: *This comment expresses an opinion about nuclear power plant emissions and does not provide any specific information that can be used for the environmental review.*

D.2.7 Comments Concerning Geology

Comment: The Pax Mountain Fault System runs very near Jenkinsville, SC. As a consequence, multiple earthquakes have been known to occur in the general vicinity of the VC Summer Nuclear Station. The earthquakes of April 20, 1964, and of May 19, 1971, are a few of the earthquakes attributed to the Jenkinsville area. Additionally, just last month two more earthquakes (March 18 and March 19, 2009) were attributed to Peak, SC -directly across the Broad River from Jenkinsville. Is the potential for seismic events being taken into consideration when determining whether or not more reactors should be placed here? (**0041-18** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: Also, could the blasting at the granite and gravel quarry in Blair have an increase in threat for seismic events to occur in this area? (**0041-19** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Response: *The EIS will contain a short description of local geology. Geotechnical and seismic issues are addressed in Section 2.5 of the NRC staff's Safety Evaluation Report.*

D.2.8 Comments Concerning Hydrology - Surface Water

Comment: In our V.C. Summer location 94 percent of all the water that we take out of the Monticello reservoir is non-consumptive use, it goes back there. That remaining roughly 5 or 6 percent is what is evaporative losses. Our new units will use only the equivalent of about one percent of the average annual flow of the Broad River. (**0010-101** [Byrne, Stephen])

Comment: Reactors will use millions of gallons of water a day, affecting the flow of the Broad River. (**0010-116** [Cooper, Elaine])

Comment: And there is also the issue of water depletion. We have been in a drought, in South Carolina, and especially in this area, along the Broad River, for several years now. There is the one nuclear reactor, Duke Power is proposing two new nuclear reactors upriver. And in addition to these two, that are proposed, that would be five nuclear reactors all being cooled by the water from the Broad River and the reservoir. Now, if there is not enough water to sufficiently cool the plants, then all that -- you can't generate the energy, and it is a real issue of what will happen to these rivers with so many power plants. (**0010-22** [Berg, Michael])

Comment: Somebody mentioned how many gallons, billions of gallons of the water is going to evaporate from the cooling system, a lot of them. I just make a very simple calculation. I would tell you that just these two reactors, forget about the Duke Power reactors, somewhere in Cherokee County, this is going to take the water from about two million people, or it is going to take the water from over a quarter of million of farms, the farms that are going to create the food for us. (**0010-90** [Wojcicki, Joe])

Comment: The second, we are going to save the water.
You don't probably realize what is going to happen if we are going to put the units here in Jenkinsville. Also, South Carolina Electric and Gas failed to show us the balance of the water. Also, with this regard, another two reactors they are going to build, Duke Power somewhere, in the Broad River. So we are going to, probably, already have much less water because Duke Power is going to take the water on the beginning, we are not going to have water in South Carolina, in the midlands. (**0011-62** [Wojcicki, Joe])

Comment: Now, what happen if we don't have the water, enough water? Who is going to be first to be disconnected from the source of the water, farmers, residential houses, schools, golf courses, churches and synagogues, judicial administration buildings, hospitals, day cares, nursing homes? (**0011-64** [Wojcicki, Joe])

Comment: And my question to the NRC is, there are two other lakes, Lake Murray, and Lake Wateree, which are a lot larger, and in a better populated, higher income area. Why couldn't the nuclear reactors be located over there? I think those two lakes would be enough to supply water for the next 20, 30, 40, 50 years that the nuclear reactors are going to have to have, that type of water to supply the power to it. I don't believe that the area over here is large enough, that Lake Monticello is large enough to facilitate those nuclear reactors. (**0011-84** [Hill, Carol])

Comment: Additionally, water usage is minimal when put in the proper context. Nuclear plants that use cooling towers, such as the two future units at V.C. Summer, would consume the equivalent of 20 to 26 gallons of water per day per household. By comparison, according to the USGS, an average three person household in the U.S. consumes approximately 300 gallons of water per day. (**0033-3** [Merrill, Denver])

Comment: LWVSC [League of Women Voters of South Carolina] agrees with expressions from our citizens that Scoping include the following: A study of the adequacy of surface water from the Broad River to supply the demands of communities and industries, especially during drought

conditions. The analysis should include demands of current and proposed coal and nuclear plants along the Broad River. (**0035-9** [Zia, Barbara])

Comment: This section [COL Application, Part 3, Environmental Report Section 2.3.1.1.4] provides a very general overview of the operation of the reservoirs and FPSF, stating that pumping is normally done at maximum capacity. There is no information on whether operation is modified during times of low flow. Is pumping curtailed during times of extreme low flows? Is operation of the Parr hydro facility modified during low flows? Information on how water is apportioned between reservoirs, the FPSF and the Broad river, particularly during low flow periods, is needed. If no provisions exist, then a drought response plan will need to be developed in consultation with regulatory and resource agencies. (**0036-10** [Vejdani, Vivianne])

Comment: On page 2.3-21 the COL [Application, Part 3, Environmental Report] indicates that the licensee intends to request a license amendment of the Parr hydro project for increased water withdrawals for the operation of Units 2 and 3. Licensed flows for the Parr Hydro project are 1,000 cfs or average daily natural inflow (less evaporation) during the striped bass spawning season of March, April and May, and 800 cfs (less evaporation) for the remainder of the year, with a minimum instantaneous flow release of 150 cfs. Estimated evaporative loss from Unit 1 alone is estimated at between 8.7% to 15% of the licensed minimum instantaneous flow of 150 cfs. Increased evaporative loss from the addition of Units 2 and 3 could have significant impacts on downstream flows, particularly during times of low flow. The state of South Carolina continues to experience drought conditions of unprecedented severity and duration. As of this writing, the entire state is in drought status ranging from "incipient" to "extreme." This fact underscores the supreme importance of carefully and thoroughly evaluating the hydrological impact of the proposed expansion. (**0036-12** [Vejdani, Vivianne])

Comment: The COL [Application, Part 3, Environmental Report, Section 10.5.2] indicates that during low flow periods the additional consumptive water loss associated with Units 2 and 3 would be mitigated by removing water from the reservoirs rather than directly removing water from the Broad. The COL also identifies the Lee Nuclear plant as a future upstream water user, adding that cumulative impacts of VC Summer and Lee nuclear plants will be small with the addition of any water supply features and mitigation measures. However, the COL [ER] does not indicate how water is to be allocated between the reservoirs and river, or how operation of the Parr project and FPSF will be modified, to mitigate low flows. The COL indicates a minimum reservoir elevation of 418 ft. What are the operational or physical constraints on minimum reservoir elevation? As stated above, it is of extreme importance that issues of water supply during low flows are thoroughly addressed and appropriate mitigation measures are clearly identified, in consultation with regulatory and resource agencies, during the licensing process. (**0036-19** [Vejdani, Vivianne])

Comment: The [Broad] river is also an important water supply resource for municipalities, hydropower and various industries. (**0036-4** [Vejdani, Vivianne])

Comment: The COL [Application, Part 3, Environmental Report] refers to the calculation of mean daily and mean monthly flow in the Broad River using the Richtex, Alston and Carlisle

USGS stream gauges. However, it is unclear what methods or additional data were used to estimate inflow into the Parr Reservoir. Were flows estimated using a combination of USGS gauge flow data, scaled down to the drainage area of the reservoir, or were they estimated with a water balance equation? A complete description of methodology is needed to evaluate flow estimates provided in the COL [Environmental Report] . (**0036-6** [Vejdani, Vivianne])

Comment: The COL [Application, Part 3, Environmental Report or ER] describes a seven-day average low flow of 156 cfs calculated from 2002 flow data from the Alston gauge, located approximately 1.2 miles downstream of Parr Shoals Dam. A 100-year daily mean flow of 125 cfs, and a 100-year seven-day average low flow of 430 cfs were also calculated for the Alston gauge. The seven-day average low flow at the Parr dam was estimated to be 190 cfs, also in 2002. A 7Q10 flow equaling 853 cfs was estimated from data from the Richtex and Alston gauges. There is no information on historical or estimated low inflow to the Parr Reservoir other than that provided from the Carlisle gauge, 21 miles upstream of the project site. According to the COL [ER], historical daily mean flows in the Broad River at the Alston gauge have been as low as 48 cfs (2002). The COL [ER] adds that this flow was not considered representative of natural river flows because it was influenced by the upstream flow diversion from the Parr Reservoir to Fairfield Pumped Storage Facility. This statement seems to suggest that downstream flows are run-of-river and not regulated by the operation of the Parr project and Fairfield Pumped Storage Facility (FPSF). (**0036-7** [Vejdani, Vivianne])

Comment: The COL [Application, Part 3, Environmental Report] states that the state of South Carolina uses the 7Q10 flow to determine potential impacts. This statement is misleading. The South Carolina Department of Health and Environmental Control uses the 7Q10 of a water body to determine the assimilative capacity of that water body when setting limits to effluents in National Pollutant Discharge Elimination System permits. DNR follows the guidelines of the South Carolina Water Plan (second edition, 2004) when evaluating potential impacts to state water resources. (www.dnr.sc.gov/water/hydro/water_plan.htm). (**0036-8** [Vejdani, Vivianne])

Comment: The COL [Application, Part 3, Environmental Report] states that the pan evaporation loss rate from the Parr Reservoir was estimated from data obtained from DNR, but the exact source of this data is not identified. In addition, there is no information provided on how evaporative loss was estimated for the Monticello Reservoir. Complete information is needed on the data and methods used to estimate pan evaporation loss rates for Parr and Monticello reservoirs. (**0036-9** [Vejdani, Vivianne])

Comment: Water quantity, water quality and water temperature effects of the VCSNS on the Broad River, and downstream effects on the city of Columbia and the Congaree National Park. Water quality issues were raised by intervenors in the South Carolina Public Service Commission hearings on the VCSNS held during December 2008. The city of Columbia obtains a large fraction of its water supply from the Broad River downstream of the VCSNS (**0037-2** [Thomas, Ruth])

Comment: The operation of the VCSNS will stress water resources in South Carolina and add radioactive contaminants to the environment. Use of the energy efficiency and renewable

energy alternatives will serve long-term productivity to a much greater extent. Intervenors in the SCPSC hearings raised serious questions about the stress on water resources and pointed out that alternative locations on the Atlantic Ocean would avoid the water quantity concern. (**0037-9** [Thomas, Ruth])

Comment: Also, Midcounty Water is reportedly constructing a pipeline to the Broad River with the intent to extract river water for filtration into drinking water for the Winnsboro area. Will consideration be given to the impact on the capacity of the Broad River and its impact on available drinking water for the communities and cities downstream? (**0041-7** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: The second point would be the drought. We are in a drought, and nuclear power plants use a lot of water. There is, currently, a bill in the state house, which is expected to pass this year, regarding water allocation. It will limit large withdrawals, that is three million gallons per month or more. That may seriously impact the ability to construct this plant, okay? (**0049-40** [Hartmeier, Gina])

Response: *These comments refer to the consumptive use of water. The construction and operation of a nuclear plant involves the consumption of water. The NRC staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population, and changes in water supply. While the NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively. Cumulative impacts will be addressed in Chapter 7. In addition, staff will evaluate system design alternatives, including cooling water system designs, in Chapter 9.*

Comment: Increased use of, and warming of, scarce water resources are irreversible; furthermore warming trends in the environment exacerbates these effects. (**0037-13** [Thomas, Ruth])

Comment: Is the carrying capacity of Lake Monticello large enough to mitigate the cooling needs of two additional reactors? (**0041-1** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: Will the Broad River be able to meet EPA Safe Drinking Water Standards and still remain a viable ecosystem throughout long periods of drought? (**0041-8** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: The Jenkinsville site location did not consider at least three aspects...Necessary enormous volume of cooling water (over 40 million extra gallons per day) to be taken from the Broad River located in the Southeast (SE) drought region of the USA. (**0044-1** [Wojcicki, Joe])

Comment: The last years' drought and heat wave events in Europe as well as in the SE of the USA must be considered, including their influence on nuclear reactor operation and SC people and industry. Be aware of specifics of water supply from the Broad River and the Greater Columbia area and SC Midlands needs. (**0044-14** [Wojcicki, Joe])

Comment: How will the additional demands on the capacity of the Broad river impact the availability of drinking water for the communities and cities that are downstream? With the increase in industrial demand, will the Broad river be able to meet EPA safe drinking water standards, and still remain a viable ecosystem throughout long periods of drought? (**0049-5** [Barnes, Jenifer])

Comment: SR143 [My concern(s) about the two proposed reactors is/are] Water pollution (**0050-58** [Respondent, Community Survey])

Comment: SR11 [My concern(s) about the two proposed reactors is/are] Will our waters and soil be safe. (**0051-17** [Respondent, Community Survey])

Comment: SR185 [My concern(s) about the two proposed reactors is/are] water pollution. (**0052-17** [Respondent, Community Survey])

Response: *Staff will consider impacts of the construction and operation of the plant on water quantity and quality including temperature (thermal impacts) in Chapters 4 and 5 of the EIS.*

Comment: ...about the drought here. And what will happen if for some reason we are going to have the high temperature in the [drought period]-- it will be necessary to shut down the reactors. You are not going to have electricity, but the reactors still will not have water to cool them down. So it is terrible solution to put these two guys here. (**0010-93** [Wojcicki, Joe])

Comment: What is going to happen if we are going to have a drought? And, already, NRC already have the map which show 24 existing reactors, in the area in the southeast, in the area they call drought zone. That means if we are going to have drought, or very high temperature, we have to shut down the reactors. (**0011-65** [Wojcicki, Joe])

Response: *These comments generally express concern about the impacts of drought conditions necessitating a shutdown of the proposed Units 2 and 3 without sufficient water to safely do so. The EIS evaluates the potential effects of plant construction and operation on the environment. Therefore, these comments are not within the scope of the environmental review. The staff's Safety Evaluation Report will address the effects of drought on the plant. Nuclear power plants are extremely robust structures that are designed to safely shut down when necessary. If an extreme drought event causes the nuclear power plant to be shut down, the reactor can be maintained in a safe condition.*

Comment: And we will have low-rise, not big-tall, but low-rise cooling towers for our new units, so as not to increase the temperature of the Monticello reservoir. So we are being good stewards of the environment. (**0010-102** [Byrne, Stephen])

Comment: And the water, is it like ten degrees warmer than it is supposed to be? (**0011-102** [Mason, Corry])

Comment: The CORMIX model was used to model the extent of the thermal plume that would exceed applicable SCDHEC water quality standards of T> 90ºF or ?T of 5ºF above ambient river temperatures. A variety of scenarios were modeled using input flows synthesized from Carlisle and Alston gauge flows. The "worst case scenario" was identified as follows: 2 cycles of concentration through cooling towers, 7Q10 flows, no operation of the FPSF, and max-?T(winter). The extent of the plume resulting from these conditions was modeled to be ~ 0.30 to 0.40 acre and would extend ~ 25% of the reservoir's width. Inflow to the Parr reservoir has been considerably lower than the modeled 7Q10 flow. .....DNR requests additional consultation on the analysis of thermal impacts for low-flow conditions. (**0036-17** [Vejdani, Vivianne])

Response: *Chapters 4 and 5 of the EIS will describe the methods and results of the evaluation of water-quality impacts from the construction and operation of the proposed action. Impacts to Monticello Reservoir, Broad River, and Parr Reservoir will be considered. The NRC staff will include consideration of heat, nutrients, and other pollutants. Because the State of South Carolina is the primary regulatory authority over water quality, NRC staff will work closely with state agencies. Because water-quality actions also have an impact on aquatic ecology, the NRC staff will closely coordinate these reviews.*

Comment: LWVSC [League of Women Voters of South Carolina] agrees with expressions from our citizens that Scoping include the following: Statistical analysis of the evaporation in terms of the estimate of 80 million gallons a day that was made by Tom Clements with Friends of the Earth. (**0035-10** [Zia, Barbara])

Response: *Chapters 4 and 5 of the EIS will describe the methods and results of the evaluation of water-quality impacts from the construction and operation of the proposed action. . Impacts to Monticello Reservoir, Broad River, and Parr Reservoir will be considered. The NRC staff will include consideration of heat, nutrients, and other pollutants. The water budget on which the analysis is based includes the analysis of evaporative losses from these water bodies. Because the State of South Carolina is the primary regulatory authority over water quality, NRC staff will work closely with State agencies. Because water-quality actions also have an impact on aquatic ecology, the NRC staff will closely coordinate these reviews.*

Comment: Two water intakes and one discharge are included as lake impacts. A raw water intake and a water treatment plant intake will be constructed in the Monticello Reservoir. Construction of the raw water intake will be accomplished in the dry with the assistance of a sheet pile coffer dam surrounded by silt curtains. The applicant has proposed to pump silt-laden water from behind the coffer dam into the space between the coffer dam and the silt curtain.

Rather than pumping silt-laden water directly into Monticello, water should be filtered to remove silt and sediment before it is returned to the reservoir. (**0036-16** [Vejdani, Vivianne])

Response: *The construction and operation of a nuclear plant involves some discharges to nearby water bodies. The Clean Water Act designated the EPA as the Federal agency with responsibility for effluent discharges to the nation's waters. While the NRC does not regulate effluents other than radiological effluents, it does have the responsibility under NEPA to assess and disclose the expected impacts of the proposed action on water quality throughout the plant's life. The staff's assessment will determine whether the designated uses of the local and regional water supplies are jeopardized by the construction or operation of a nuclear plant at the proposed site. The staff's assessment of the nonradiological impacts to water quality will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.*

D.2.9 Comments Concerning Hydrology - Groundwater

Comment: All residents in the western part of Fairfield County currently receive their drinking water from groundwater -be that through private wells or through wells operated by the Jenkinsville Water Company. With triple the potential for groundwater contamination, what assurances will be given to the citizens of the surrounding area that the groundwater will remain safe? Are additional monitoring wells going to be required? (**0041-6** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: With tripling of the potential for contamination, by adding two more reactors, what steps will be taken to assure the citizens of the surrounding area, that the groundwater is safe? Are additional monitoring wells going to be established? (**0049-6** [Barnes, Jenifer])

Comment: SR124 [My concern(s) about the two proposed reactors is/are]possible effects of ground water contamination (**0050-42** [Respondent, Community Survey])

Response: *Groundwater monitoring will be addressed in EIS Chapter 2 (pre-application hydrologic and water-quality monitoring), EIS Chapter 4 (construction hydrologic and water-quality monitoring), and EIS Chapter 5 (operational hydrologic and water-quality monitoring, radiological monitoring). The applicant proposes expansion of the current groundwater-monitoring network for the additional units. Additional wells were installed at the site as part of the pre-application site characterization, described in Chapter 2 of the EIS, some of which will be included in the expanded groundwater-monitoring network. The NRC staff will review the consequences of an accidental release of radionuclides to the groundwater in its Safety Evaluation Report.*

D.2.10 Comments Concerning Ecology - Terrestrial

Comment: And about the wildlife, I hunt a lot around here. And I can tell you, from talking to the old timers, there weren't any deer around here in the '40s, there weren't any bald eagles here in the '60s and '70s, and there certainly weren't any black bears. But guess what? They are all back in Fairfield County. Black bears, yes, they are roaming around right here at night. And that nuclear plant isn't killing them. (**0049-26** [Dennis, Dan])

Comment: SR144 [My concern(s) about the two proposed reactors is/are] loss of animals (**0050-61** [Respondent, Community Survey])

Response: *Current wildlife data for the site, vicinity, and transmission line corridors will be summarized in Chapter 2 of the EIS, and potential impacts of plant construction and operation will be discussed in Chapters 4 and 5 of the EIS.*

Comment: [What impact is anticipated on these aquatic ecosystems and] what will the resulting impact [of potential oxygen level impacts to aquatic ecosystem] be on the keystone species in this environment, the Bald Eagle (Haliaeetus leucocephalus)? (**0041-4** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: And what impact might that [drop in oxygen levels prove detrimental to those aquatic ecosystems] have on the keystone species of this environment, the bald eagle? (**0049-4** [Barnes, Jenifer])

Response: *Discussion of impacts to aquatic and terrestrial ecology, including the bald eagle and other important species and habitats, resulting from construction and operation of the proposed Units 2 and 3 will be discussed in Chapters 4 and 5 of the EIS.*

Comment: Protected Species. The EIS should present a detailed analyses of potential impacts to federally protected species as a result of the construction and operation of the Summer site. Although the main facility may be located in Fairfield County, infrastructure development, mining operations, supply components and transmission utilities are an integral part of the reactor facility and must be reviewed for impacts to threatened and endangered species. The Service does have records of smooth coneflower (Echinacea laevigata) from near the Cherokee County project site. We recommend a field survey to determine the presence or absence of this species and its habitat. (**0012-6** [Hall, Timothy N.])

Response: *The NRC staff will assess potential impacts to Federally-protected species stemming from construction and operation of the proposed Units 2 and 3 in Chapters 4 and 5 of the EIS. Cumulative of impacts to Federally-protected species will also be discussed in the EIS.*

Comment: The listed T&E species include Federal species of concern that are currently under status review by the Service and may occur in the project impact area. Federal species of

concern are not legally protected under the Act and are not subject to any of its provisions, including section 7, unless they are formally proposed or listed as endangered or threatened. We are including these species in our response to give you advance notification and to request that any surveys include these species as well. The presence or absence of these species in the project impact areas should be addressed in the environmental assessment. We encourage you to consider alternatives which minimize impacts to these species and their habitats that may be present in the area of affect of the project. (**0012-7** [Hall, Timothy N.])

Response: *The NRC staff will describe species and habitats meeting NRC criteria for "important" in the project impact areas of the proposed site in Chapter 2 of the EIS, and will assess potential impacts to those species from construction and operation of the proposed Units 2 and 3 in Chapters 4 and 5 of the EIS. NRC "important" species include both Federally-listed and State-listed species and habitats, and any species or habitats considered to be of special concern to the relevant Federal or State agencies.*

Comment: Potential impact to migratory bird populations and movement should also be analyzed. We are concerned about impacts of potential bird collisions, or electrocution. We believe that a monitoring program should be developed consistent with the MOA between the Service and NRC for migratory birds. Since bald eagles, osprey, black and turkey vultures, and herons frequent the project vicinity, we recommend any associated transmission lines or distribution lines crossing wetlands, large bodies of water, or open areas should be maintained to maximize visibility of the line to raptors by one of the following design modifications: (1) remove the static line, (2) enlarge the static line to improve visibility to raptors, or (3) mount aviation balls or similar markers on the static line. (**0012-8** [Hall, Timothy N.])

Comment: How will stormwater basins, settling ponds, lagoons, and other storage facilities be designed and managed to minimize impacts to migratory birds, including waterfowl? (**0012-9** [Hall, Timothy N.])

Response: *The NRC staff will assess potential impacts to migratory birds, including waterfowl, from construction and operation of the proposed Units 2 and 3 in Chapters 4 and 5 of the EIS. Best Management Practices (BMPs) will be discussed in Chapter 5 of the EIS. Cumulative impacts will also be addressed in the EIS.*

Comment: High quality natural areas and hardwood forests occur along the river corridor and are home to a diversity of game and non-game wildlife species. Many nesting populations of bald eagle (Haliaeetus leucocephalus) inhabit its floodplain and depend on the Broad as a source of food. (**0036-3** [Vejdani, Vivianne])

Response: *The NRC staff will describe the bald eagle and other important species and habitats, as well as any federally listed terrestrial species and habitats in potentially affected areas, in Chapter 2 of the EIS. The NRC staff will assess potential impacts to those species and habitats from construction and operation of the proposed Units 2 & 3 in Chapters 4 and 5 of the EIS.*

Comment: We recommend the licensee incorporate low impact procedures such as constructed wetlands, rain gardens, and double silt fencing throughout construction. Storm water detention facilities should be built well above floodplains and wetlands, and should not impound any streams. Detention facilities should discharge to constructed wetlands for further treatment of stormwater runoff. In shoreline areas, the applicant should use bioengineering techniques to the greatest extent possible. Maximum width buffers should be maintained between any construction site and any aquatic site. These buffers should be non-disturbance areas that are maintained in natural vegetation. (**0036-14** [Vejdani, Vivianne])

Response: *The NRC staff will assess potential impacts to wetlands, floodplains, streams, and riparian habitats from construction and operation of the proposed Units 2 and 3 in Chapters 4 and 5 of the EIS, and will include discussion of associated BMPs to address stormwater runoff issues.*

Comment: The COL [Application, Part 3, Environmental Report] states that a small portion of a small intermittent stream and its associated wetland extend slightly into the area in which the cooling towers would be located; a portion of this wetland would be impacted by construction activities. During an interagency meeting with the licensee on February 5, 2009, anticipated impacts to intermittent stream and wetland were described as totaling approximately 600-700 linear feet and approximately 0.30 acre of wetland. We recommend avoiding all impacts to onsite streams and wetlands to the greatest practicable extent. An appropriate mitigation plan for unavoidable impacts to waters of the United States should be reviewed and approved by resource agencies and provided consistent with the Federal Mitigation Rule. (**0036-15** [Vejdani, Vivianne])

Response: *The NRC staff will assess impacts on onsite wetlands from construction of the proposed cooling towers, and discuss mitigation plans for unavoidable impacts in Chapter 4 of the EIS.*

Comment: Invasive Exotic Species. We are also concerned with the introduction and spread of invasive exotic species in association with the proposed project. Without active management, including the revegetation of disturbed areas with native species, project corridors will likely only be sources of (and corridors for) the movement of invasive exotic plant species. Exotic species are a major contributor to native species depletion and extinction, second only to habitat loss. Exotics are a factor contributing to the endangered or threatened status of more than 40 percent of the animals and plants on the Federal List of Endangered and Threatened Wildlife and Plants (Wilcove, et. al., 1998). It is estimated that at least 4,000 exotic plant species and 2,300 exotic animal species are now established in the United States, costing more than $130 billion a year to control (Pimentel, et. al., 2000). Additionally, the U.S. Government has many programs and laws in place to combat invasive species (see www.invasivespecies.gov) and thus cannot spend money to counter these efforts. Specifically, Section 2(a)(3)of Executive Order 13112 -Invasive Species (February 3, 1999) directs federal agencies to "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere." Despite their short-term erosion-control benefits, many exotic

species used in soil stabilization seed mixes are persistent once they are established, thereby preventing the reestablishment of native vegetation. Many of these exotics plants are also aggressive invaders of nearby natural areas, where they are capable of displacing already established native species. Therefore, we strongly recommend that only native plant species be used in association with all aspects of this project, including secondary impacts (i.e., connecting sewer lines). (**0012-14** [Hall, Timothy N.])

Response: *The NRC staff will assess potential impacts to important terrestrial species and habitats from invasive exotic species during construction and discuss any associated BMPs in Chapter 4 of the EIS.*

Comment: Lighting. We are concerned about the effects of night security lighting. We are primarily concerned about the potential for overlighting the large site and the potential adverse effects on fish and wildlife resources in the area, including migratory birds and bats. A dark nighttime sky is essential. Contributions of light from the earth (both direct emissions and reflected light) brighten the night sky background. This brightening also greatly diminishes the view of the sky for migrating birds, moths, bats, and the general public. The type of light source chosen for outdoor lighting is important because some types may result in more adverse effects than others. We prefer down-shielded, low-pressure sodium (LPS); its nearly monochromatic yellow light can be easily filtered out. Other advantages of LPS are that the wavelength emitted is most near the point where the human eye is most sensitive and efficient, and it is also the most energy-efficient light source available. All outdoor fixtures should be fully shielded and installed in such a way that no light is emitted above a horizontal plane running through the lowest part of the fixture. Thus, glare, light trespass, and light pollution will be minimized, and energy savings will be maximized. The design of the fixtures should include time controls or occupancy sensors to turn lamps off when not needed (LPS has the ability to restrike immediately after a momentary power failure, while high-pressure sodium and metal halide lamps must cool before restriking). We recommend safe, energy-efficient lighting that minimizes impacts to fish and wildlife resources. (**0012-10** [Hall, Timothy N.])

Comment: Infrastructure. All activities associated with the construction and necessary operations of the Summer site should be considered a part of the project and considered in the EIS. Construction of transmission lines, roads and support structures may contribute to resource impacts that extend well beyond the foot print of the Summer site. Stormwater detention and retention capacities should be designed and constructed to adequately prevent contamination of adjacent land and water resources. (**0012-11** [Hall, Timothy N.])

Response: *The NRC staff will assess potential impacts to terrestrial species onsite and in the vicinity of the proposed Units 2 and 3 from construction and operation in Chapters 4 and 5 of the EIS.*

D.2.11 Comments Concerning Ecology - Aquatic

Comment: look very carefully what happen in the nuclear industry in France in the 2006 summer? Probably remind the people working and living here, that in the end of '80s, there was some kind of boiling fish in the park reservoir.
What is going to happen if you are going to have two extra reactors here? We are going to boil alligators? (**0011-67** [Wojcicki, Joe])

Comment: Water Intake, Loss and Thermal Changes. The Summer site proposes to obtain water from the Monticello Reservoir to serve as a heat sink for the reactors during power operations. Intake of water poses a potentially adverse affect upon the aquatic biota. We understand that the volume of water taken for facilities of this type from generally exceed the volume returned. Much of the water used in cooling operations will be lost through evaporation. Therefore, the EIS must analyze impacts to downstream habitats and species as a result of this water loss. We encourage you to develop an instream flow study plan that considers the potential effects of these consumptive losses across the full range of flow scenarios. How will the water abstraction impact the physical habitat of fish and other aquatic community members? We will be glad to review and participate in the development of a study to consider the potential effects on aquatic species, their habitats, and community assemblages. (**0012-2** [Hall, Timothy N.])

Comment: Water returned to the reservoir is likely to have a substantial temperature variation from the intake water. A sudden change is the thermal environment may be hazardous to aquatic organisms near the outflow. The EIS must address these impacts and provide alternatives to eliminating or reducing aquatic thermal variations. (**0012-3** [Hall, Timothy N.])

Response: *The NRC staff will assess the potential ecological and hydrological impacts in Monticello Reservoir and in Parr Reservoir due to the operation of the intake and discharge from the proposed Units 2 and 3 in Chapter 5 of the EIS.*

Comment: Impingement and Entrainment of Aquatic Organisms. One of several issues associated with a large water intake includes impingement and entrainment of aquatic organisms at the cooling water intake. Previous studies at similar nuclear sites by Duke found impingement of some fishes, mostly threadfin shad, some bluegill, and alewife, most during periods of cold water. Although these impacts may be considered small, we recommend that the licensee establish a regular monitoring program and develop a strategy to reduce impingement and entrainment, and to mitigate these potential impacts. Methods to prevent entrainment of aquatic species such as appropriate screen sizes, low pump velocities or variable operation schedules during power operations to block biotic intake must be detailed in the EIS. (**0012-4** [Hall, Timothy N.])

Response: *Although it can recommend ecological monitoring, the NRC does not have the authority to require operational monitoring on the part of the applicant. However, the NRC staff will evaluate potential impingement and entrainment impacts due to operation of the proposed Units 2 and 3 in Chapter 5 of the EIS.*

Comment: Protected Species. The EIS should present a detailed analyses of potential impacts to federally protected species as a result of the construction and operation of the Summer site. Although the main facility may be located in Fairfield County, infrastructure development, mining operations, supply components and transmission utilities are an integral part of the reactor facility and must be reviewed for impacts to threatened and endangered species. Heelsplitter (**0012-5** [Hall, Timothy N.])

Response: *The NRC staff will assess potential impacts to Federally-protected species stemming from construction and operation of the proposed Units 2 and 3 in Chapters 4 and 5 of the EIS. Cumulative impacts associated with the construction and operation of the proposed Units 2 and 3 will be evaluated in Chapter 7 of the EIS.*

Comment: Secondary and Cumulative Impacts. Additional reactors at the Summer site may foster or accelerate increased development of the surrounding areas.....Particular attention should be given to the effected lacustrine and natural wetland and floodplain systems. We are concerned that the water intake from the Monticello Reservoir will disrupt the ecological balance within the system. How will the water intake affect the drinking water supplies and assimilative capacity of the reservoir? (**0012-13** [Hall, Timothy N.])

Response: *The NRC staff will assess potential ecological and water-quality impacts in the Monticello Reservoir from operation of the intake for the proposed Units 2 and 3 in Chapter 5 of the EIS.*

Comment: The Broad River is an outstanding resource of state and regional significance and is important habitat for the priority conservation species robust redhorse (Moxostoma robustum) and American shad (Alosa sapidissima), a wide diversity of freshwater fish and mussel species, and economically important recreational fisheries. (**0036-1** [Vejdani, Vivianne])

Response: *A description of aquatic biota that occurs in Parr Reservoir, and the recreational fisheries in the reservoir, will be included in Chapter 2 of the EIS. The NRC staff will assess potential construction and operation impacts to aquatic biota in Chapters 4 and 5 of the EIS.*

Comment: The [Broad] river also supports numerous populations of the rare and sensitive plant species rocky shoals spider lily (Hymenocallis coronaria). (**0036-2** [Vejdani, Vivianne])

Response: *The NRC staff will assess impacts to rare and sensitive plant species in Chapters 4 and 5 of the EIS.*

Comment: DNR manages the Parr Reservoir and Monticello Reservoir Waterfowl Management Areas, and the Monticello Sub-Impoundment supports a recreational fishery. Water level fluctuations within the reservoirs and their potential impact on waterfowl habitat and fisheries are of concern. Increased temperatures during low flows have caused fish kills in the Monticello Reservoir. In the early to mid-1990s the licensee employed several mitigation

measures, including dredging the discharge canal in 1993, to increase water circulation and cool water temperatures during low flow periods. No fish kills have been reported since that time. It is not known what, if any, impacts may accrue from increased reservoir fluctuations attributable to the addition of Units 2 and 3. Additional consultation throughout licensing is requested to address these concerns. (**0036-11** [Vejdani, Vivianne])

Response: *The NRC staff will evaluate the impacts to aquatic biota in the Monticello Reservoir stemming from the hydraulic fluctuation and operation of the proposed Units 2 and 3 in Chapters 5 and 7 of the EIS. NRC will continue consultation with the South Carolina Department of Natural Resources (SCDNR), per the Fish and Wildlife Coordination Act, as stated in the letter from NRC to SCDNR dated January 12, 2009.*

Comment: As noted in the COL [Application, Part 3, Environmental Report], DNR stocks robust redhorse and smallmouth bass in the Broad River. Smallmouth bass have developed into a spawning population and fishery of increasing local and regional significance. Robust redhorse will continue to be stocked by DNR with the goal of creating a self-sustaining population. Both species were collected in the Monticello Reservoir in 2008. It is not known whether the intake area of the Parr Reservoir and FPSF is attracting these species, and there is a concern that increased pump-back operations may have an adverse impact on smallmouth bass and robust redhorse populations. (**0036-13** [Vejdani, Vivianne])

Response: *The NRC staff will discuss important aquatic species, including the robust redhorse and smallmouth bass, near the vicinity of the proposed site in Chapter 2 of the EIS. Chapter 5 of the EIS will include an impact analysis on such species resulting from operation of proposed Units 2 and 3. Cumulative impacts, including those related to the pump-back operations of the Parr Shoals hydroelectric power facility, will be analyzed in Chapter 7 of the EIS.*

Comment: Inflow to the Parr reservoir has been considerably lower than the modeled 7Q10 flow. Adverse impacts to aquatic resources can be significant if organisms are not able to avoid or find refugia from the thermal plume. More information is needed on the extent of the plume under very low flow conditions (e.g., flows less than the 7Q10 of 853 cfs). DNR requests additional consultation on the analysis of thermal impacts for low-flow conditions. (**0036-18** [Vejdani, Vivianne])

Response: *The NRC staff will analyze and assess potential impacts to aquatic biota in the Parr Reservoir stemming from thermal discharge of the proposed Units 2 and 3 in chapter 5 of the EIS. NRC will continue consultation with SCDNR, per the Fish and Wildlife Coordination Act, as stated in the NRC letter to SCDNR dated January 12, 2009.*

Comment: [Is the carrying capacity of Lake Monticello large enough to mitigate the cooling needs of two additional reactors?] Or will the increased water temperatures pose a significant impact on water quality resulting in a detrimental impact on the resident wildlife? (**0041-2** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: How will the additional cooling needs impact oxygen levels in both the Broad River and Lake Monticello? What impact is anticipated on these aquatic ecosystems (**0041-3** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: Will the impact of the continuing drought condition on the aquatic ecosystems of the Broad River and Lake Monticello be given consideration when the EIS is conducted? (**0041-5** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: On the environmental front, I want to know, is the carrying capacity of Lake Monticello large enough to mitigate the cooling needs of two additional reactors? Or will the increases in water temperature lead to an unacceptable drop in water quality standards, posing a significant threat to the resident wildlife? (**0049-2** [Barnes, Jenifer])

Comment: How will those additional cooling needs impact the oxygen levels, in both Lake Monticello and the Broad river? Would a drop in oxygen levels prove detrimental to those aquatic ecosystems? (**0049-3** [Barnes, Jenifer])

Comment: SR53 [My concern(s) about the two proposed reactors is/are] Fish and wildlife dying. (**0051-47** [Respondent, Community Survey])

Response: *The NRC staff will assess the potential direct and cumulative impacts to aquatic ecosystems stemming from water withdrawals from the Parr Reservoir and the Monticello Reservoir as a result of operation of the proposed Units 2 and 3. Other potential water-quality and thermal impacts on dissolved oxygen levels and aquatic biota will also be analyzed by NRC staff. These issues will be addressed in Chapters 5 and 7 of the EIS.*

D.2.12 Comments Concerning Socioeconomics

Comment: I think one of the first things that we are concerned about, and we think you should be concerned about, is the economics of this plant. They have asked for a 37 percent rate hike, immediately, because they want you to start paying for this thing up front. And it is going to raise utility bills. (**0011-113** [Corbett, Susan])

Comment: SR147 [My concern(s) about the two proposed reactors is/are]and light bills being higher than normal (**0050-68** [Respondent, Community Survey])

Response: *The purpose of the EIS is to disclose potential environmental impacts of constructing and operating the proposed Units 2 and 3. Neither the determination of the impact of constructing and operating a nuclear power plant on retail power rates, nor the impacts such potential rate changes may cause, is under NRC's regulatory purview, and therefore these comments will not be considered further.*

Comment: South Carolina in particular has a chance to really benefit from a massive program of nuclear power plant construction. In Columbia, Westinghouse Nuclear makes the fuel rods. In Greenville, GE designs generation facilities. In Barnwell we can reprocess nuclear waste into reusable fuel and eliminate the waste problem. This is already being done throughout the rest of the world. Finally, Charleston can ship & receive nuclear power plant equipment and materials throughout the world. The number of high paying skilled jobs created could change the very way SC Citizens lead their lives for the better. (**0001-6** [Byrd, William A.])

Comment: Nuclear plants are substatial contributors to the tax base, which supports the region both directly and indirectly. A significant number of Newberry County residents are currently employed at the plant. The two proposed units would only add more much needed, high paying, job opportunities for the citizens of Newberry County, and the surrounding area. (**0010-17** [Powers, Theresa])

Comment: And the other thing about jobs, 90 percent of the people that work at the nuclear power plant, over the last 25 to 30 years, according to the community, do not live in Fairfield County, and there is some fear that if all these jobs come here, and affluent people come here, whether or not they are going to live in the county, or other different places. Again, I said, they impact the land, and take the land (**0010-37** [Marcharia, Kamau])

Comment: At the present time we [Midlands Technical College, main workforce educator serving Fairfield, Lexington, and Richland Counties] are working with three important partners in this process. The Shell Group, who will actually construct these units, the South Carolina Electric and Gas, who will operate and maintain these units; and also the Westinghouse Company, who will supply the two AP100 units.
And, importantly, for our region here in South Carolina, the Westinghouse plant in Richland County, South Carolina, which produces now, and will produce all of the nuclear fuel, the nuclear rods for those particular two plants. In that regard we are working with the house Shell Group, who will construct those companies. We are looking at more than 3,000 skilled craft workers, required over ten years, to build those plants.
We are looking at welders, electricians, iron workers, carpenters. In addition to that, millwrights, and so on and so forth, to make that happen. We have a partnership with them now, we are working in concert with them to develop the programs, and make that happen.
With South Carolina Electric and Gas, they have asked us to develop a nuclear operator training program. And they, by sitting on our advisory committee, by giving input into the curriculum, we are now developing that nuclear operator training program, so that you have environmental and safe programs, in terms of the ability to run those facilities long term.
And we really do appreciate the working relationship that we have, and the partnership we have with South Carolina Electric & Gas, in order to develop those programs, and have the advisory council go out and recruit the people, and get the right kind of people into those particular programs.
And then, thirdly, we are presently starting to work with the Westinghouse Company. We work with them, extensively, over the years. But now we work with them even more, as they will need to ramp up to supply more of the nuclear fuel.

Here in Fairfield County, along with Mr. Ferguson, and Mr. Brown, who chair the County Council, we have been able to get a new training facility. We just got a million dollars from the State of South Carolina Department of Commerce, to build a quick jobs training center, where we will be able to provide the training, help provide some of that training in the skilled craft area. And, also, start to develop students who can take those courses to become nuclear operators. So we look forward to that particular partnership. (**0010-5** [White, Sonny])

Comment: [...these two reactors, forget about the Duke Power reactors, somewhere in Cherokee County, this is going to take the water from about two million people, or it is going to take the water from over a quarter of million farms, the farms that are going to create the food for us.] If we are going to take the water from these people, what you can expect to pay for the tomatoes, and all this stuff, right now, even the peanuts, which is a South Carolina product. (**0010-91** [Wojcicki, Joe])

Comment: I wanted to speak, tonight, about the economic environment. It is a little different, but it is also an environment that is very important to us. (**0011-1** [Cincotta, Jill])

Comment: It is my understanding, as we build these two new reactors, we get two new reactors, and one is we get two for the price of one. One is going to be state, and the other one is going to be private. So I understand the state don't pay taxes, so the community will only be getting taxes for one of these reactors, is my understanding, that Santee Cooper versus SCE&G (**0011-22** [Marcharia, Kamau])

Comment: If you are planning of bringing thousands of people here, that would equate to more people that is living in the town of Winnsboro, and they have only four to five thousand, we would be close to ten thousand people in this district working, if we can get those jobs. (**0011-29** [Marcharia, Kamau])

Comment: A significant number of our [SCE&G] security contract staff are local, which provides jobs for the local community. (**0011-37** [Archie, Jeff])

Comment: Finally, as has been mentioned, in an era of economic uncertainty, the building of these plants will bring both construction jobs, and long-term operational jobs to this area. (**0011-48** [Rudnicki, Steve])

Comment: We've got people coming from everywhere, we live here, we need growth, we need somewhere for people to work, whether you live here, or whether you live in Blair, or whether you live at Ridgetech, or Jenkinsville, or Winnsboro, it doesn't matter, if you live in Georgia it doesn't matter. The place needs growth. And that is what we are looking for tonight. (**0011-80** [Rabb, Ernestine])

Comment: We talk about the pros, you talk about the pros, and you want everybody to say yes, we want to put these here, we want to bring jobs. But do you think about the costs? If you are going to think about putting jobs here, or the nuclear plant here, is it just going to be to the people that live in this community, are you going to open up jobs to this community first, or are

you going to extend the boundaries outside the community and bring in 10,000 people from 150 miles away, when the people here are the ones that need the jobs. (**0011-86** [Hill, Carol])

Comment: As you know, the construction and operation of the plants will greatly benefit the economy of South Carolina. As members of the business community, truck owners and operators will greatly benefit from the economic development created by the project. (**0014-1** [Todd, J. Richards])

Comment: Moreover, the construction and operation of the plants will generate thousands of construction jobs, more than a hundred direct new permanent jobs and the positive collateral benefits as well. (**0017-6** [Campbell, Paul G., Jr.] [Duncan, Jeff] [Harrison, James H.] [Laffitte, Sterling] [Lummus, John] [Ott, Harry L., Jr.] [Pinson, Lewis E.] [Rawl, Otis B.] [Sandifer, Bill] [Smith, J. Roland] [Sottile, Mike] [Thordahl, Jeff])

Comment: We look forward to the stimulus of new houses being built, increased sales of new and existing homes, new small businesses that will spin-off and the tremendous increase in tax base for the county and the state. The homeowners and businesses will be greatly benefited by dependable, low-cost electricity. (**0017-7** [Campbell, Paul G., Jr.] [Duncan, Jeff] [Harrison, James H.] [Laffitte, Sterling] [Lummus, John] [Ott, Harry L., Jr.] [Pinson, Lewis E.] [Rawl, Otis B.] [Sandifer, Bill] [Smith, J. Roland] [Sottile, Mike] [Thordahl, Jeff])

Comment: Moreover, the construction and operation of the plants will generate thousands of Construction jobs and nearly 1000 permanent jobs in an area where unemployment is rampant. Further, we look forward to the stimulus of new houses being built, increased sales of new and existing homes, new small businesses that will spin off and the tremendous growth in the tax base for both Fairfield County and the state of South Carolina. The homeowners and businesses across our region will benefit significantly from this dependable, low-cost electricity. (**0021-6** [Lanier, Hope])

Comment: As a small business owner, I recognize the need for low cost energy sources and benefits to the tax base of additional power-producing facilities. (**0030-1** [Combie, Joan])

Comment: Also, in respect to South Carolina's economic future, we will benefit with the creation of jobs and the further development of our state's competitiveness. (**0031-3** [Beaman, Charles, Jr.] [Benjamin, Steve] [McLeese, Ike] [Novinger, Cathy] [Speth, Charles Ted])

Comment: The Home Builders Association is continually working to increase homeownership in South Carolina through housing construction in an environmentally sensitive manner and we believe SCANA and Santee Cooper's record of running the VC Summer Plant will ensure that the American dream of home ownership will be realized. The plant will generate thousands of construction jobs and a couple hundred direct new permanent jobs which will spur the building of new homes, businesses and a large increase in tax base for the county and state. Homeowners and businesses in South Carolina will greatly benefit from the construction of dependable, low-cost electricity. (**0032-3** [Gregorie, Jim])

Comment: Economically, property taxes totaling more than $19 million are paid annually for the site itself and more than 800 are employed at and live in close proximity to V.C. Summer. These are dollars, jobs and residents to the area that benefit schools, roads and other local infrastructure. Approximately 3,000 to 4,000 people will be employed for three to four years during construction of the two new units, while another 800 to 1,000 full-time workers will be hired to operate the new reactors. With a 12% unemployment rate; 18% of Fairfield residents living at or below the poverty level; and a median household income of $8000 less than the state average, the existing and future jobs associated with V.C. Summer are vital to this county's growth and prosperity. (**0033-12** [Merrill, Denver])

Comment: Specifically to the impact of the expansion of the V.C. Summer Nuclear Station, it's not only environmentally safe, but Fairfield County will see a substantial economic benefit. (**0033-9** [Merrill, Denver])

Comment: Moreover, the construction and operation of the plants will generate thousands of construction jobs, a couple hundred direct new permanent jobs and the positive collateral benefits as well. (**0046-6** [Hendrix, Samuel H.] [Hope, Leslie B.])

Comment: Construction and operation of the plants will generate thousands of jobs in the Fairfield County area. The development of the nuclear reactors will stimulate the economy by increasing the number of new homes built, increasing sales on existing homes, and creating new businesses. An added benefit is the increase in tax base for the county and the state. (**0047-4** [Whatley, Michael])

Comment: I'm well aware that V.C. Summer provides the single largest source of revenue for Fairfield County. However, it is my belief that the short-term financial benefits of this project are far outweighed by the potential for long-term harm. Let us take off our blinders, see the whole picture, and not be blinded by the promise of economic gain. Thank you. (**0049-11** [Barnes, Jenifer])

Comment: And not only will units 2 and 3 provide more jobs, some 3 or 4,000 during the construction phase, an additional 6 to 800 permanent employees. By the way, the leadership at SCANA has been very involved with engaging the local technical colleges, the universities, local workforce partners, in developing programs to begin preparing the workforce in this area, to both be eligible for these construction jobs, as well as for the permanent operator positions. (**0049-14** [Harrison, Tiffany])

Comment: In addition we will be looking at more tax revenue as a result of these two proposed reactors. (**0049-15** [Harrison, Tiffany])

Comment: I'm a business owner, I own a small engineering company, surveying and construction management. We employ 80 people. Ten of our employees live in Fairfield County. We happen to be the county engineers for Fairfield County, our firm. We do a lot of work in the county. Obviously we also do some work for the town of Winnsboro, and the town of Ridgeway. We have an office located in downtown Winnsboro, 118 S. Congress Street. Why am I telling

you all this? I have skin in the deal, just like you folks do. And let me tell you, I will get into a little bit more of that skin in the deal. (**0049-18** [Dennis, Dan])

Comment: I am in favor of this project. And I'm going to tell you why. This project is good for Fairfield County. Fairfield County is rural, and it is poor, and it needs these plants. (**0049-19** [Dennis, Dan])

Comment: But I want to leave with this message. And you NRC folks, I don't see anybody writing anything down, so write this down. SCE&G, SCANA and Santee Cooper have to do a better job of spending the 11 billion dollars that it will ultimately take to build these two plants. What do I mean by that? They are sole-sourcing this project to one contractor. Let me repeat myself. One contractor has one contract for 10 to 11 billion dollars. Okay, that is fine. That contractor may or may not sub that work out to small businesses in Jenkinsville, in Columbia, in South Carolina, because their contract doesn't require them to do that.
This project is the largest project in the history of South Carolina. There is no other project as big as this. SCE&G just finished building the backup dam for Lake Murray. This project would make that look like building a picnic table.
SCE&G has to assure us that small businesses have the opportunity to bid on work. Nobody should get a handout, but we should have the opportunity to bid on work. It should not be given to one company, and that money go out of state. I don't know what percent of 11 billion dollars, or 10 billion dollars should stay in South Carolina, but one percent of one billion dollars is a hell of a lot of money. And it needs to stay in Jenkinsville, it needs to stay in Columbia, and it needs to stay in South Carolina. And the only way to do that is through small business. Small business is the economic backbone of this country, 90 percent of the jobs in America are created by small business.
So SCE&G you have to fix that. I'm not going to let up. I have talked to the highest gentleman at SCANA, I have talked to the highest folks at Santee Cooper, I will not give up. You must convince your contractor, who is building these plants, as we speak --to outsource this work to small businesses. You guys are writing this down? This needs to be in the NEPA document. And it needs to be in the EIS, because I'm going to read the EIS, and I'm going to check it, and this falls under the socioeconomic section. Small business jobs need to be created, but they need to be created by small businesses. Thank you. (**0049-27** [Dennis, Dan])

Comment: And the interest that I want to convey to you is that when I went to work at a Duke facility in Catawba, and at a Duke facility at McGuire in Charlotte, and at a Duke facility at Oconee up there in Seneca, Seneca has three reactors, the others had two. But what I saw was the magnitude of people, and the jobs that were available. And that being said, this county needs something like that, where we can get jobs. But at the same time the safety aspect of it, which I'm glad that you all will truly address, that it is viable to do that. (**0049-36** [Hendrix, Clifton])

Comment: But myself, if I wanted to, I could work year round making a pretty good bit of money just working the shutdowns that occurs. And right now this facility has one every 18 months, I believe. And with three that means that they will have an average of two a year. And for people that want seasonal work, that is good. But the main thing is that real jobs, the one that they talked about, the 800 now, and the 600 that might come about, that is a real plus for

this county, if we train ourselves for it. And the systems that they have in place that provide the training. (**0049-37** [Hendrix, Clifton])

Comment: SR96 [My concern(s) about the two proposed reactors is/are] Jobs (**0050-17** [Respondent, Community Survey])

Comment: SR97 [My concern(s) about the two proposed reactors is/are] Jobs, (**0050-19** [Respondent, Community Survey])

Comment: SR101 I agree with it because it will allow more jobs and will benefit the economy. (**0050-22** [Respondent, Community Survey])

Comment: SR81 [My concern(s) about the two proposed reactors is/are]high taxes (**0050-3** [Respondent, Community Survey])

Comment: SR109 I don't have any concerns. It is a great opportunity to bring more jobs to the area. (**0050-33** [Respondent, Community Survey])

Comment: SR114 [My concern(s) about the two proposed reactors is/are]higher taxes (**0050-34** [Respondent, Community Survey])

Comment: SR114 [My concern(s) about the two proposed reactors is/are]jobs being given to outsiders like before (**0050-36** [Respondent, Community Survey])

Comment: SR114 Yes, people in Dawkins, Jenkinsville, Blair should have first choice [to be offered jobs at VCSNS]. (**0050-37** [Respondent, Community Survey])

Comment: SR126 Yes it's a good thing because it would provide jobs to those that don't have jobs. (**0050-43** [Respondent, Community Survey])

Comment: SR127 [My concern(s) about the two proposed reactors is/are] That they be safe and provide jobs for Fairfield County. (**0050-44** [Respondent, Community Survey])

Comment: SR132 [My concern(s) about the two proposed reactors is/are] Losing land due to taxes (**0050-49** [Respondent, Community Survey])

Comment: SR133 [My concern(s) about the two proposed reactors is/are] High taxes (**0050-51** [Respondent, Community Survey])

Comment: SR138 [My concern(s) about the two proposed reactors is/are]Growth for the county (**0050-52** [Respondent, Community Survey])

Comment: SR140 We need more jobs. (**0050-56** [Respondent, Community Survey])

Comment: SR141 We need more jobs. (**0050-57** [Respondent, Community Survey])

Comment: SR145 [My concern(s) about the two proposed reactors is/are]3 Job placement (**0050-64** [Respondent, Community Survey])

Comment: SR146 [My concern(s) about the two proposed reactors is/are] 1 Jobs 2. Community development. (**0050-65** [Respondent, Community Survey])

Comment: SR147 [My concern(s) about the two proposed reactors is/are]taxes on the land going up (**0050-67** [Respondent, Community Survey])

Comment: SR152 I have no concerns. Fairfield County need jobs. (**0050-71** [Respondent, Community Survey])

Comment:
SR160 I don't have any [concerns about the two proposed reactors}, I think it is a great opportunity to bring jobs back in Fairfield County. (**0050-73** [Respondent, Community Survey])

Comment: SR161 [The two proposed reactors] Will be a great opportunity for new jobs in Fairfield County. (**0050-74** [Respondent, Community Survey])

Comment: SR87 We need these jobs [at VCSNS for Fairfield County residents] to boost the economy in this area. (**0050-8** [Respondent, Community Survey])

Comment: SR169 I have no concerns as long as it [two proposed reactors] provides jobs here in Fairfield Co.. (**0050-81** [Respondent, Community Survey])

Comment: SR171 [My concern(s) about the two proposed reactors is/are]Bringing jobs to the people (**0050-82** [Respondent, Community Survey])

Comment: SR171 Looking towards retirement, my husband and I more concerned about the young people jobs.. (**0050-83** [Respondent, Community Survey])

Comment: SR8 Residents who live in fairfield county should be offered jobs first and training should be provided (**0051-12** [Respondent, Community Survey])

Comment: SR18 Fairfield County would certainly profit from having the proposed reactors become a reality especially since there are so many people out of work. (**0051-24** [Respondent, Community Survey])

Comment: SR54 I think that it's a good thing to provide jobs to people that don't have one or get that done lost there jobs. (**0051-48** [Reed, Cyrus])

Comment: SR55 [My concern(s) about the two proposed reactors is/are] That there will still not be enough jobs for those who lost theres due to plants closing down, lay offs, and jobs moving. (**0051-49** [Respondent, Community Survey])

Comment: SR3 [The two proposed reactors] might be good for community-create jobs. Do have concerns, however. (**0051-5** [Respondent, Community Survey])

Comment: SR56 [My concern(s) about the two proposed reactors is/are] High taxes. (**0051-50** [Respondent, Community Survey])

Comment: SR65 [My concern(s) about the two proposed reactors is/are] Will the two nuclear reactors help the residents in this area of Fairfield County or will this plant benefit people from other places. Cost of living increase? (**0051-57** [Respondent, Community Survey])

Comment: SR67 [My concern(s) about the two proposed reactors is/are] Not able to get jobs. (**0051-60** [Respondent, Community Survey])

Comment: SR78 [My concern(s) about the two proposed reactors is/are] High taxes, danger, lose family land because of high taxes. (**0051-73** [Respondent, Community Survey])

Response: *Hiring choices for construction and operations labor force personnel is outside the scope of NRC's regulatory authority. The EIS, however, will evaluate the expected economic impacts of construction and operations activities including any local purchasing of production inputs, local and in-migrating labor, local spending of earnings, and tax revenues generated by local purchasing activities or from real property assessments in Chapters 4 and 5 of the EIS.*

Comment: I want to applaud the Chairman for coming in and expressing his desire to help Fairfield County. He talked about the construction jobs, but my prayer is that our county will not only do that, but in the sector of operating the plant, provide courses where our people can study, even if not during the daytime, at night, to advance themselves. (**0010-163** [Hendrix, Clifton])

Comment: I have had meetings in Western Fairfield, and Shelton, Stone, Buckhead, Blair, Monticello, the Dawkins community, Jenkinsville, Austin, Herb Glenn, Bethel, and the Greenbriar communities, talked to people coming in and out of the stores. And I'm reflecting on the perceptions of what people have said to me. They talked about the infrastructure of roads, water system, jobs, health care, fire protection, and recreation. (**0010-28** [Marcharia, Kamau])

Comment: For instance, with health care, putting two more reactors there, with four to six thousand people, that number keeps fluctuating, in a community that don't even have a car wash or a laundromat, of four thousand people working, perhaps, for four, five, seven years, to build this institution, or reactors, gives some concerns about health. (**0010-29** [Marcharia, Kamau])

Comment: We have our elementary school within five to six miles of the nuclear power plant, about 300 elementary children who are all on fixed lunches, which means that their mother and father are extremely poor. And we don't know the health conditions of all those children. We know there is millions of people that don't have health care. And having the health care center that is very important for that particular part of the community, and the community wants some assistance on that. (**0010-30** [Marcharia, Kamau])

Comment: In terms of fire stations, you are going to put two more reactors there. The community kind of felt that they needed more protection. The fire station they have is really run down, it needs some upgrading. (**0010-31** [Marcharia, Kamau])

Comment: In the event that something happens, fire protection and health care is important. And if you have thousands, and thousands, and thousands of people coming into the community, an influx into the community, the community has a concern that folks are still buying up land, and purchasing land already in the Dawkins community. (**0010-33** [Marcharia,])

Comment: But if we are going to train people in Fairfield County, how do you prepare them, what are they looking for? Do they need GEDs, what is the process? People really need to know that. (**0010-38** [Marcharia, Kamau])

Comment: So, overall, I hope that the socioeconomics...portion of the impact statement team really, really takes a look at some of the issues for such a community. (**0010-60** [Tansey, Sara])

Comment: And those [human environmental impacts] are also economic. So you have jobs, and the promise of investment, etcetera, but you also have increased health care. You know, people losing work days because they are sick. All of these things need to be more holistic and universal. (**0011-17** [Ramsburgh, John])

Comment: So my concern, as I have talked to the constituency in Shelton, Stone, Buckhead, Blair, Dalkans [Dawkins?] Community, Monticello, Jenkinsville, Austin, Wallaceville, Bethel, Cedar Creek, Greenbriar, I have talked to people in all of these communities. And if you are going to be here, they talked about infrastructure, roads, water systems, jobs, health care, fire protection, recreation, and displacement. (**0011-25** [Marcharia, Kamau])

Comment: And I will say if there are going to be that many, four to six thousand people coming here to work, in this community, and we need to see the plan for what is your construction for the roads, infrastructure. Because right now people are coming from Powell and Prosperity, hit 215, residents on that road take 15 to 20 minutes to get out of their driveway, and sometimes you have school buses coming, they won't even get to school. So we want to know what kind of construction it is going to provide. (**0011-26** [Marcharia, Kamau])

Comment: Water systems, we have some communities, in some communities we don't have drinking water, provided drinking water in some of the communities. We don't have the capacity for the water lines to provide for these communities. If you go down in the Dalkans [Dawkins?]

Community, you have several hundred families down in that area, that would need fire protection, have fire hydrants in. (**0011-27** [Marcharia, Kamau])

Comment: We have a fire station in Jenkinsville, and over the years we have had fire trucks show up at fires without any water in it. Don't ask me why that happens, but it has happened. We have had fire trucks break down, we had to give them a jump to get to the fire. And if you are going to put two more reactors, that triples the potential dangers. You can't tell me that you will never have an accident. As I have said before, the folks who work there, try to work to really keep that place safe, and I know this for a fact. But that does not obviate the fact that an accident can happen. That we need an adequate fire station, with fire trucks, in this community, an adequate water system. (**0011-30** [Marcharia, Kamau])

Comment: We also need health care. We have four, five, six thousand people working in this community, we need health care centers in this community that are adequate to the needs of the community, in the event that some issues would occur. Several years ago SCE&G was generous enough to give this community, I think, 8.5 acres of land, and I think the express purpose of that, at that time, was to try to build a health center, and a recreation center on that, and I hope that we can follow up to be able to do that. (**0011-31** [Marcharia, Kamau])

Comment: Now, the partnership between the Fairfield County School District, and SCE&G, will continue to grow with the growth of the new facilities at the nuclear plant. Student training for work career path at the facilities have begun. A grant has recently been written to help women start non-traditional careers, in the engineering field, to help get our county's workforce ready. This plant expansion offers the promise of job creation for our current and future students which will, in turn, increase the quality of life for residents in Fairfield County. (**0011-4** [Cincotta, Jill])

Comment: I can sit here and say there is going to be a bunch of traffic, and there is going to be a bunch of people coming in, and what is the crime going to be, what is the crime level going to be in our little quiet neighborhood, once all of this starts to happen? (**0011-6** [Ginyard, Gregrey])

Comment: And in the best case situation, which most people want to know, where is the employment, where is the infrastructure, where is the coming, where is the tax base, where is that? Someone needs to put that out in an informative way, so that we can all benefit from it. (**0011-89** [Schaffer, Jeff])

Comment: Building the nuclear plants near poor communities actually can provide job opportunities for those in that area. They can be put in training programs. This would result in less poor communities and more prosperous economies. These job skills can be applied in many other career fields: the attention to detail, managing under stress, decision making, etc. (**0026-3** [Sims, Raymond])

Comment: LWVSC [League of Women Voters of South Carolina] agrees with expressions from our citizens that Scoping include the following: Clarification regarding local job training of local workers for plant construction. (**0035-5** [Zia, Barbara])

Comment: Finally, simply the act of construction of the two additional reactors will have a detrimental impact on the lives of the local citizens. The increase in traffic alone is something to be concerned about, particularly for the many elderly people who attempt to drive on the local roads and the children who play alongside them. Has any thought been given to decreasing the speed limits on Highways 213 and 215 within a five mile radius of the Station in order to alleviate the pressures of having so many additional heavy trucks speeding past our homes on roads which are already in great need of repair? (**0041-22** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: Does Fairfield County have the infrastructure necessary for the tripling in size of this facility? The Fairfield County Fire Department is an all volunteer system with Jenkinsville having only FOUR actual members. (**0041-9** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: The local environment situation analysis should show any limits for the future economical development around the reactor site (radius of 50 miles) (**0044-17** [Wojcicki, Joe])

Comment: The South Carolina state must be prepared to educate the new reactors' construction crew as well as their operators. The present SC educational system is not ready and seems not to have a proper orientation in the field of preparation of professional and technical staff to run this kind of investment and new AP1000 generation of facilities. The report must also set minimum and required levels of education, e.g. associate (AS) degree in nuclear technology, AS in Instrumentation and Process Control from institution with ABET accreditation. (**0044-22** [Wojcicki, Joe])

Comment: The local communities in Fairfield County are in great need of a potable water plant and a sewer plant and lines. Only with this infrastructure can the nearby communities grow and prosper. The smart residents leave because there is no opportunity in the area. The existing Plant, as you can see, has not helped with economic development in the area and few people want to live near a nuclear plant. (**0048-5** [Lewis, Crosby])

Comment: these two reactors will also assist the state with attaining a very critical economic development goal, which is access to safe, reliable, and cost-effective power. That is a key component to the future economic development success of this county, the central Midlands region, and the state of South Carolina. (**0049-16** [Harrison, Tiffany])

Comment: SR80 [My concern(s) about the two proposed reactors is/are] High crime. (**0050-1** [Respondent, Community Survey])

Comment: SR89 [My concern(s) about the two proposed reactors is/are] [I] Need a better unstand [understanding?] about the plant and how in with impact in county not just Jenkinsville area. (**0050-10** [Respondent, Community Survey])

Comment: SR94 [My concern(s) about the two proposed reactors is/are] Will it effect that community in anyways. (**0050-15** [Respondent, Community Survey])

Comment: SR95 [My concern(s) about the two proposed reactors is/are] will they in anyway effect the residents of that community. (**0050-16** [Respondent, Community Survey])

Comment: SR108 [My concern(s) about the two proposed reactors is/are] Will it effect our community. (**0050-32** [Respondent, Community Survey])

Comment: SR115 [My concern(s) about the two proposed reactors is/are] Crime , traffic , loss of land , higher taxes. (**0050-38** [Respondent, Community Survey])

Comment: SR116 [My concern(s) about the two proposed reactors is/are] Crime , traffic. (**0050-39** [Respondent, Community Survey])

Comment: SR131 [My concern(s) about the two proposed reactors is/are] High crime , land lost. (**0050-48** [Respondent, Community Survey])

Comment: SR145 [My concern(s) about the two proposed reactors is/are]1. Community development (**0050-62** [Respondent, Community Survey])

Comment: SR162 [My concern(s) about the two proposed reactors is/are] Traffic (**0050-75** [Respondent, Community Survey])

Comment: SR166 [My concern(s) about the two proposed reactors is/are] More traffic and the crime rate will go up. and the crime rate will go up. (**0050-79** [Respondent, Community Survey])

Comment: SR167 [My concern(s) about the two proposed reactors is/are] Way over too many people in this small town of Jenkinsville. (**0050-80** [Respondent, Community Survey])

Comment: SR20 [My concern(s) about the two proposed reactors is/are] Safety and Growth. (**0051-26** [Respondent, Community Survey])

Comment: SR44 [My concern(s) about the two proposed reactors is/are] Traffic. (**0051-36** [Respondent, Community Survey])

Comment: SR47 [My concern(s) about the two proposed reactors is/are] More people, traffic. (**0051-40** [Respondent, Community Survey])

Comment: SR52 [My concern(s) about the two proposed reactors is/are] Traffic. (**0051-46** [Respondent, Community Survey])

Comment: SR63 [My concern(s) about the two proposed reactors is/are] 1. Health risks 2. Jobs that will be available to local citizens. (**0051-55** [Respondent, Community Survey])

Comment: SR64 I have plenty concerns especially about crime, health care, and all of the outsiders who will be coming from different states for the jobs when there are 1,000's of people right here who need jobs. (**0051-56** [Respondent, Community Survey])

Comment: SR68 [My concern(s) about the two proposed reactors is/are] Lost communities, traffic. (**0051-61** [Respondent, Community Survey])

Comment: SR69 [My concern(s) about the two proposed reactors is/are all the different sickness, like cancer, babies being borned deformed]....and no health facilities to take care of these things. (**0051-63** [Respondent, Community Survey])

Comment: SR70 [My concern(s) about the two proposed reactors is/are] Younger generation carrying babies, crime. (**0051-64** [Respondent, Community Survey])

Comment: SR71 [My concern(s) about the two proposed reactors is/are] over crowdness and heavy traffic. (**0051-65** [Respondent, Community Survey])

Comment: SR74 [My concern(s) about the two proposed reactors is/are] Communities lost. (**0051-69** [Respondent, Community Survey])

Comment: SR75 [My concern(s) about the two proposed reactors is/are] lose land, crime. (**0051-70** [Respondent, Community Survey])

Comment: SR76 [My concern(s) about the two proposed reactors is/are] Population increases, crime increase. (**0051-71** [Respondent, Community Survey])

Comment: SR187 [My concern(s) about the two proposed reactors is/are]What purpose is it serving our community. (**0052-20** [Respondent, Community Survey])

Response: *Impacts of plant construction and operation on the use of existing local infrastructure, including transportation networks, emergency services, and other community services or the need for such new infrastructure, are within the scope of the socioeconomic impacts and will be addressed in Chapters 4 and 5 of the EIS.*

Comment: Light and noise pollution are two other issues of concern for those of us who live near the facility (**0041-20** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: Simply the act of construction of the two reactors poses a significant safety concern for those of us who live in this area. The increase in traffic, alone, is not something to be dismissed. Has there been any thought given to decreasing the speed limits on highways 213 and 215, in order to alleviate the pressures of having so many trucks speeding past our houses, on roads which are in such need of repair? (**0049-9** [Barnes, Jenifer])

Comment: SR102 [My concern(s) about the two proposed reactors is/are] Increased problem. increased in traffic (**0050-27** [Respondent, Community Survey])

Response: *The EIS will evaluate the physical impacts of the construction and operation of the proposed Units 2 and 3 such as visual impacts, air quality, noise, and traffic congestion in Chapters 4 and 5 of the EIS. Measures to mitigate the physical impacts, including impacts from traffic, will also be discussed in Chapters 4 and 5 of the EIS.*

Comment: Secondary and Cumulative Impacts. Additional reactors at the Summer site may foster or accelerate increased development of the surrounding areas. The EIS should model potential changes including, but not limited to, demographics, population growth, traffic needs, and spread of invasive and exotic species. (**0012-12** [Hall, Timothy N.])

Response: *Impacts of plant construction and operation on the use of existing local infrastructure, including transportation networks, emergency services, and other community services or the need for such new infrastructure, are within the scope of the socioeconomic impacts and will be addressed in Chapters 4 and 5 of the EIS. The EIS also will address the effects of the action on the spread of invasive and exotic species as potential terrestrial ecology impacts.*

Comment: County taxes are one way the local community can offset the additional risks imposed by the location of the plants, but is there no other way that the SC Pubic Service Authority could be encouraged to carry some of the local burden, in nuclear safety risks, costs incurred by local city and county governments and economic deprivation? (**0048-4** [Lewis, Crosby])

Comment: Now, I don't want to be called a hypocrite. I'm also here because the Dennis Corporation, we want to get some work out of this plant, and I'm going to get to that in a minute when I mention Mr. Steve Byrne, over there, I'm not going to let him off the hook. (**0049-24** [Dennis, Dan])

Response: *These comments provide no information relevant to the environmental review of the COL application and therefore will not be considered further.*

Comment: We realize that the Virgil C. Summer Nuclear Station is the single largest provider of tax income to Fairfield County and, therefore, our leaders are clamoring to get this permit approved. We, as concerned citizens, wish to represent those of us in the Jenkinsville area who have so often been overlooked. It is the local citizens of this area who must live with the direct impact of the current facility as well as any future impacts that expanding this facility will have. Please take our concerns seriously and consider our questions when deciding the scope and extent of the Environmental Impact Statement as well as the permit itself. (**0041-23** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: SR144 [My concern(s) about the two proposed reactors is/are] increases in taxes, lost of community (**0050-60** [Respondent, Community Survey])

Comment: SR164 [My concern(s) about the two proposed reactors is/are] Taxes will go up on the land and on the houses and the lights. (**0050-77** [Respondent, Community Survey])

Comment: SR45 [My concern(s) about the two proposed reactors is/are] Higher Bills, lost [loss] of land. (**0051-38** [Respondent, Community Survey])

Comment: SR46 My main concern are the elderly, disabled, and low income who get these small monthly checks not being able to afford to keep their homes, land, electricity because of the high increase of electricity bill and taxes. (**0051-39** [Respondent, Community Survey])

Comment: SR49 [My concern(s) about the two proposed reactors is/are] Having to move from my land. (**0051-43** [Respondent, Community Survey])

Comment: SR72 [My concern(s) about the two proposed reactors is/are] tax increase, bill increase for electricity (**0051-66** [Respondent, Community Survey])

Comment: SR77 [My concern(s) about the two proposed reactors is/are] High taxes, land will be lost. (**0051-72** [Respondent, Community Survey])

Response: *The potential tax-revenue impacts, along with a characterization of the current tax structure in the vicinity and region, will be addressed in the EIS. The purpose of the EIS is to disclose potential environmental impacts of constructing and operating the proposed Units 2 and 3. Neither the determination of the impact of constructing and operating a nuclear power plant on retail power rates, nor the impacts such potential rate changes may cause, is under NRC's regulatory purview, and therefore these comments will not be considered further.*

Comment: Number one, utility rates will rise dramatically with the building of these very expensive plants. SCE&G has refused to conduct a valid analysis of lower cost efficiency, and conservation alternatives, that could result in lower rates. (**0010-114** [Cooper, Elaine])

Comment: SCE&G will begin charging ratepayers a decade before the plant goes on-line, with no guarantee it will actually be built, and with no refunds if they change their minds. (**0010-117** [Cooper, Elaine])

Comment: So the shareholders are protected from that risk, but the public is holding that risk. A Public Service Commission friendly to SCE&G reduces the risk to investors about the cost, I mean, the rates that they can charge to cover their increasing costs. So ratepayers are the ones holding those risks. Even if the plant never opens, because of whatever, the lack of water, or the public opposition, or for whatever reason, rate payers will still pay, and investors are protected from that risk. (**0010-169** [Rudolph, Gerald])

Comment: Other financial risks that SCE&G is that when rates go up alternative energies become more viable. Recently in our house we installed hot water solar heaters. And as rates

go up other people will start buying more alternative energies and conserving in their homes. So the revenue that I was giving will have to be covered by the rest of you ratepayers, as the rates go up, to cover the cost of a reduced consumption. But the investors and the shareholders are protected from that. It is the ratepayers that will assume that risk. (**0010-170** [Rudolph, Gerald])

Comment: Another are the rates. Again, there, we are hearing one thing from the utilities with respect to rates. But if you look at even Wall Street conservative, pro-business investment firms, they are projecting rates for nuclear energy that are twice what Santee Cooper and SCE&G are suggesting. (**0011-19** [Ramsburgh, John])

Comment: And I understand that they asked for an increase from the citizens to help pay for this, prior to us ever getting service, x number of years. And that people pay into this, and happen to pass away five or six years down the road, do their family get reimbursed for all the money they put in for services they are not going to get? (**0011-23** [Marcharia, Kamau])

Comment: And we can expect, those of us ratepayers, are going to get stuck far before the reactors operate, with potentially large cost overruns. But once reactors start up, they may have been built in China by then, but there will be no operating experience. (**0011-74** [Clements, Tom])

Response: *The purpose of the EIS is to disclose potential environmental impacts of constructing and operating of the proposed Units 2 and 3. Neither the determination of the impact of constructing and operating a nuclear power plant on retail power rates, nor the impacts such potential rate changes may cause, is under NRC's regulatory purview, and therefore these comments will not be considered further.*

Comment: The other one is recreation. A lot of people don't like to talk about that. But that is important, especially over in our area. A lot of the people with resources can access recreation real easy. But from the general public standpoint, there ought to be something there that we can do better. (**0010-167** [Hendrix, Clifton])

Response: *Impacts of proposed Units 2 and 3 on affected public infrastructure including roads, bridges, and recreational facilities such as parks, boat ramps, and public lands will be analyzed in Chapters 4, 5, and 7 of the EIS.*

D.2.13 Comments Concerning Historic and Cultural Resources

Comment: My name is Crosby Lewis, I live about five miles from the plant. My great, great, great-grandfather is buried on the site of the plant. I tell you that so that you know that I don't have any interest in this, other than myself and my family. I don't represent anybody in this proceeding. (**0049-28** [Lewis, Crosby])

Response: *Locations of known cemeteries will be discussed in Chapter 2 of the EIS. Details on how construction and operation activities will avoid impacting known cemeteries will be described in Chapters 4 and 5 of the EIS.*

D.2.14 Comments Concerning Environmental Justice

Comment: I'd like for you to really, really look at the economics. I know that SCE&G has gone before the Public Service Commission and has asked for a 37 percent rate hike immediately, to begin paying for that. And there are lots of folks, in low economic situations in this county, and in this service area, that are really going to have a hard time when their utility rates go up. (**0010-64** [Corbett, Susan])

Comment: I think you have to look at the economics of this, and how it is going to impact people of low income, in terms of their utility bills. (**0010-66** [Corbett, Susan])

Comment: we [Sierra Club] think this [37% rate hike] is going to be an economic hardship on low income people. We think that rising utility rates are really going to make people have to choose between keeping their lights on, and feeding your kids. (**0011-114** [Corbett, Susan])

Response: *The purpose of the EIS is to disclose potential environmental impacts of constructing and operating the proposed Units 2 and 3. Neither the determination of the impact of constructing and operating a nuclear power plant on retail power rates, nor the impacts such potential rate changes may cause, is under NRC's regulatory purview, and therefore these comments will not be considered further.*

Comment: They have proposed virtually all of them in the South. I guess they figure we are more vulnerable and expendable. (**0010-152** [Mason, Corry])

Comment: And it is just that some people are making some bucks off this thing. They know we are vulnerable, they know they can run over people in South Carolina, we are poor. (**0010-156** [Mason, Corry])

Comment: People are building 500,000 dollars to a million dollar homes, and predominantly in an African-American community. And you put a million dollar home next to a 50,000 dollar trailer, it won't be long before you legally lose your home and land, and get run off the land. (**0010-34** [Marcharia, Kamau])

Comment: I have seen some studies on the impact on fish, wildlife, and fauna, and the area was more particular about that than they are particular about the people who might need some of these resources. (**0010-36** [Marcharia, Kamau])

Comment: So, overall, I hope that the ..environmental justice portion of the impact statement team really, really takes a look at some of the issues for such a community. (**0010-61** [Tansey, Sara])

Comment: So one of the things that I have here today, that we are going to have a lot of jobs. Now, think about what kind of jobs we can expect here. There will be, probably, jobs delivered by Westinghouse. So according to the information from the Westinghouse, there is going to be three years of the job down in the site, that is going to be -- that one of the reactor is going to build.
And if you know that Westinghouse is property of the Toshiba, what do you think that the owners of this company is going to suggest to do with these people here? Second, what kind of jobs we can expect here. Already we have heard the existing unit number 1 hired people that are out of the Fairfield County. Just ten percent from the people living here are going to be hired. So can you expect more people locally will be hired for units 2 and 3? Probably not. (**0010-87** [Wojcicki, Joe])

Comment: Now, the second problem is, yes, if we are going to have ability to teach these people, I have heard two persons from Midland Tech, and from Aiken Technical College. Now, I never heard that we have ability to teach these people. Aiken Technical College closed the nuclear program several years ago. They closed control and instrumentation program a few years ago. They have no chance to really reopen this program, they don't have the instructors, they don't have the facility to teach them. So you cannot really expect that your children, from the people living here in Jenkinsville, will have a chance to learn how to operate a nuclear facility, a generator, and all this stuff. (**0010-88** [Wojcicki, Joe])

Comment: I appreciate that 19 million dollar check we saw spread across the paper the other day, handing it to Norma Brown, my wonderful treasurer. I don't see a whole lot of it going on out here, however. And as far as Jenkinsville, and prosperity, etcetera, somebody has some blinders on, I do believe. Now, I understand we were quite prosperous when the last nuclear power plant was built and I'm sure we will be again. I have heard stories about the beer joints that you wouldn't believe. And so I'm sure that if the construction people come we will have beer joints, and brothels, and I may open one myself, if that is what it takes to get some money, let's go for it. (**0011-108** [Hager, Richard])

Comment: Since we don't know a way to stop nuclear plants from coming, because you are not going to tell us that, of course, so we feel as though if we are not going to stop them, and it is going to come, and you are building a ten billion dollar project, I would like to know how many minority contractors are going to be part of that project, from the community. (**0011-24** [Marcharia, Kamau])

Comment: I think we have a 40 percent illiteracy rate in this county. But the challenge of jobs coming here with the tens, and tens of thousands of people who are unemployed, around this state, will come to this county with these good jobs. They might now know how to be plumbers or electricians, but they can take these tests, and get these jobs, and our people will be jobless trying to get a GED, or trying to get to a so-called key road process, to even get the jobs.

Once again, we are going to be locked out of these jobs, and opportunities, and that is going to leave people in a state where crime might be increased. How would you address all of this? (**0011-33** [Marcharia, Kamau])

Comment: Where is the economic benefit of these plants to Jenkinsville? I mean, I can drive down the road and it is like, where is the money from the plants?
I'm an outsider, and I readily admit that. But, my gosh, there may have been some in the school with the tax money, and I know that there is taxes paid to the county. But this company has been negligent, it looks to me, in providing resources to this community to host these facilities. And if two new plants are going to come here, I certainly hope that there is a positive job impact for you. But that there is a better impact to the tax base for you, as well, because you are bearing the environmental and safety risk, and you ought to be compensated for taking that risk. (**0011-78** [Clements, Tom])

Comment: And another thing about Jenkinsville, it has been the most prosperous community you can ever find in Fairfield County. Yes, it has gone down, people have their own businesses, you might see houses boarded, you might see stores vacant. Those people are deceased, they no longer live here. Maybe there is no one else to occupy those homes. Children leave, children don't come back. (**0011-82** [Rabb, Ernestine])

Comment: To me putting those nuclear reactors here is the same thing as the government placing landfill in low socioeconomic neighborhoods. Just because, you know, people don't make a whole lot of money, they decide we are just going to put a landfill here, because it really doesn't matter, you know, we don't care about the people anyway. We just want to make sure we get our project done, and take care of our people. (**0011-85** [Hill, Carol])

Comment: There was a comment made that people in Jenkinsville were a poor community, so therefore what does it matter? And I believe that is a public statement. Maybe some of you all should think about that, before you welcome these two new neighbors into our community. (**0011-92** [Gunter, Deborah])

Comment: Why is it that the people of Jenkinsville, SC, have been chosen as the Tuskegee Experimental station for this project in the United States? Does the fact that we are an overwhelmingly poor, undereducated, elderly, African-American community have anything to do with this? Why isn't SCEG seeking to place these reactors on Lake Murray since it is those high priced subdivisions with their wealthy residents that are in much greater need of additional power than we poor rural folk? (**0041-15** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: And, is the impact on subsistence livelihood being taken into consideration by the NRC when determining whether or not these additional permits should be rendered? (**0041-17** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: SR82 We don't need a three plant in the black resitdents we all ready have one put it somewhere else. (**0050-4** [Respondent, Community Survey])

Comment: SR132 [My concern(s) about the two proposed reactors is/are] communities becoming own by whites . (**0050-50** [Respondent, Community Survey])

Comment: SR44 [My concern(s) about the two proposed reactors is/are] All job positions being available to the whites first. (**0051-37** [Respondent, Community Survey])

Comment: SR73 [My concern(s) about the two proposed reactors is/are] Communities being taken over by the whites, people not being able to afford electricity. (**0051-68** [Respondent, Community Survey])

Comment: SR5 We raise green beans, peas, okra, tomatoes, corn to mention a few items which means we eat from garden numerous times a week. (**0051-7** [Respondent, Community Survey])

Response: *Environmental justice impacts are those environmental impacts that disproportionately affect low-income and minority populations, or that impact subsistence practices or unusual resource dependencies. Environmental impacts include many physical, social, community, demographic, and economic impacts - including employment and tax revenue impacts. Chapters 4, 5, and 7 of the EIS will address all of these types of impacts. Redressing the grievances of participants in real estate transactions is outside the NRC's regulatory jurisdiction.*

Comment: SR128 [My concern(s) about the two proposed reactors is/are]That fairfield member get the jobs (**0050-45** [Respondent, Community Survey])

Comment: SR138 Due to unemployment rate in Fairfield County, residents should have 1st offer [for jobs at VCSNS]. (**0050-54** [Respondent, Community Survey])

Response: *Hiring choices for construction and operations labor force personnel is outside the scope of NRC's regulatory authority. The EIS, however, will evaluate the expected economic impacts of construction and operations activities including any local purchasing of production inputs, local and in-migrating labor, local spending of earnings, and tax revenues generated by local purchasing activities or from real property assessments in Chapters 4 and 5 of the EIS.*

D.2.15 Comments Concerning Health - Non - Radiological

Comment: SR81 [My concern(s) about the two proposed reactors is/are] Fear, (**0050-2** [Respondent, Community Survey])

Response: *The EIS for the proposed Units 2 and 3 will include an evaluation of the risks associated with potential severe accidents, including accidents that involve reactor core melts. The evaluation will include estimates of health and economic risks to a distance of 50 miles from exposure to the plume and from exposure to contaminated land and water. These risks will be compared with risks associated with the existing unit. In addition, the evaluation will include an estimate of the cumulative risk of severe accidents for all units at the site. This evaluation will be in Chapter 5 of the EIS.*

Comment: I think the nuclear power plant are more healthy for your lungs than coal fired (**0028-1** [Whetsell, David])

Response: *The comments appear to express support for the proposed Units 2 and 3. Because they do not supply information related to environmental impacts of the plant, they will not be addressed in the EIS.*

Comment: Increasing noise from construction as well as an increase in traffic noise will have a large impact on the citizens who live near this facility. (**0041-21** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Response: *Local noise impacts of the proposed Units 2 and 3 are within the scope of the COL and will be evaluated in Chapter 4 of the EIS.*

Comment: I am concern about the dangers that the increase number of power lines will cause to my community. We all know that radiations come from power lines. I feel that our exposure w ill triple. What health risk or disease can I expect my children and grand child to suffer within 20 years? (**0043-1** [Ginyard, Betty])

Response: *Potential impacts to members of the public from the transmission system associated with the proposed Units 2 and 3 are within the scope of the COL and will be evaluated in Chapter 5 of the EIS.*

Comment: SR145 [My concern(s) about the two proposed reactors is/are]2. Health (**0050-63** [Respondent, Community Survey])

Response: *This comment refers to health impacts. As required by federal regulations, the impact analysis will contain an analysis and evaluation of components of the facility relating to the potential radiological and nonradiological health consequences from plant construction and operation. Chapters 4 and 5 of the EIS will address health impacts.*

Comment: It will also displace about 350 kilograms of mercury. This is based on a DOE Brookhaven National Lab study of 2004, based on large coal plants. To give you some of the idea of the impact of mercury emissions, in 2005 the National Institutes of Health study estimated a 9 billion dollar economic impact associated with mercury emissions, related to child brain development. A 2004 CDC study, Centers for Disease Control, estimates that 8 percent of

women of childbearing age have unsafe levels of mercury. As well, that same study, estimated some 300,000 children at risk for mercury poisoning. (**0010-176** [Knight, Travis])

Response: *The comment appears to express support for nuclear power generation as opposed to coal. Because the comment does not supply information related to environmental impacts of the plant, it will not be addressed in the EIS.*

D.2.16 Comments Concerning Health - Radiological

Comment: It doesn't matter how many jobs are created by the nuclear power industry, if you are sick, you can't bring all this money to heaven or hell, wherever you will end up. (**0010-113** [Cooper, Elaine])

Comment: It makes me think I work hard to try to leave the earth a better place than I found it, and I don't like to think that the land I live on is going to be radioactive for the next thousand human generations. Or take depleted uranium, we are talking about birth defects, 4.5 billion years. (**0010-160** [Mason, Corry])

Comment: With respect to radiological aspects, it was mentioned here, again those were mentioned by some of the earlier speakers, radiological aspects, the health effects have been studied for more than 100 years. There is no --we cannot draw any correlation between nuclear power emissions and some of these ridiculously reported studies here, earlier tonight. While no, of course radiation is a hazard, like any other hazard, or carcinogen in the environment, and it is true, what one of the earlier speakers said, that there is no safe radiation level, of course.
But the important thing is that radiation of any type, regardless of the source, is the same, and the health effects are the same (**0010-177** [Knight, Travis])

Comment: So tonight I would really charge the NRC with taking every pain to research, thoroughly, the impacts of the radiation emissions the plant is allowed to release. You know, there are safe amounts of radiation, but addressing bio accumulation of that radiation, within the organisms in the lake and the reservoir, and in the water.
A lot of the community members, in Jenkinsville, have to subsistence fish, or grow a garden in their backyard, to put food on the table every night. (**0010-54** [Tansey, Sara])

Comment: I think that there should be more transparency in terms of the health risk. (**0010-68** [Corbett, Susan])

Comment: Do not be fooled, for a second, in thinking there are no releases. Nuclear plants release radiation. And there is no -- the National Academy of Science says there is no safe level of radiation, there just isn't. It is all dangerous, it is all potentially dangerous to your health. (**0010-70** [Corbett, Susan])

Comment: SR102 [My concern(s) about the two proposed reactors is/are] Increased problem. medical problem and expsoure (**0050-25** [Respondent, Community Survey])

Comment: SR102 [My concern(s) about the two proposed reactors is/are] Increased problem. shortern human lives (**0050-26** [Respondent, Community Survey])

Comment: SR105 [My concern(s) about the two proposed reactors is/are] Radiation (**0050-31** [Respondent, Community Survey])

Comment: SR114 [My concern(s) about the two proposed reactors is/are]sickness (**0050-35** [Respondent, Community Survey])

Comment: loss of life due to contamination (**0050-40** [Respondent, Community Survey])

Comment: SR124 [My concern(s) about the two proposed reactors is/are]long term effects of reactors (**0050-41** [Respondent, Community Survey])

Comment: SR128 [My concern(s) about the two proposed reactors is/are]Concern about our health. (**0050-46** [Respondent, Community Survey])

Comment: SR85 [My concern(s) about the two proposed reactors is/are] Cancer (**0050-6** [Respondent, Community Survey])

Comment: SR147 [My concern(s) about the two proposed reactors is/are]People becoming ill from radiation, (**0050-66** [Respondent, Community Survey])

Comment: SR162 [My concern(s) about the two proposed reactors is/are]cancer, sickness (**0050-76** [Respondent, Community Survey])

Comment: SR165 [My concern(s) about the two proposed reactors is/are] Most of the people will get sick because we live around the nuclear plant. (**0050-78** [Respondent, Community Survey])

Comment: SR13 [My concern(s) about the two proposed reactors is/are] Spreading disease by radiation. (**0051-20** [Respondent, Community Survey])

Comment: SR14 [My concern(s) about the two proposed reactors is/are] My concern is about the people's health that live in the area or live near the plant. (**0051-21** [Respondent, Community Survey])

Comment: SR25 [My concern(s) about the two proposed reactors is/are] Danger to your health. Too much radiation cause cancer. (**0051-30** [Respondent, Community Survey])

Comment: SR34 [My concern(s) about the two proposed reactors is/are] Health concerns. (**0051-33** [Respondent, Community Survey])

Comment: SR48 [My concern(s) about the two proposed reactors is/are] All the radiation seeking [sic] through the air, the soil, and the water getting into people's body causing them to become extremely sick. (**0051-41** [Respondent, Community Survey])

Comment: SR50 [My concern(s) about the two proposed reactors is/are] Babies and wildlife borned deformed. (**0051-44** [Respondent, Community Survey])

Comment: SR51 [My concern(s) about the two proposed reactors is/are] People becoming sick. (**0051-45** [Respondent, Community Survey])

Comment: SR59 [My concern(s) about the two proposed reactors is/are] Long term health effects. i.e. cancer, birth defects (**0051-51** [Respondent, Community Survey])

Comment: SR60 [My concern(s) about the two proposed reactors is/are] Cause a lot of sicken with the one now. (**0051-52** [Respondent, Community Survey])

Comment: SR61 [My concern(s) about the two proposed reactors is/are] Health issue. (**0051-53** [Respondent, Community Survey])

Comment: SR62 [My concern(s) about the two proposed reactors is/are] The two proposed reactors could cause cancer and sickness in people body of the community. (**0051-54** [Respondent, Community Survey])

Comment: SR66 [My concern(s) about the two proposed reactors is/are] People becoming surverily [severely] ill from all the radiation. (**0051-58** [Respondent, Community Survey])

Comment: SR67 [My concern(s) about the two proposed reactors is/are] Increase in deaths. (**0051-59** [Respondent, Community Survey])

Comment: SR69 [My concern(s) about the two proposed reactors is/are] All the different sickness, like cancer, babies being borned deformed (**0051-62** [Respondent, Community Survey])

Comment: SR72 [My concern(s) about the two proposed reactors is/are] ... sickness. (**0051-67** [Respondent, Community Survey])

Comment: SR174 [My concern(s) about the two proposed reactors is/are] Danger and longtime effects. (**0052-1** [Respondent, Community Survey])

Comment: SR182 [My concern(s) about the two proposed reactors is/are] Skin problem (**0052-10** [Robin, Ella])

Comment: SR183 [My concern(s) about the two proposed reactors is/are] Health issues, ... radiation. (**0052-12** [Robinson, Terria])

Comment: SR184 [My concern(s) about the two proposed reactors is/are] Health concerns (**0052-14** [Robinson, Claude])

Comment: SR186 [My concern(s) about the two proposed reactors is/are] Health problems. Radiation. (**0052-18** [Respondent, Community Survey])

Comment: SR187 [My concern(s) about the two proposed reactors is/are] How will this effect our health (**0052-19** [Respondent, Community Survey])

Comment: SR188 [My concern(s) about the two proposed reactors is/are] Will it harm us?. (**0052-22** [Respondent, Community Survey])

Comment: SR189 [My concern(s) about the two proposed reactors is/are] Health concerns (**0052-23** [Gatson, Viola])

Comment: SR190 [My concern(s) about the two proposed reactors is/are] Radiation. Our health. (**0052-26** [Robinson, Bobby])

Comment: SR178 [My concern(s) about the two proposed reactors is/are] Radiation leaks. Health problem do [due] to radiation. (**0052-6** [Respondent, Community Survey])

Comment: SR179 [My concern(s) about the two proposed reactors is/are] Health Concerns. Why do we need to [two] more? Radiation. (**0052-7** [Respondent, Community Survey])

Comment: SR180 [My concern(s) about the two proposed reactors is/are] Radiation. Health Concerns. (**0052-8** [Respondent, Community Survey])

Comment: SR181 [My concern(s) about the two proposed reactors is/are] How will it affect our health. (**0052-9** [Respondent, Community Survey])

Response: *These comments refer to potential health effects due to radiation doses from release of radioactive material from the proposed Units 2 and 3. The impacts on human health from radiological emissions will be addressed in Chapter 5 of the EIS. NRC regulations also limit radiological releases and compliance with these limits will be examined during the safety analysis and will be documented in the safety evaluation report.*

Comment: a lot of people concerned about cancer rates, about the effects of radiation. (**0010-18** [Berg, Michael])

Comment: And a lot of folks who have concerns, who have seen cancer mortality rates increase since the first reactor came in, are not very happy about two new reactors in their

neighborhood. A lot of folks I spoke with, and consider friends now, had children -- one of the most striking was an older gentleman in the community, whose 24 year old daughter had passed away from cancer. Another family who had lost a young son to leukemia. These are very real, very devastating concerns within the community. (**0010-55** [Tansey, Sara])

Comment: I brought with me, tonight, a leukemia map of South Carolina. Now the insidious thing about radiation is you can't prove that it causes anything, that is what is kind of sad about it. But every county in this state that has a nuclear facility in it, has higher than average leukemia rates, including Fairfield County. And maybe that is just coincidental.
But I would like to see that addressed in your study. I would like to see you project what the increased cancer rates, not only leukemia, but there is also, now, a higher, significantly higher group of thyroid cancers around the Oconee plant, there is three reactors up there.
I want to see you project what are going to be the increased cancers in this area, from releases of that plant. (**0010-72** [Corbett, Susan])

Comment: And the last thing that I'm going to say is that, and I was sitting over here, and I just got an email, a big report out today about world-wide higher incidences of leukemia around nuclear facilities. Not in this country, not just in this country, France, Germany, other countries are experiencing this. And I have, with me, a map, a DEHAP map, and it is just coincidence that every county in this state, that has a nuclear facility in it, has a higher than average leukemia rate. And there it is, there is the DEHAP. So I think that that needs to be a question that you all think about. How many added leukemias, or cancers, are you going to experience in this county from the daily releases, the accidental releases, of radiation into your environment? It is not going to be a huge number, but every person is a valuable cherished person to someone. (**0011-121** [Corbett, Susan])

Comment: We often hear assertions that there are correlations between nuclear power plants, and cancer incidents. To the contrary, there has never been a credible study which linked health effects to nuclear power plants. (**0011-51** [Wolfe, Clint])

Response: *These comments refer to health effects to populations around nuclear power plants. For this topic, NRC relies on the studies performed by the National Cancer Institute (NCI). The NRC will evaluate human health impacts of radiological emissions, and the results of this analysis will be presented in Chapter 5 of the EIS.*

Comment: So let's make some comparisons. A coal plant emits three times more radiation than a nuclear power plant. This is based on the Environmental Protection Agency data. And you can google this, go to EPA dose calculator, you can put it in, and you can estimate your own dose levels. That is assuming you live within 50 miles of the coal plant. The same thing for a nuclear plant, it is one-third that of the coal plant. Coal has uranium, thorium, it comes out of the ground. It has radon, radon daughters. Those get into the environment, of course, and that is where the dose results from.
Also for perspective, the radiation received from a nuclear power plant is equivalent of having a smoke detector in your home. I have nine, and I think it is well worth the risk, and I intend to

keep my nine smoke detectors. It is 100 times less than watching TV, assuming you don't have one of the fancier new TVs, which don't emit any radiation. (**0010-177** [Knight, Travis])

Comment: Some will tell you there is no safe level radiation. And that because radiation from nuclear power plants exist they, therefore, are not safe. Radiation emitting from nuclear power plants contribute less than one millirem a year to our average annual radiation dose of about 360 millirem per person. Sleeping with one's partner contributes about one millirem per year, to this average annual radiation dose. So if radiation exposure is what motivates you, you should get rid of your partner before you get rid of the nuclear power plants. (**0011-52** [Wolfe, Clint])

Comment: -The average person receives more radiation taking a plane from NY to California than the amount released during TMI. (**0026-4** [Sims, Raymond])

Response: *These comments are generally related to the radiation dose a member of the public would receive daily from all sources. They do not provide specific information related to the environmental impacts and therefore will not be evaluated further.*

Comment: And I want to ask people, those of you who live within ten miles of the plant? I'm curious if anybody has ever shown you, or worked with you about radiation detectors, so you might know if you are being exposed to any radiation. Mayor, has SCE&G, anybody trained people, or brought devices out here in the community? I mean, that is kind of shocking to me. I've got one, these cost, this is a very primitive device, or low end. But the Environmental Impact Statement, in my opinion, needs to review as the mayor hinted at, do people know about what they are being exposed to, is the city equipped with radiation devices, is there proper training that has gone on? You know, you should know what the background level is here, and to look for any kind of radiation that might be released from the plant. It is really shocking to hear that that hasn't happened. (**0011-77** [Clements, Tom])

Comment: And we used to have someone to come by and check our soil, we do not see that any more. We have never had anyone come and test our radiation levels. And I just want to bring that awareness to the community, to the public, to SCE&G, to the NRC, and to anybody else that may have concerns for us in this community. (**0011-91** [Gunter, Deborah])

Comment: Radioactive contaminants to the ground, air and water are irreversible. (**0037-11** [Thomas, Ruth])

Comment: Many of the citizens in this area hunt and fish as part of their subsistence lifestyle. Gardening is also a vital part of life to many of the local citizens. One local family right outside the boundary of the VC Summer Station used to have soil samples taken from their property regularly by SCEG. No such sampling has occurred there in the past several years. They have, however, noticed a marked increase in the number of dead birds and trees on their property as well as one deer in particular that has a huge tumor on her head. What kind of on-going sampling is occurring on site? (**0041-16** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Comment: I am also concerned about the impact on the environment. As I looked at the SCA NA Impact Statement there was a number of items listed such as goats, cows, fish, but I did not see the animals that are hunted in this area such as deer, rabbit, ducks, and turkey. Why are th ey not listed? (**0043-2** [Ginyard, Betty])

Comment: SR143 [My concern(s) about the two proposed reactors is/are] Soil/Agriculture pollution. (**0050-59** [Respondent, Community Survey])

Comment: SR8 [We eat out of a home garden] Whenever we can get the vegetables to grow. Seems there is a problem with the soil in areas of my garden where vegetables used to grow . (**0051-13** [Respondent, Community Survey])

Comment: SR10 [My concern(s) about the two proposed reactors is/are] Contamination. (**0051-16** [Respondent, Community Survey])

Comment: SR49 [My concern(s) about the two proposed reactors is/are] a spill. (**0051-42** [Respondent, Community Survey])

Response: *These comments relate to the Radiological Environmental Monitoring Program (REMP) and the airborne and liquid radioactive effluents from the proposed Units 2 and 3. Chapter 2 of the EIS will discuss the radiological environment around the proposed Units 2 and 3 and Chapter 5 will address the monitoring of effluent releases during operation and the impacts from these releases.*

Comment: So I would look to test those gardens, look at the food coming out of them, test the fish, account for accumulation of the food chain, of that radiation, and those very real impacts in the community. (**0010-56** [Tansey, Sara])

Comment: SR1 I used to have a garden that I ate from daily, but I will never plant another garden because of the health risk associated with eating plants grown in my community. (**0051-2** [Respondent, Community Survey])

Comment: SR16 [My concern(s) about the two proposed reactors is/are] Radiation leaks, health problems due to radiation. (**0051-22** [Respondent, Community Survey])

Comment: SR17 [My concern(s) about the two proposed reactors is/are] health and environmental. (**0051-23** [Respondent, Community Survey])

Comment: SR191 [My concern(s) about the two proposed reactors is/are] Health and well being. Why do we need two more? The negetive affect for the people, the food we eat, the air we breathe, the water we drink. (**0052-27** [Gatson, Annette])

Response: *These comments have two parts. One part relates to the Radiological Environmental Monitoring Program (REMP) and the airborne and liquid radioactive effluents from the proposed Units 2 and 3. Chapter 2 of the EIS will discuss the radiological environment around the proposed Units 2 and 3, and Chapter 5 will address the monitoring of effluent releases during operation and the impacts from these releases. The other part refers to potential health effects caused by operation of the proposed Units 2 and 3. The impacts on human health from radiological emissions will be addressed in Chapter 5 of the EIS.*

Comment: Now, it is interesting that this just happened a couple of weeks ago in New York. Indian Point, which is a big reactor outside of New York, they were finding strontium 90 in the groundwater. It turns out that the fuel pool from unit 1 was leaking. So they had to empty the pool, take out the rods, and put them in dry cask storage, and then they dumped 495,000 gallons of irradiated water into the Hudson river, because what the heck were they going to do with it? It was full of strontium, cesium, all kinds of very toxic radioactive contaminants. So that is what happens when you get these old plants. They start to fall apart, they start to break, they leak, what are you going to do with them? So you need to think about that. That is going to stay in your community for the rest of this century, and longer. (**0011-120** [Corbett, Susan])

Response: *This comment is related to the unplanned release of radioactive material and aging of nuclear plants. The release and monitoring of radioactive material will be addressed in Chapter 5 of the EIS. NRC requirements are directed toward ensuring safe operation during the term of the license. Nuclear plant aging issues are addressed during the license renewal of an operating reactor.*

D.2.17 Comments Concerning Accidents - Severe

Comment: I ask you also to include, in your Environmental Impact Statement, a review of the costs of severe accidents not properly evaluated, so far, by either the NRC or this Applicant. And that includes the cost of the, hopefully, improbable but now we know not impossible, accident of an intentional aircraft crash directed at these proposed new units. I submit that such a low probability, high consequence event would have catastrophic consequences for the people of Fairfield County, and likely for the people of Columbia, as well. That accident has been deemed non-credible, and was not included in the environmental evaluation submitted by the company. (**0010-186** [Guild, Robert])

Comment: In conclusion, the EIS should carefully consider the increased risk of nuclear accidents .... associated with locating 3 reactors in a major metropolitan area. (**0037-15** [Thomas, Ruth])

Comment: Risks associated with operating 3 reactors at VCSNS in a major metropolitan area with a population of 700,000. Since the early 1980s, when VCSNS Unit 1 was completed, the Columbia metropolitan area population has grown from 500,000 to more than 700,000. Further,

the geographic reach of the metropolitan area population today is much closer to the VCSNS site than was true when the first unit was built. If the probability of a serious accident in each unit at VCSNS were an independent event, the probability would be additive over 3 units, thus tripling the risk when compared to a single unit. A more serious issue is whether, in fact, the occurrence of an accident at one reactor increases the risk of an accident at the other two reactors in a 3-unit complex. If so, adding units 2 and 3 at VCSNS would more than triple the risk of an accident as compared to a single unit. The environmental impact statement should address whether this increased risk of an accident in a larger, more densely population metropolitan area, is an acceptable risk. This risk is made more acute by the fact that Columbia is the state capital of South Carolina and that the metropolitan area houses major military bases. (**0037-4** [Thomas, Ruth])

Comment: SR172 [My concern(s) about the two proposed reactors is/are] Danger of exploding. (**0050-84** [Respondent, Community Survey])

Comment: SR8 [My concern(s) about the two proposed reactors is/are] If there were a disaster where would the residents go? How long would it take to clean up the area? Or could the area be cleaned up?. (**0051-11** [Respondent, Community Survey])

Comment: SR189 [My concern(s) about the two proposed reactors is/are] explosions. (**0052-24** [Gatson, Viola])

Response: *The EIS for the proposed Units 2 and 3 will include an evaluation of the risks associated with potential severe accidents, including accidents that involve reactor core melts. The evaluation will include estimates of health and economic risks to a distance of 50 miles from exposure to the plume and from exposure to contaminated land and water. These risks will be compared with risks associated with the existing unit. In addition, the evaluation will include an estimate of the cumulative risk of severe accidents for all units at the site. This evaluation will be in Chapter 5 of the EIS.*

D.2.18 Comments Concerning the Uranium Fuel Cycle

Comment: On the issue of fuel, we have effectively, safely, dealt with spent fuel at the V.C. Summer site for about 26 years now. We will continue to safely and effectively deal with that fuel, until the federal government lives up to their obligation to take that fuel. (**0010-101** [Byrne, Stephen])

Comment: So-called lethal nuclear waste has never killed anybody, and can be safely disposed, stored, or reprocessed (**0010-109** [Wolfe, Clint])

Comment: Citizens of this area will be left with hundreds of additional tons of high level radioactive nuclear waste, stored on-site, creating environmental and health risks. All nuclear plants regularly release radiation into the environment. (**0010-115** [Cooper, Elaine])

Comment: I wanted to compliment SCE&G on reducing risk in one area, and that is in the risk to their shareholders. You and I, the public, will eventually own all of this nuclear waste. And we will be financially, and otherwise, responsible for that waste. And the investors are protected from that risk. You and I, the public, are financially and otherwise responsible for all but a minor part of any cost related to a disaster. (**0010-168** [Rudolph, Gerald])

Comment: The waste, a lot has been said about waste. The waste is small, if you compare all the waste from all 100-plus nuclear plants, for the last 50 years, commercial nuclear power, is one-fifth the volume of ash and sulphur generated by one coal plant in one year. It is a manageable amount of waste, and to think that we can't manage this waste and, ultimately, whether it goes to geologic disposal, or whether it is above ground storage, or whatever it may be, ultimately we are going to deal with it, and it is easily managed. And ultimately we will mine this as a resource, once we have exhausted existing fossil resources. It will be important, since 99 percent of that spent nuclear fuel, used nuclear fuel is, indeed, recyclable. (**0010-180** [Knight, Travis])

Comment: I think there is a lot of problems with the expansion of nuclear power, such as that we still don't know what to do with the waste. (**0010-21** [Berg, Michael])

Comment: As far as the nuclear waste, the Barnwell nuclear facility, according to the Department of Health and Environmental Control, is going to close in 2035.
If that does happen, and I think there has been more feeling in the state not to accept out of state waste, and to close on schedule, where is the low level waste going to go? This has to be analyzed in the EIS. The high level nuclear waste I think the company said they have 19 years of storage in the spent fuel pools. Where is the high level waste
going to go? Now reactors are storing the waste on-site, in big dry casks.
But, basically, we are looking at a medium term, if not long-term high level nuclear waste storage facility expanded over what the current reactor would produce. As was mentioned earlier, the Yucca Mountain project is in trouble. So this waste could essentially be here forever.
(**0010-50** [Clements, Tom])

Comment: I think that we have to look for all the new reactors, that are being proposed right now, at the life cycle impacts from the uranium mining, to the transportation of uranium, to the enrichment process, all the way to waste management. Like a lot of folks have mentioned tonight, most of the waste that is produced at V.C. Summer, if two new reactors are built, will stay on-site. It will stay in Jenkinsville, in the community (**0010-59** [Tansey, Sara])

Comment: The issue of waste, I've already spoken about that. It is going to sit here. We are condemning -- we may be providing energy for our children, but we are providing a nuclear waste storage dump for our great-great-grandchildren, to babysit and have to take care of. And how much is that going to cost, and what is that going to mean to them? And they are probably look back on us and say, what did you all leave us this stuff for? So I want to know what you are going to do with the waste. (**0010-73** [Corbett, Susan])

Comment: The other thing that I'm concerned about, that they don't want to talk about, and it has been mentioned here, is the waste. You know, you have waste up there right now, you've got spent fuel. And now you have two more plants, you are going to have triple the amount of high level, very hot, very radioactive spent fuel, and most likely it is going to stay there. I mean, I saw something today, you know Yucca Mountain is just not going to open. Three federal judges have said it is not safe. It is not going to open. The Nevadans don't want it. It is a NIMBY thing, they don't want it dumped in a hole in the ground in their backyard. So the reality of the situation is, you make it, you keep it. And that is what is going to end up happening here across the country. So you better think about that, because what that means is that your community is going to be stuck with dealing with aging reactors, aging fuel pools, and what is going to happen with that waste for the rest of this century? (**0011-119** [Corbett, Susan])

Comment: On the subject of spent fuel, because I know there are a lot of questions about spent fuel, at V.C. Summer we have handled spent fuel successfully and safely for the last 26 years, and will continue to do that, until the Department of Energy lives up to their contractual obligation to take the fuel. We do have a contract with the Department of Energy for them to take the fuel, not only eventually from our existing V.C. Summer unit 1, but also from the two proposed units. And the government will, eventually, comply with the contract, whether it be moving the fuel to Yucca Mountain, whether it be through recycling, or other interim measures. (**0011-39** [Archie, Jeff])

Comment: And my final comment has to do with Yucca Mountain. I'd like to make sure that the public also understands that Yucca Mountain, a deep geologic repository, is moving through the process. And the Department of Energy has submitted a license application to the NRC, and that was done just here recently, in June of 2008.
Now, it will take three to four years for that review, and public interaction, but that process has started. Funding for Yucca Mountain is going to be the issue and the challenge. Funding for Yucca Mountain must be appropriated, and Senator Harry Reid, of Nevada, holds the purse strings. So the message there is that there are some political issues, with Yucca Mountain, that I'm confident will be worked through. But Yucca Mountain is not a technical issue, it is truly a political issue. (**0011-40** [Archie, Jeff])

Comment: The utilities have advanced the design of storage of spent fuel, as was just described [by Mr. Archie], while waiting on the Government to complete its commitment for the national storage site, or recycling. And even with those delays, the storage plan, at this facility, can meet the needs. (**0011-47** [Rudnicki, Steve])

Comment: As far as the nuclear waste, a nuclear reactor produces about 20 tons of high level nuclear waste every year. So that means that there are about 500 tons of high level nuclear waste with no place to go out at the site. So two reactors, new ones, are going to produce about 40 tons of high level waste a year. The Yucca Mountain issue, out in Nevada, is not only a political issue, but is a technical issue. As was said, the license is under review by the Nuclear Regulatory Commission, but there are a lot of indicators that a license might not be able to be granted, because they can't meet the Environmental Protection Agency discharge

standards at a certain length into the future. And there is also some issues about storing of the casks, and building protective shields over them. So the waste that comes out of these plants may be here forever. It looks to me like all the nuclear reactors are starting to store waste, in containers, on the sites that is what you could be facing. (**0011-76** [Clements, Tom])

Comment: Used fuel from the additional units will be stored on-site in their own spent fuel pools. Dry cask storage is an option for longer term storage if construction of a permanent federal repository does not come on line. (**0033-11** [Merrill, Denver])

Comment: LWVSC [League of Women Voters of South Carolina] agrees with expressions from our citizens that Scoping include the following: Clarification regarding onsite permanent storage. One local official expressed conviction that the spent fuel would go to Nevada. (**0035-6** [Zia, Barbara])

Comment: The concentration of spent fuel on the site, given the unknown startup of Yucca Mountain or other permanent storage sites, are a risk to the quality of the human environment in the Columbia metropolitan area and in South Carolina. (**0037-12** [Thomas, Ruth])

Comment: Dangers of containing and managing the large volumes of spent fuel that will be stored on the site. Because the Yucca Mountain long term storage facility may never be built, spent fuel will be stored on site for the foreseeable future, and perhaps forever. The volume of spent fuel for 3 reactors poses a substantial risk for environmental damage. (**0037-3** [Thomas, Ruth])

Comment: It is not fair to construct these plants and to store this waste which will be a part of their lives, their children's lives and so on for decades and not take the time and make the effort to help these people understand the issues. (**0048-2** [Lewis, Crosby])

Comment: Number three I wanted to mention is, basically, there is no free lunch. I agree that nuclear power is probably the most efficient power source that we have available right now. But with that efficiency also comes the risk involved. It is the highest risk. We don't have any place to put these fuel rods. I think other folks have said that nobody really wants them, so if you build it, you are going to be stuck with it. I agree with that. (**0049-41** [Hartmeier, Gina])

Comment: SR92 [My concern(s) about the two proposed reactors is/are] Nuclear waste. (**0050-13** [Respondent, Community Survey])

Comment: SR102 [My concern(s) about the two proposed reactors is/are] Increased problem. nuclear waste (**0050-29** [Respondent, Community Survey])

Comment: SR7 [My concern(s) about the two proposed reactors is/are] What will be done with the waste that is said to be radioactive for thousands of years. (**0051-10** [Respondent, Community Survey])

Response: *These comments provide general information in support of the applicant's COL. They do not provide any specific information related to the environmental effects of the proposed action and will not be evaluated in the EIS.*

Comment: The comment that if we run out of uranium in the United States is not true. We have the third largest reserves in the world, when you consider all grades of uranium, and the fact that uranium is such a small part of the overall cost of the generation of nuclear power, it is about five percent. Any volatility in the price of uranium is easily absorbed. So we have adequate uranium reserves. (**0010-173** [Knight, Travis])

Comment: I also want you to address the supply of uranium. Everybody seems to think that this is some way to get away from being dependent on foreign sources. Well, there is not much uranium left in this country. So we are going to have to go to Kazikstan, or South Africa, or wherever it is, and try to get enough uranium, in the future, for all these nuclear power plants. And we are going to be right back in a situation where we are having to negotiate with foreign governments for the supply of uranium. So let's get a reading on the uranium supply, and how consistent, and what the price is going to be on that. (**0010-74** [Corbett, Susan])

Response: *These comments discuss the available uranium ore supply and associated potential impact on the viability of the nuclear industry. The NRC will analyze the impact of irretrievable and irreversible resources in Chapter 10 of the EIS.*

D.2.19 Comments Concerning Transportation

Comment: Waste disposal. Disposal of hazardous waste material from the [Summer] site must be carefully reviewed. Potential hazards during waste removal and transport to an appropriate facility must be documented in the EIS. (**0012-15** [Hall, Timothy N.])

Response: *The radiological and nonradiological impacts of transporting spent nuclear fuel and radioactive waste to/from the VCSNS site and alternative sites will be addressed in Chapter 6 of the EIS.*

Comment: Will the railroad spur need extending in order to service the expanded facility? (**0041-11** [Barnes, Jenifer] [Brendell, Julie] [Mann, Deborah] [Moore, Robbie])

Response: *Traffic-management planning to support construction and operation of the proposed Units 2 and 3 will be addressed in Chapters 4 and 5 of the EIS.*

D.2.20 Comments Concerning Decommissioning

Comment: A lot of you that are from this county are aware of the power reactor. That is a reactor that was on the drawing board before I was born. It operated and shut down in 1967, here in Fairfield County. We put a fence around it, and we locked it down for 30 years. In 1997 we came back to it and started a decommissioning process. We will be finished with that decommissioning process this year. So we have an obligation to decommission that reactor in that site, we are living up to that obligation, and we will live up to our obligations to the environment, and the community, with these new reactors. (**0010-104** [Byrne, Stephen])

Response: *This comment concerns decommissioning. 10 CFR Section 50.75 requires the applicant to provide reasonable assurance that funding will be available for decommissioning activities at the time it is needed. The environmental impact of decommissioning a permanently shut down commercial nuclear power reactor will be discussed in Chapter 6 of the EIS. In addition, the staff may consider information from Supplement 1 to NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, which was published in 2002, when analyzing the expected impacts of decommissioning.*

D.2.21 Comments Concerning Cumulative Impacts

Comment: The water impact was mentioned earlier. The two reactors are going to use about 35 million gallons of water from the Monticello Reservoir, which could restrict flow into the Broad river. With the two new Duke reactors upstream, if they go forward, and Duke hasn't decided on that, 35 million gallons, from those reactors, Duke is also planning a coal plant on the Broad river, right on the North Carolina side, so we are talking about 80 million gallons of evaporative cooling water removed from the Broad river basin. So the cumulative effect of the two Duke reactors, and the new coal plant, have to be examined in the EIS. (**0010-51** [Clements, Tom])

Response: *These comments refer to the consumptive use of water. The construction and operation of a nuclear plant involves the consumption of water. The NRC staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population, and changes in water supply. While the NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively. Cumulative impacts will be addressed in Chapter 7. In addition, staff will evaluate system design alternatives, including cooling water system designs, in Chapter 9.*

Comment: And there is a lot of concern about global warming, and climate change. And a lot of folks are really giving nuclear energy sort of the emissions free status that it doesn't deserve. (**0010-58** [Tansey, Sara])

Response: *The NRC is responsible for conducting an environmental review of the COL application, but it is not responsible for establishing policies related to emission of nonradiological pollutants or to global warming. While it is recognized that the issue is of national importance, policy is outside the scope of this review. The cumulative impacts of the proposed Units 2 and 3 construction and operation related to global warming will be addressed in Chapter 7 of the EIS.*

Comment: Since we are here for an environmental hearing it would be instructive to know what environmental impacts have resulted from 25 years of operation of the current unit at the site. (**0011-50** [Wolfe, Clint])

Response: *As a baseline for assessing environmental impacts of the proposed Units 2 and 3, a number of reports will be identified in the EIS describing the environmental impacts at the current site.*

Comment: -Nuclear power is cleaner than coal and, environmentally speaking, causing virtually no harm to the air or water supplies if proper safety practices that are already in place are followed and updated regularly. Nuclear power does not produce harmful gas byproducts such as NO2, CO, etc. (**0026-1** [Sims, Raymond])

Comment: Nuclear plants do not burn fossil fuels and thus do not emit pollutants associated with smog, acid rain and high ozone levels. Nuclear plants also do not produce greenhouse gases that many believe lead to global warming. As our nation looks for ways to clean up our air and address potential sources of global warming, nuclear plants must be a part of the solution. (**0033-2** [Merrill, Denver])

Response: *These comments provide general opinions about nuclear power that do not provide any specific information relating to the environmental impacts of the proposed action. Therefore, these comments will not be addressed further in the EIS.*

Comment: Approving localization of reactors with such high needs for cooling water in the drought zone must list emergency shut down procedures and sources of environment and people as its component. The focus must be especially on the water, energy, and food supply. (**0044-12** [Wojcicki, Joe])

Comment: Deficit in water supply must respect agricultural / food production needs, especially if created by an electric energy production. (**0044-13** [Wojcicki, Joe])

Response: *Changes in the availability of the water resources by competing demands and long-term variability will be addressed in Chapter 7 of the EIS on cumulative impacts.*

Comment: My issues may seem petty to some of you all, but to me, to my family, and maybe to others of you all, out there, they may be serious. I just want to make some comments about the wildlife, the environment, the ground, the soil, the air, the trees that we need to breathe, that are dying on our property. The grass is not growing for my horses to eat. The vegetables in the garden is not producing. The trees that are on our property that are dying day by day, that we see that are 20 or 40 years old that are just dying. (**0011-90** [Gunter, Deborah])

Response: *The radiological impacts of reactor operation, including impacts to biota, will be addressed in Chapter 5 of the EIS.*

Comment: C02 Emissions. The EIS should consider the potential environmental impacts associated with production of raw materials for the new nuclear site, as well as any related improvements in infrastructure necessary to bring those raw materials into the Summer site or to transport hazardous wastes from the site. Please consider the entire supply chain, transportation, use, and disposal in your analysis of these air quality effects. (**0012-1** [Hall, Timothy N.])

Response: *The airborne emissions from the proposed Units 2 and 3 will be considered in the evaluation of potential impacts. The impacts on air quality resulting from construction and operation of proposed Units 2 and 3 will be discussed in Chapters 4 and 5 of the EIS. The impacts of nuclear power generation on climate change will be addressed in Chapter 7 of the EIS.*

Comment: In conclusion, the EIS should carefully consider .....the environmental hazards associated with locating 3 reactors in a major metropolitan area. (**0037-16** [Thomas, Ruth])

Response: *The Council on Environmental Quality advises that when there are potentially a very large number of alternatives, only a reasonable number of examples covering the full spectrum of alternatives must be analyzed and compared in an EIS (46 FR 18027). NRC staff will review the alternative site-selection process to determine whether it is systematic, employs reasonable selection criteria, and constitutes an acceptable number of reasonable sites for consideration. The process must enable the applicant and reviewers to evaluate and select proposed and alternate sites based on environmental preference and obvious superiority. The process and results will be provided in Chapter 9 of the EIS.*

D.2.22 Comments Concerning the Need for Power

Comment: The entire US Transmission System would have to be wastefully reengineered to provide vast and inefficient electrical power transfers into these unbalanced networks. The system already has large problems with system stability. Note: the several massive power

failures in the Northeast, Midwest, and Canadian regions in just the past few years. All due to system stability problems. (**0001-4** [Byrd, William A.])

Response: *Transmission system configuration and stability is addressed in the EIS only to the extent that new or expanding existing transmission corridors and their associated impacts are assessed and disclosed. Network engineering is outside the scope of the environmental review and will not be considered in the EIS.*

Comment: The U.S. Energy Information Administration (EIA) predicts that total electricity sales will increase by 29 percent, from 3,659 billion kilowatt-hours in 2006 to 4,705 billion in 2030. No one resource alone can meet that demand. The country needs an energy mix that includes renewable energy, wind, solar, natural gas, and nuclear. Nuclear reactors provide baseload power -that is, they are reliable, producing energy 24 hours a day at a constant rate to supply a region's regular energy needs. Renewables -like wind and solar -are intermittent resources that will require a baseload system in order to have backup power available to ensure reliability of supply. (**0004-2** [Winsor, Susan A.])

Response: *Alternative energy sources, including combinations of sources such as fossil fuels and renewable energy sources, will be evaluated and addressed in Chapter 9 of the EIS in comparison with the proposed action.*

Comment: And, believe me, in our region today, and in the State of South Carolina, in order to support economic development, we need a source of sustainable long-term energy.
We believe, enthusiastically, at the College, that nuclear needs to be a part of that. And, in that respect, our job is to educate a skilled workforce, in order to make these two projects go forward. (**0010-4** [White, Sonny])

Response: *This comment expresses general support for the proposed Units 2 and 3 and the associated COL application. It provides no information relevant to the environmental review of the COL application and therefore will not be considered further.*

Comment: As we all know, manufacturing needs power. The continued availability of reliable, economical energy is critical to maintaining Newberry County's current industrial base, and to attracting new industry to our county. If we are going to continue to meet the needs of our existing power requirements, and have the ability to meet the needs of new growth and development, we must invest in new power generation facilities. (**0010-12** [Powers, Theresa])

Response: *The need for power analysis will be addressed in Chapter 8 of the EIS.*

Comment: I charge you, and ask you to consider fully the need for this plant. That is the forecast of growth and demand for electricity in the SCE&G and Santee Cooper service area. I submit to you that SCE&G and Santee Cooper have performed no current load forecasts justifying the need for this plant. And, in fact, the most recent load forecast by SCE&G predates the economic collapse that we all are experiencing and suffering from. While other utilities in

the region, including Duke Power Company, have substantially reduced their load forecast, showing some recognition of the current economic reality, SCE&G refuses to do so. And their environmental report contains no updated load forecast. (**0010-129** [Guild, Robert])

Comment: ...after a three decade hiatus, utility companies like SCANA are pursuing plans to build more than 30 new reactors in several areas of the country, including here in South Carolina. This is welcome news for an energy-hungry region and nation that must find new and better ways to meet a growing demand. (**0010-183** [Toole, W.R. (Rick)])

Comment: We certainly do have to look for alternative means of power, and the country of France, a couple of years ago, went 80 percent nuclear power.
That was a very courageous move.
And I think we have to be on the lookout for better ways to have power. We are going to certainly need it, and we are finding more ways to use power. (**0010-45** [Kinley, Mary Lynn])

Comment: We [Showa Denko Carbon, Ridgeville, SC] use a large amount of electrical power in our process, as do our customers. We are strongly in favor of conservation, wind, solar, nuclear, coal, gas, you name it. We believe that the only way this country, and our company, can be successful is if we have all of these resources available to us. My company, we would like to expand our facility, double it really. We are going to need a lot of additional electrical energy if we do do that. (**0010-80** [Whitten, Robert])

Comment: The State of Security clearance's Office of Research and Statistics, projects that the population of our state will grow by approximately a million more people over the next 20 years. Our state's available surplus electricity power supply continues to dwindle, in its efforts to meet a continuously increasing demand for that power. I also am a member of the South Carolina Economic Developers Association, and have been involved in the recruitment of many industries to our state. The availability of electricity power is vital to our industrial community, and to our economic development efforts here in the state. (**0011-10** [Clary, C. Douglas, Jr.])

Comment: I have watched the Midlands grow in the northeast, from Clemson road being a two lane road, running through the pine trees, to now being a five lane thoroughfare, with housing all over the place. That type of growth requires electrical power. (**0011-42** [Rudnicki, Steve])

Comment: Where are we going to need this electricity? I have nothing against nuclear, because this is going to be a big two producer of two gigawatts of the power. But telling us that this is going to be baseload for the people, for the residents, is completely wrong. These million people that are going to come to our state, is probably going to live in completely different houses. The houses are going to be designed with completely different application for appliances, and needs for the electricity. I just, a few minutes ago, was listening how bad is solar.
But there will be, also, the solar on the roof of our houses. But also, please remember, that we as people need in our houses, we need to have electricity when it is very warm. We need to have air conditioners running. Now, if -- and we need, also, if we install heat pump, we need to

have this heat pump running on the electricity in the wintertime, right now. So if we are going to use geothermal energy, we don't need any 24 hours power from any sources. So in this case, this I think that will be much better for South Carolina Electric and Gas to look for the customer of this two gigawatt, you need somewhere there is going to be a huge industry, like for example port [huge port near Savannah, SC, proposed Jasper Ocean Terminal]. (**0011-60** [Wojcicki, Joe])

Comment: South Carolina must build for the planned growth in demand for electricity. (**0017-4** [Campbell, Paul G., Jr.] [Duncan, Jeff] [Harrison, James H.] [Laffitte, Sterling] [Lummus, John] [Ott, Harry L., Jr.] [Pinson, Lewis E.] [Rawl, Otis B.] [Sandifer, Bill] [Smith, J. Roland] [Sottile, Mike] [Thordahl, Jeff])

Comment: South Carolina must build in anticipation of the projected growth in population and associated demand for electricity. Further, it is absolutely essential to the state's manufacturing base that we maintain constant access to a safe, affordable and reliable source of electricity. (**0021-4** [Lanier, Hope])

Comment: We strongly believe that the new units will provide needed electrical power for many years. (**0031-2** [Beaman, Charles, Jr.] [Benjamin, Steve] [McLeese, Ike] [Novinger, Cathy] [Speth, Charles Ted])

Comment: Nuclear power has been a safe, low cost provider in South Carolina for a long time and we feel the new plants will be successful through the review of the combined license application by the Nuclear Regulatory Commission (NRC). Without this new generation capacity our state's economy could grind to a halt in the near future as power shortages start to occur. Once this occurs, it will be too late to act. (**0032-2** [Gregorie, Jim])

Comment: Forecast for energy demand in the future must be a function of the projected increase in the state population as well as big energy customers, e.g. JOT. Common sense does not allow to compare apples to oranges, e.g. JOT 24/7 base load to residential power as a time function demand. (**0044-15** [Wojcicki, Joe])

Comment: It is no secret that South Carolina must build for the planned growth in demand for electricity. (**0046-4** [Hendrix, Samuel H.] [Hope, Leslie B.])

Comment: South Carolina is expecting an increase in demand for electricity over the next couple of decades as the population continues to grow. Nuclear energy, which is safe, environmentally-friendly, efficient- and low-cost, is an essential part of meeting South Carolina's future needs with a balanced energy policy that includes all energy resources. (**0047-2** [Whatley, Michael])

Comment: SR12 [My concern(s) about the two proposed reactors is/are] Why do we need two more reactors? (**0051-18** [Respondent, Community Survey])

Comment: SR188 [My concern(s) about the two proposed reactors is/are] Why do we need them? (**0052-21** [Respondent, Community Survey])

Comment: SR189 [My concern(s) about the two proposed reactors is/are] Why do we need them?. (**0052-25** [Gatson, Viola])

Response: *The need for power is within the scope of the environmental review and will be reviewed in Chapter 8 of the EIS. The Need for Power analysis used in the applicant's Environmental Report was prepared by SCE&G through the Combined Application for the Certificate of Public Convenience and Necessity (Docket No. 2008-196-E), and Santee Cooper through an annual Integrated Resource Plan (South Carolina Public Service Authority IRP, 2008), and submitted to the requisite State bodies for evaluation. NRC staff will review the applicant's Need for Power analysis and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty.*

Comment: We have, what I have seen reported, as the fourth highest per capita consumptions of electricity in the United States, and some of the highest per household electric bills, coupled with low, relatively low electric rates. And that is a product of the fact that we use that electricity resource extremely inefficiently. There are a lot of savings available that will make the lives of the people in Fairfield County better. The people of Fairfield County do not need to waste electricity by heating and air conditioning the great outdoors, because SCE&G fails to provide us the tools to use their power efficiently. They want us to waste their electricity to justify the need for this new plant. (**0010-131** [Guild, Robert])

Comment: I think, beyond the breadth of the community, that we have to be thinking about global impacts. Right now we face a crossroads in energy decisions, and how we are going to create, produce, and supply energy. (**0010-57** [Tansey, Sara])

Comment: The question really is do we need the additional nuclear power at this time, or don't we? Or do we need it some time in the future. The real issue, here in South Carolina, is simply the fact that we are probably one of the most wasteful states in terms of energy usage. And to give you a very simple example, let's say that it is 40 degrees outside, and you are cold, your window is open, and so what would you normally do? Would you go turn up the thermostat, or would you close the window? Well, typically you would close the window. What if you didn't know that the window was open? That is the situation in most South Carolina residential homes today. Typical figures indicate, and I'm talking mostly from national studies, that a 20 to 30 percent energy waste figure is typical in almost every house that is out there, that has been built, probably, more than five years ago. (**0011-123** [Newton, Larry])

Comment: Our state's Public Service Commission has required a Demand Side Management (DSM) Study by the applicant, and we request that any further legal action await full completion of the DSM Study that has been directed for June 2009. (**0035-4** [Zia, Barbara])

Response: *The NRC does not establish public policy regarding electric power supply alternatives nor does it promote the use of nuclear power as a preferred energy alternative. Requesting legal action is outside the scope of the environmental review. However, Chapter 8 of the EIS will include review of energy efficiency and demand-side management (DSM) as*

updated by the June 2009 proposed issuance of SCE&G DSM Programs, and their impact on the load forecast and territory need for power. Chapter 9 of the EIS will include the no-action alternative, new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives, the potential for environmental and economic impacts will be assessed against that of the proposed Units 2 and 3. If one of the potentially acceptable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.

Comment: Now, if the feds think they can do two million homes for six billion dollars, how much do you think we can do in South Carolina? You could do two-thirds of the state. So the problem here is not the lack of money, it is the way the money is being allocated. So you might ask yourself, why isn't it being allocated better?
Well, simply the fact is that it takes three people to make this work. The first person, or first organization that should really be helping you is the PSC. They are charged for looking after the customer. If they were alert, and if they were energetic, like they are in some other states, and their legislature was behind them, you would see that they would be putting together programs that would encourage energy efficiency. They might be promoting things like decoupling. That means SCE&G could take their seven billion dollar investment, and put it into energy efficiency, instead of building these new plants. Do you think that maybe they need these plants right now, or they need them at all? It is a question nobody can answer, because nobody has bothered to look at it. (**0011-126** [Newton, Larry])

Response: *Decisions regarding which generation sources and alternatives to deploy are made by the applicant and regulatory bodies such as State energy-planning agencies and public utility commissions. The alternatives must be technically viable, feasible, and competitive. Chapter 8 will review the impacts of energy efficiency and demand-side management on the need for power and load forecasts. Alternative actions such as the no-action alternative, new generation alternatives, purchased electrical power, energy efficiency, alternative technologies (including renewable energy such as wind and solar), and the combination of alternatives will be considered in Chapter 9 of the EIS.*

Comment: Nuclear power is the only emissions-free source of baseload generation today. And it is a perfect ingredient for an environmentally responsible generation portfolio.
(**0010-147** [Thomas, Ralph])

Response: *The NRC evaluates energy alternatives as part of its review of applications for new nuclear power plants under NEPA, and it regulates the nuclear industry to protect the public health and safety within existing policy. The discussion of alternative energy sources in Chapter 9 of the EIS will describe the potential impacts, (including emissions estimates) from alternative energy sources such as fossil-fired and renewable energy facilities.*

D.2.23 Comments Concerning Alternatives - Energy

Comment: With at least one new coal plant and four new nuclear plants proposed for construction, and only hollow gestures of interest in energy conservation and alternative strategies, it is time for all of us to rethink our energy future.

Part of the NRC responsibility in developing the EIS and NEPA is to look at alternatives. The League of Women Voters of South Carolina urges public officials at NRC and in South Carolina to give efficiency, conservation and renewable energy serious consideration before committing to risky new nuclear and coal plant projects.

Compared with other states, South Carolina ranks very high in per capita energy consumption, particularly electricity. We do need air conditioners in South Carolina, but not to the point of needing sweaters. There is much we can do to decrease our demands for residential and non-residential electricity.

The League of Women Voters and other citizen groups can't understand why off-shore wind potential, which is indicated to be available here, is not on the visible planning board in South Carolina. Other states are monitoring offshore wind, and reports indicate that South Carolina's offshore wind is a viable source of renewable energy.

One of our state's goals must be to develop policies that enable utility companies to benefit financially from energy conservation. This might be as simple as providing loans to customers for smart energy efficiency investments that might not be financed traditionally. We need not experiment, as there are many utility conservation models around the country.

Energy conservation and renewable energy alternatives have additional benefits. Rather than committing citizen and corporate resources to more nuclear and coal power plants--and purchasing power plant equipment from other countries--we could be creating new jobs by producing materials and equipment here. (**0009-2** [Rhodes, Suzanne])

Comment: I ask you to consider, fully, the cost of alternatives that are more environmentally attractive than building nuclear power plants with their attendant risks and dangers, and costs. Those include aggressive demand side management, energy efficiency, and alternative renewable energy sources. I won't belabor the point, except to say that the Governor's Climate Energy and Commerce Committee, charged by Governor Sanford, issued a report, only this last year, contradicting SCE&G's grossly pessimistic view about the prospects of efficiency and alternatives. And, instead, as others have said tonight, identifying the short term availability of large amounts of offshore wind, and a very, very significant potential savings in energy efficiency. I would just note, in passing, South Carolina has some of the least efficient use of electric energy in the country. (**0010-130** [Guild, Robert])

Comment: Renewable energy is important, but it cannot generate enough power by the time we need it. Landfill biogas generation is a great win for everyone, including electricity utility

customers. But its potential capacity is very limited. Solar and wind energy are promising, but with current technologies, practical baseload solutions, because they can only generate power when the sun is shining and the wind is blowing (**0010-148** [Thomas, Ralph])

Comment: With respect to other sources, wind and solar, what was said earlier, nuclear power is, indeed green. It is as green as wind, hydro, and solar. It emits about, when you consider the full life cycle cost, the full energy chain, it is about two and a half grams carbon equivalent per kilowatt hour. And those are the facts backed up by a 2004 OACDC study. (**0010-178** [Knight, Travis])

Comment: Part of the NRC responsibility, and actually part of the responsibility of the state officials, is to look at other alternatives, whether it is EIS or the NEPA, and efficiency, conservation, and renewables, should get a careful look before we go further with this huge investment. (**0010-53** [Rhodes, Suzanne])

Comment: What we actually need, what I feel we need in this public forum, is we are all for conservation, none of us are against it. Some of us, most of us, half of us, I don't know, want nuclear energy. But I think what we all need is a balance. A balance in this approach to this energy solution. We need to get up there and bring up solar cells, bring up geothermal, clean coal, and there is such thing as clean coal, biomass, nuclear, have a good mix out there, where we have a balanced approach toward solving our energy problems. (**0010-96** [Von Kaenel, Hoyt])

Comment: And a lot of these costs [electricity production cost per kwh] that they are projecting now make solar and wind very attractive. I just took part in a recent webinar. A professor from Clemson said they have done a big study of off-shore wind in South Carolina, not on-shore because we don't have a lot of on-shore wind, but off-shore wind. His studies show that we have 4,000 megawatts of off-shore wind power. That is 4,000 megawatts that we could get up and running in five years. And it wouldn't cost 20 cents a kilowatt hour. We could power all of our coastal cities with that off-shore wind. And that wasn't really considered in forward. the proposal that the utility put forward. (**0011-116** [Corbett, Susan])

Comment: A recent poll by Bisconti Research showed 72 percent of Americans felt that solar power would be our major source of electricity by 2023. Now the Energy Information Agency is a government organization that is charged with compiling data, and statistics, and reporting on energy data, and energy trends in the country. And when Bisconti asked them what the percent solar would be in 2023, they said the answer was 0.2 percent, or about the same as it is now. Wind fared somewhat better, in that 65 percent of the people felt wind would be a major contributor by 2023, and the EIA estimated that wind contribution at 2.4 percent. So the lure of renewable energy sources is grounded more in wishful thinking, and expectations of huge windfalls for those hawking everything from solar to animal byproducts. (**0011-54** [Wolfe, Clint])

Comment: -The impact of solar and wind would not be significant compared to nuclear. Where would wind turbines be erected? We would have to cut down trees thus having a huge impact on the environment. Similarly, there would need to be solar fields. Again, this requires cutting

tress and perhaps relocating people.
Nuclear is by far the most reliable and economical decision. (**0026-6** [Sims, Raymond])

Comment: Is SCEG doing any kind of study for alternative energy in SC? I think this should be done instead of another reactor and before another increase in cost to consumers be approved. (**0027-1** [Wiggs, Rose Mary])

Comment: I would also like you to address alternative ways for power and energy saving. If they put lock and dams on most of our major rivers. It wood be used for hydro-power and for barges that are 90% more efficient than a truck. You could also suggest they use bioenergy also because it is renewable. Just my thoughts. (**0028-2** [Whetsell, David])

Comment: Additionally, nuclear power is much more reliable and cost effective than renewable technologies like wind and solar, which cannot provide the capacity or around-the-clock generation required to meet South Carolina's near term energy needs. The sun doesn't always shine and the wind doesn't always blow; but nuclear plants can operate at their maximum output 24 hours a day, seven days a week for months on end. This helps hold down the cost of nuclear-generated electricity. To produce as much electricity as the V.C. Summer Station, a solar-powered plant would require panels covering an area the size of Columbia, S.C., while equivalent wind generation would require hundreds of turbines stretching across the entire South Carolina coast. By comparison, V.C. Summer takes up only a few square miles. (**0033-6** [Merrill, Denver])

Comment: And when compared with fossil fuel sources, nuclear plants are extremely efficient. One uranium fuel pellet "about the size of a pencil eraser" can produce about the same amount of electricity as 17,000 cubic feet of natural gas, 1,780 pounds of coal or 149 gallons of oil. V.C. Summer's reactors will utilize 157 fuel bundles each that are designed to last four-and-a-half years before being replaced. Clearly, that's a cost benefit as well as an environmental benefit. (**0033-8** [Merrill, Denver])

Comment: The League of Women Voters of South Carolina (LWVSC) urges public officials to give conservation and renewable energy serious consideration before committing to risky new nuclear and coal plant projects (**0035-3** [Zia, Barbara])

Comment: This project is good for our planet, it reduces the carbon footprint. There is no other mechanism that the scientific community has developed that generates this much power, this clean. Windmill, solar, it doesn't work. If it did it would be -- people in America love to make money. If you could make money selling wind energy and solar, somebody would be doing it. I don't see any solar or wind farms off the coast of South Carolina. It doesn't make financial sense. (**0049-23** [Dennis, Dan])

Response: *The need for power is within the scope of the environmental review and will be reviewed in Chapter 8 of the EIS. The Need for Power analysis used in the applicant's Environmental Report was prepared by SCE&G through the Combined Application for the Certificate of Public Convenience and Necessity (Docket No. 2008-196-E), and Santee Cooper*

through an annual Integrated Resource Plan (South Carolina Public Service Authority IRP, 2008), and submitted to the requisite State bodies for evaluation. NRC staff will review the applicant's Need for Power analysis and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty.

Comment: Solar collectors are too inefficient, and produce too little power for the amount of surface area that they require. We would have to cover half of the US with Solar Collectors, just to provide for the amount of power the USA uses in the other half: today. This fact will not change any time soon with any new solar cells presently being scientifically investigated. (**0001-2** [Byrd, William A.])

Comment: Wind turbines produce too little power per unit and require vast arrays to provide any meaningful power. They kill migrating birds by the thousands. They also produce certain low frequency sound waves that are already causing health concerns to local citizens.
Both Solar and Wind have a giant problem. What do you do when the sun doesn't shine or the wind stops blowing? Just last summer the city of Houston, Texas, lost power because a local wind farm stopped producing power, due to no wind. Where is the power going to come from to replace that power not being produced? (**0001-3** [Byrd, William A.])

Comment: We [League of Women Voters of South Carolina] are concerned because South Carolina citizens' desires for new energy strategies are being ignored in favor of traditional toxic and polluting industries. (**0009-1** [Rhodes, Suzanne])

Comment: I also see that we are at the -- we are kind of at the cusp of finding ways to create greater efficiency in grids, greater insulation, use of renewable energy.
These technologies are being developed. And, hopefully, there will be more development into that. (**0010-23** [Berg, Michael])

Comment: [The commenter expects to see the following addressed in NRC's environmental review:] Allowed connections to a new hydrogen production technology. Or limitations from the environmental point of view. (**0044-23** [Wojcicki, Joe])

Response: *The EIS will be prepared in accordance with 10 CFR 51.75(c). Alternative energy sources, including renewable energy sources such as wind and solar power as well as energy conservation and efficiency programs, and the no action alternative, will be considered in Chapter 9 of the EIS. Energy conservation and energy efficiency will also be considered as part of the need for power analysis in Chapter 8 of the EIS.*

Comment: In the application, before the Public Service Commission, the analysis that SCE&G did of alternatives, efficiency, conservation, and renewable energy, was a mere matter of pages. There was hardly any analysis done of demand side management, as it is called, which is now sweeping the nation. In the Public Service Commission hearing, the company said they would do such an analysis of these alternatives, which costs far less than building a new nuclear plant, sometime later this year. But we don't have that analysis. The EIS should cover

the analyses, including energy efficiency, conservation, and renewables , which conservation can be brought online at a cost of three to four cents, where there are indications that the nuclear power coming out of these new reactors could be 20 cents, 25 cents, 30 cents, per kilowatt hour. (**0010-46** [Clements, Tom])

Response: *The NRC does not establish public policy regarding electric power supply alternatives nor does it promote the use of nuclear power as a preferred energy alternative. Decisions regarding which generation sources and alternatives to generation to deploy are made by the applicant through least-cost planning and integrated resource plans. Additional regulatory purview is provided by bodies such as State energy-planning agencies and commissions. However, the discussion of various alternatives to the proposed Units 2 and 3 is pertinent to the extent that an energy alternative must reasonably be expected to meet the need for power (including baseload power needs), whether individually or in combination. The alternatives must be technically viable, feasible, and competitive. Chapter 9 of the EIS will include the no-action alternative (energy efficiency and demand-side management as updated by the June 2009 proposed issuance of SCE&G DSM Programs), new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives, environmental impacts will be assessed against that of the proposed Units 2 and 3. If one of the potentially acceptable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.*

Comment: I think that we can create jobs by investing in different sources of energy, and greater efficiency, insulation, renewables, and jobs that can be spread throughout the state. And jobs that, hopefully, would not cost the ratepayer the great amounts that SC&G wants to charge the ratepayer, much likely much more so. (**0010-25** [Berg, Michael])

Comment: I mean, our rates are relatively low, but because our homes, especially our low income homes, are so inefficient, they are so leaky, even my own house is leaky, and I'm working on that now, these people have huge electric bills. Not because the (rates are high, but because we are so inefficient, and our houses are so leaky. We could probably negate the need for this plant, at all, if we would put serious consideration into doing weatherization, and energy efficiency, in making our houses energy efficiency. (**0010-65** [Corbett, Susan])

Comment: Lastly I would just like to say, you know, we don't have to be on the lookout for new energy sources. We have them, we have a PhD professor from Clemson, Professor Nick Rigas, he did he did an incredible study of our offshore wind potential. He says that we have over 4,000 megawatts of offshore wind that could be up and running in five years. Half the time that it would take to build this reactor. (**0010-75** [Corbett, Susan])

Comment: Let me just give the example of California or Nevada. They built one production solar panels for 100 million dollars. Each of them, they were built in one year. And each of this facility can build in ten years exactly two and a half gigawatts power that is right now planned by these two reactors. (**0010-92** [Wojcicki, Joe])

Comment: One of the things you have heard tonight is a lot about renewables, and renewables are great, but one thing about our renewables, we would be using them right now, is that they are not sustainable. We have not reached that level yet, with solar cells, wind power, biomass, something that Santee Cooper is working on, is a biomass project with Newberry. And if it was so great, you know, we would be doing it right now. But it is not sustainable, we don't have the infrastructure, we don't have the time. We are taking baby steps. (**0010-95** [Von Kaenel, Hoyt])

Comment: And if there are better, safer, faster, cheaper ways to do this, that don't leave a legacy of toxic radioactive waste for thousands of years, I think those should be the first things that we look at, not the last. (**0011-122** [Corbett, Susan])

Comment: Others are here to champion alternative energy approaches. Certainly we should all be able to agree that we should use energy efficiently. We should conserve energy wisely. And we should use energy sources that may provide unique applications, such as solar panels for powering remote equipment. Unfortunately many of the folks who want to believe so strongly in the promise of these approaches, that they are convinced that we don't need additional baseload energy supply. Taken to an extreme of practicing efficiency and conservation as the only approaches to solving our energy woes, will lead to abject poverty for our citizens. This has been demonstrated in the rest of the world, where one-third of the population have no electricity, and they live in abject poverty. (**0011-53** [Wolfe, Clint])

Comment: Another myth about these [green energy] technologies is that they are somehow cleaner. Cleaner than coal, maybe. Cleaner than nuclear? No way. If all of our energy were produced from nuclear power then all of the high level nuclear waste attributable to a single person, in his or her lifetime, could be contained in a single coke can, a 12 ounce coke can. Compare that to the mountains of coal ash and tons of carbon dioxide from burning coal. Solar panels are manufactured in processes involving extremely toxic materials. And when the panels are discarded they will have to be monitored, in regulated disposal sites, due to heavy metal content. Toxic metals, unlike radioactive waste, does not go away with time, rather remain toxic forever. (**0011-56** [Wolfe, Clint])

Comment: The VCSNS would add an incremental amount to the employment and tax base of the Columbia economic area. The employment effects, however, depend on worker skills that may not be available locally. Any economic benefits of VCSNS would be more than offset by the substantial increase in electricity prices paid by consumers. Adoption of the alternatives of renewable energy sources and greater energy efficiency, rather than approval of the VCSNS, would have larger employment effects and would also result in lower long-term electricity prices. (**0037-14** [Thomas, Ruth])

Comment: Finally, with the incredible costs associated with the project, financial as well as environmental, would it not be more prudent for SCE&G to commit this funding to alternative renewable energy sources? Solar and wind farms have the ability to provide needed electricity without the potential for catastrophe. What price should the citizens of western Fairfield County

be required to pay for our state's increasing appetite for energy? Can we as a county, and a country, continue to consume resources with no concern as to how those resources are obtained? (**0049-10** [Barnes, Jenifer])

Response: *The NRC does not establish public policy regarding electric power supply alternatives nor does it promote the use of nuclear power as a preferred energy alternative. Decisions regarding which generation sources and alternatives to generation to deploy are made by the applicant through least-cost planning and integrated resource plans. Additional regulatory purview is provided by bodies such as State energy-planning agencies and commissions. However, the discussion of various alternatives to the proposed Units 2 and 3 is pertinent to the extent that an energy alternative must reasonably be expected to replace the base load energy supplied by the proposed Units 2 and 3, whether individually or in combination. The alternatives must be technically viable, feasible, and competitive. Chapter 9 of the EIS will include the no-action alternative (such as energy efficiency and demand-side management; demand-side management is also captured in Chapter 8 as an energy supply contribution), new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives environmental impacts will be assessed against that of the proposed Units 2 and 3. If one of the potentially acceptable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.*

Comment: You heard some discussion about life cycle of greenhouse gases. People would have you believe that nuclear plants do emit greenhouse gases, because if you mine uranium, or if you build the plants, and then you decommission the plants, that that process emits greenhouse gases.
And when you look at it on a per unit of energy basis, the life cycle of greenhouse gas emissions for nuclear are lower than that of solar, and about the same as that of wind. So, remember, it takes manufacturing to build solar panels, and it takes manufacturing to build wind turbines, also. (**0010-100** [Byrne, Stephen])

Response: *The NRC does not establish or comment on public policy regarding electric power supply alternatives. The NRC does not promote the use of nuclear power as a preferred energy alternative. In addition, the NRC does not regulate alternatives to producing electricity that do not involve nuclear power. The NRC does evaluate energy alternatives, as part of its review under NEPA of applications for new nuclear power plants, and it regulates the nuclear industry to protect the public health and safety within existing policy. The discussion of alternative energy sources in Chapter 9 of the EIS will describe the potential impacts from alternative energy sources such as fossil-fired facilities, including estimated emissions of greenhouse gases, and will also include analysis of energy efficiency and renewable energy sources.*

Comment: And immediately, the thing cheapest that we electricity could do is, the electricity that you don't use. I have been recently doing some work on my house, because I know that I need to -- if I'm going to talk the talk, I need to walk the walk. So I have been sealing up my windows, I'm blowing new insulation in my attic, and changing out my light bulbs. I have been able to cut my kilowatt usage dramatically. If everybody did that, and if people got help, through

incentives and programs, and subsidies, we could cut way back on the amount of electricity that we are using, and maybe negate the need for building these plants, or using alternatives to fill in. So energy efficiency is something that we just really have, it is underused. (**0011-117** [Corbett, Susan])

Comment: I have a 12 year old house. I just had an energy rating done. The house was tight, I didn't have problems with air infiltration. But I had a duct that had slipped off of one of its boots. The study came back indicating that I'm spending 35 to 50 dollars a month more for energy that I'm not receiving. And this is typical of most houses today. As a matter of fact, when you look at where the problems are, and I work with energy raters, so I'm not talking off the top of my head, air infiltration is probably one of the more significant issues. And that is air leaking into your house. So when we talk about a window being open, that is literally true. Sometimes it may be more than that, you just don't know where it is, but it is happening all the time.
The next thing that most people don't know about, is that their duct work is probably severed some place, other than their attic, or under their house. Part of the reason for this is that building practices, for the last 30 or 40 years, have used duct tape, instead of mastics, to seal your duct work together.
Duct tape dries out, fittings fall apart, they leak, and bingo, 20 percent of the air, whether it is summertime conditioned air, or heat that you put into your house, and a lot of South Carolinians use heat pumps, so it is electrical demand, is going into heating the greater outdoors, not your house.
And the final area is probably just inadequate attic insulation. Now, does anybody know this for a fact? No, because there have been very few studies done on it here in the state. We have information from studies that have been done by our energy raters, that covers some 50 houses. We also know that building sciences are developing very quickly. It is very possible, today, to build a house that is 95 percent energy efficient. Houses that are being built today are anywheres from 30 to 50 percent more efficient than they were just in 2003. (**0011-124** [Newton, Larry])

Comment: So the real question today is, with all the changes that are going on, rapidly, technological progress, what is going on in building sciences, the ability to retroactively, or retrofit older houses, both commercial and residential buildings, which probably are in great need here in South Carolina.
If you achieve a 15 percent efficiency improvement over the next, say, six or eight years and SCE&G is looking to basically cover a ten percent increase in demand. Now that is demand, not necessarily average electricity. Demand is when you get that spike in the summertime, when all of the air conditioners come on. If you manage the spike, if you do the efficiency, you might be surprised. Massachusetts and New York are committed to doing that right now. And a lot of other states are following suit. So the question is, why aren't we? (**0011-127** [Newton, Larry])

Comment: The environmental report.....is severely lacking in the analysis of alternatives. I have looked at some of the sections, but on the consideration of energy efficiency, conservation, and renewable energy, there is almost nothing. It is a few pages. And the application to the Public Service Commission, is really about this much. And we all know that turning off a light is cheaper than building a new generation source to power that light bulb. We

can see that energy efficiency and conservation may cost three cents, or so, a kilowatt hour. And building these new reactors could be anywhere from 15 to 30 cents per kilowatt hour. We need to look at the alternatives before we jump into a massively expensive project, and that has not been done, and the EIS should cover this. (**0011-75** [Clements, Tom])

Comment: When I was coming in here tonight, there are 13 lights out there, in the parking lot, just burning away. I'm sure they will burn after we leave. And then you multiply that by all the other indulgences like that. I think they could get by with three. And then you see the lights, people have four street lights in their yard, out in the country now, fright lights, I guess. I think the power companies should offer them switches to turn them off when the moon is full in the wintertime and high overhead. I mean, there are thousands of things that can be done to stop. We could cut our electricity down, I'm sure, 80 percent if we just would do it. (**0011-97** [Mason, Corry])

Comment: We [League of Women Voters of SC] are concerned because South Carolina citizens' desires for new energy strategies are being ignored in favor of traditional toxic and polluting energy-generating industries. (**0035-1** [Zia, Barbara])

Comment: [The EIS should consider] Alternatives to the proposed action. The major alternative to the proposed action is increased energy efficiency, conservation and demand side management (DSM) by the applicant utility. A review of the transcript of the hearings held in the South Carolina Public Service Commission (PSC) hearings on its consideration of the VCSNS (Docket 2008-196-E) provides considerable evidence that SCE&G could do much more to promote DSM. Hearings by PSC are to be held later in 2009 on DSM at SCE&G. Greater use of renewable technologies of wind and solar are also important alternatives. (**0037-7** [Thomas, Ruth])

Response: *Chapter 8 of the EIS will include discussion of demand-side management and energy efficiency programs to the extent that they contribute to the need for power either as a supply-side resource, or as peak-limiting mechanisms. Chapter 9 of the EIS will include the no-action alternative (such as energy efficiency and demand-side management in lieu of a new plant), new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives, the potential for environmental impacts will be assessed against that of the proposed Units 2 and 3. If one of the acceptable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.*

Comment: This project is good for the United States. It means less dependence on foreign oil. (**0049-21** [Dennis, Dan])

Response: *This comment expresses an opinion about the proposed Units 2 and 3, but it does not provide information related to the environmental impacts of the new units. Therefore, it will not be considered further in the environmental review.*

Comment: And while we are paying on that interest, up front, we are not able to develop the infrastructure and the smart grid that the legislature is looking at now. They are finally waking up

to the fact that the rest of the nation is working on smart grid, diversification, and not just diversification of resources, but change in the way the grid works, so that your power doesn't all have to come from a giant baseload, but from smaller plants. (**0010-136** [Greenlaw, Pamela])

Response: *The NRC staff recognizes that when evaluating energy alternatives to the proposed Units 2 and 3, particularly for technologies that continue to be developed and commercially deployed, the evaluation must include relevant information representative of the current technology. However, the viability of various alternatives to the proposed Units 2 and 3 is pertinent to the discussion to the extent that the alternative must be capable of reasonably meeting the need for power (including baseload power needs). The alternatives must be technically viable, feasible, and competitive. Chapter 9 of the EIS will include alternative actions such as the no-action alternative (such as energy efficiency and demand-side management), new generation alternatives, purchased electrical power, alternative technologies (including renewable energy and distributed generation such as wind, solar, fuel cell, and biomass), and the combination of alternatives.*

Comment: This project is good for South Carolina. We need the energy, we can shut off all the lights we want to, we can button up every house, but thousands of people are moving to our state every year, from all over the country, and all over the world, they are moving to South Carolina. It is a great place to live. Those people need electricity. We can't get that electricity from shutting off lights, it doesn't work, the numbers don't add up. (**0049-20** [Dennis, Dan])

Response: *This comment expresses an opinion about the proposed Units 2 and 3 as a baseload source of power in the service territory, but does not provide specific information related to environmental impacts of the proposed Units 2 and 3. Chapter 8 of the EIS will review the need for power including the impact of demand-side management and energy efficiency on the forecast load. Alternative energy sources will be evaluated in terms of the proposed Units 2 and 3 in Chapter 9 of the EIS.*

Comment: Fossil fuels, coal and natural gas are currently the only other means of generating large quantities of electricity all day long, day after day. The difference is the cost of generating electricity with nuclear fuel has decreased thirty percent over the past 10 years, while during that same time the cost of generating electricity with fossil fuels has risen substantially with no end in sight. Currently, the cost to produce 1,000 kilowatt hours of electricity (the approximate amount that an average customer uses in a month) using nuclear power is about $75. Coal, natural gas, offshore wind and solar power would cost $92, $105, $173 and $656 respectively to produce the same amount. (**0033-7** [Merrill, Denver])

Response: *The NRC does not establish or comment on public or private policy regarding electric power supply alternatives. The NRC does not promote the use of nuclear power as a preferred energy alternative. In addition, the NRC does not regulate alternatives to producing electricity that do not involve nuclear power. The NRC does evaluate energy alternatives, as part of its review under NEPA of applications for new nuclear power plants, and it regulates the nuclear industry to protect the public health and safety within existing policy. Chapter 9 of the EIS will include the no-action alternative (energy efficiency and demand-side management),*

new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives, the potential for environmental impacts will be assessed against that of the proposed Units 2 and 3. If one of the acceptable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.

Comment: Now, when you look forward to what is going to happen in the next ten years, with a very active administration in Washington, and you've seen it already, in terms of the EPA, and the actions they have taken, what they are looking to do with climate change, what they are doing in terms of weatherization, we are going to see a lot of changes coming very quickly here in South Carolina. If the stimulus package goes through, which had six billion dollars in it, to go ahead and weatherize two million low income homes, that averages about three thousand dollars a home. And this is the estimate that is being made to weatherize these houses effectively. If you look, right now, at SCE&G's cost for one and a half nuclear plants, that is about seven billion dollars in today's money. And I think that there is something like 600,000 residential customers. If you do the arithmetic, and we just talk about residences, we don't talk about helping anybody else, you are looking at 11,000 dollars a household you could spend on energy efficiency. (**0011-125** [Newton, Larry])

Comment: Nuclear power produces more (reliable) energy than solar or wind. It would cost more to construct enough wind and solar sources than it would to create new nuclear power plants (preferably breeder reactors which would reduce if not eliminate the waste issues). When I started my degree for nuclear power, I sought to prove that solar and wind would be better. However, through my research, I discovered that it would cost thousands more to power a single neighborhood via solar and wind alone than the slight increase one may see with nuclear. (**0026-2** [Sims, Raymond])

Response: *The NRC does not establish or comment on public or private policy regarding electric power supply alternatives, nor does it promote the use of nuclear power as a preferred energy alternative. Decisions regarding which generation sources and alternatives to generation to deploy are made by the applicant through least-cost planning and integrated resource plans. Additional regulatory purview is provided by bodies such as State energy-planning agencies and public utility commissions. However, the discussion of various alternatives to the proposed Units 2 and 3 is pertinent to the extent that an energy alternative must reasonably be expected to meet the need for power (including baseload power needs), whether individually or in combination. The alternatives must be technically viable, feasible, and competitive. Chapter 8 of the EIS will include review of the need for power in the service territory including the impacts of demand-side management and energy efficiency on the load forecasts. Chapter 9 will include the no-action alternative (energy efficiency and demand-side management), new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives, the potential for environmental impacts will be assessed against that of the proposed Units 2 and 3. If one of the potentially acceptable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.*

D.2.24 Comments Concerning Alternatives - Sites

Comment: They try, means South Carolina Electric and Gas, they want to build this here, close to us, in Jenkinsville. Now, practically, when you look at the load, this big load that is required 24 hours and 7 day's delivery, it is not going to be in the next 50 years here, around this area, it is going to be someplace between Charleston and Savannah river, Savannah port. There is a plan already signed by two governors, the governor of South Carolina, Mark Sanford, and the governor from Georgia, Mr. Perdue, to build an ocean terminal, which is pretty close to the Savannah port. And, really, this is going to be something that will require gigawatts of the power. (**0010-82** [Wojcicki, Joe])

Comment: The problem is to deliver the power close to the Atlantic Ocean. And here is the problem. First, if we have to put these generators in proper place, as a product of electricity, it must be done closer to Charleston and Savannah, not here. (**0010-84** [Wojcicki, Joe])

Comment: So let me turn back to the proposal of 90 moving these two units far away from Jenkinsville. Not far away, but somewhere in the Atlantic Ocean. First, we are going to have much better distribution of the electricity, we are going to have the right place to put this reactor. And we are going to get use of the seawater for cooling. (**0010-89** [Wojcicki, Joe])

Comment: the location in the Jenkinsville is not good one. (**0011-58** [Wojcicki, Joe])

Comment: And here is completely failure, because location of the Jenkinsville was finally approved in 2005. The study was done in 1970s. And right now, also, not only this was completely ignored what was going on 2024, and this is obligation of applicant to look into the future. (**0011-59** [Wojcicki, Joe])

Comment: So putting here [Jenkinsville] units for two gigawatts, to transfer power from here over 200 miles to a place [Charleston], when this power we need, is completely nonsense. And this is because nothing was done in 2008 and '09. We have locations selected in 2005. So my proposal is to look at any location close to the Atlantic Ocean. Why? If we are going to have these units in Atlantic Ocean, first, the electricity will be close to the places they will be required to be. (**0011-61** [Wojcicki, Joe])

Comment: It is not here, it should be close to the Atlantic. (**0011-63** [Wojcicki, Joe])

Comment: Move these two guys to the place that really baseload is necessary, not here. (**0011-68** [Wojcicki, Joe])

Comment: A misled PSC could not find a logical and efficient solution to this big project. For example, a statement of necessary additional transmission lines (SCE&G claim) when just a simple look at the SC map shows much smaller distances between any AOL [Atlantic Ocean Location] or JOT [Jasper Ocean Terminal] and Charleston (my version) location than between Jenkinsville via Charleston to JOT (SCE&G version of the site location). The truth is quite opposite than this claim in the Order. NRC must do this simple correction and request full map of existing network and its future topology in the SE of the USA. (**0044-10** [Wojcicki, Joe])

Comment: Basic economic estimation must be always attached. Especially it is important in a new selection of the site. You should understand that the selection done in 2005 is no longer valid. (**0044-19** [Wojcicki, Joe])

Comment: The Jenkinsville site location did not consider at least three aspects...Seawater would be a better cooling medium. (**0044-3** [Wojcicki, Joe])

Comment: My proposed AOL [Atlantic Ocean Location] should save at least hundreds of millions of dollars in construction and even billions of dollars during the life of this project. (**0044-7** [Wojcicki, Joe])

Comment:

- Requested and necessary scope of Basic Fundamental Electric Energy Generation and Distribution parts to be a replacement for already presented set of documents. With over 40 years of experience in this area, I [Joe Wojcicki] offer my help and expertise as an engineer and former SC educator.
- A Site selection process must be redone. The interests of SC, the SE, and the USA must come before those of SCE&G.
- Mistakes that happened in the first stage of review of the Application must be avoided in the NRC final review and order. (**0044-8** [Wojcicki, Joe])

Response: *NRC staff will review the alternative site-selection process to determine whether it is systematic, employs reasonable selection criteria, and constitutes an acceptable number of reasonable sites for consideration. The alternative sites will be compared against the proposed site to determine whether any of the alternative sites are environmentally preferable to the proposed site. The process and results will be provided in Chapter 9 of the EIS.*

D.2.25 Comments Concerning Benefit-Cost Balance

Comment: And as these possibilities [renewable energy technologies] get cheaper, SC&G wants to commit the ratepayer in South Carolina to invest in a nuclear power plant, that once we go down the path, and we invest billions, after billions of dollars, cannot be reversed without just wasting the entire sum. (**0010-24** [Berg, Michael])

Comment: While there may be some benefits here in the county, the people in the service area, and the rest of the county, could well be stuck with massive rate increases once we start paying for these things, which is going to be very soon, under South Carolina law. (**0010-47** [Clements, Tom])

Comment: As far as cost, and this is getting back that efficiency and conservation are far cheaper. The company has partnered with Santee Cooper to build these plants and basically said they cost around ten billion dollars. The Department of Energy, on October 2nd, said that one reactor would cost nine billion dollars. And that may be at a site that doesn't have an existing reactor. There are other estimates that the two reactors could cost 20 billion dollars or more. So there is a wide discrepancy about how much these things are going to cost the ratepayers of South Carolina. There could end up being quite a negative economic impact due to building the reactors. (**0010-49** [Clements, Tom])

Comment: And the thing that, you know, the utility passed this baseload review act, last year. This was an act in the past that used to protect people from what happened in the past. I'm holding up an NRC document. This is a document that they published about reactors around the country. This is five pages of canceled reactors that they started, and then they defaulted on. And I promise you that the ratepayers ended up paying for these. So, unfortunately, the Baseload Review Act that they got passed last year, is forcing us to pay up front for the financing, with no guarantee that it is ever going to get built. If they default we are not going to get any money back. So I have some big problems with that. I think it is an economic -- especially in this economic climate, this is a big risk. And I don't think that the ratepayers should be forced to take on that risk. We are taking on the risk, they are taking on the profit. (**0011-118** [Corbett, Susan])

Comment: part of it is about the cost, and the impact on the rates to people in the service area. (**0011-70** [Clements, Tom])

Response: *The purpose of the EIS is to disclose potential environmental impacts of constructing and operating the proposed Units 2 and 3. Neither the determination of the impact of constructing and operating a nuclear power plant on retail power rates, nor the impacts such potential rate changes may cause, is under NRC's regulatory purview, and therefore these comments will not be considered further.*

Comment: We remain convinced that apples to apples comparison of kilowatt hour costs at the buss bar, will favor nuclear generated electricity. Price fluctuations in steel, concrete, and other commodities, will affect the price of construction of any new generation capability, no matter what the technology. The largest component of potential unanticipated costs is time. (**0010-110** [Wolfe, Clint])

Comment: SCE&G is understanding the true cost of the two reactors, understating the true cost of the two reactors, risking massive cost overruns. The DOE has estimated over nine billion each, not ten billion for two. (**0010-119** [Cooper, Elaine])

Comment: I ask that you fully consider the costs of this proposed project. That is the cost of building two AP1000 plants. And I submit to you, as others have said tonight, that the company has grossly underestimated the cost of the plant, and there is substantial extrinsic evidence supporting that that plant cost is underestimated. (**0010-128** [Guild, Robert])

Comment: And it costs more to build one, get all the ores out of the ground, process it, build it, burn the lights 24/7, take the stars out of the night, building these things for years and years, and then as it produces, they run in the red. (**0010-155** [Mason, Corry])

Comment: And it comes, I mean, when you consider construction costs, the material input, the concrete and steel, it is five times more for a windmill, on a per kilowatt hour basis. Again, it is important to factor in the overall life cycle cost. And this is based on a 2005 International Journal of Life Cycle journal article, as well as a 2000 Renewable Energy Journal article. (**0010-179** [Knight, Travis])

Comment: I think that this utility has severely underestimated the cost of this plant, based on what we are seeing world-wide. And they have also underestimated the kilowatt hour. I think they ran an ad in the state paper saying that it is going to be 7 cents a kilowatt hour. I think they are underestimating that. (**0010-76** [Corbett, Susan])

Comment: And, especially, in this coming depression, so we are concerned about the economics of this plant. We feel like the cost is being understated, the kilowatt hour has been understated, and they won't guarantee a cost, so you really don't know what your final cost is going to be. You are kind of paying up front for a product that you are not sure, ultimately, what it is going to cost, or how much it is going to cost you in the end. They said in the State paper that they were going to be able to produce this thing, produce it for 9 cents a kilowatt hour. Well, there are national groups that are professional assessment investment groups that are saying now that nuclear is going to cost between 15 and 20 cents a kilowatt hour. So somewhere these figures just don't make sense. (**0011-115** [Corbett, Susan])

Comment: So with respect to this plan, some of the things for all of us in this room to consider, the incredible construction costs, there is just a real wide discrepancy between what SCE&G and Santee Cooper estimate as the cost, and what independent agencies have said that the cost will be. (**0011-18** [Ramsburgh, John])

Comment: A third are the incredible costs that are associated with plants that don't go into just the construction cost, the health care cost, the transportation cost, the transport of waste cost, the impacts on the roads, on our potholes, on our city streets. (**0011-20** [Ramsburgh, John])

Comment: one of them [two new units] is going to be private. And I read up on nukes over the years, here and there, and one of the things that I have come to understand is that there is a lot of hidden costs to build them. You take the ore out of the ground, process it, like an automobile. They say they do most of the pollution by creating them. (**0011-94** [Mason, Corry])

Comment: The National Environmental Policy Act (NEPA) requires as part of the EIS a detailed statement of alternatives to the proposed action. In the comparison of nuclear generation of electricity with alternatives such as coal, natural gas, wind or solar, there is a tendency to understate the economic costs of nuclear generation. (**0040-3** [Thomas, Ruth] [Wilder, Ronald])

Comment: The risk of nuclear accidents and the routine radioactive contamination by operating reactors means that much of the costs of the nuclear option are imposed on citizens, including many who do not receive benefits as electricity customers. In comparing the nuclear option with renewable resources, this difference in external costs of nuclear versus renewable energy sources should be quantified in the EIS when the comparison of alternatives is made. (**0040-5** [Thomas, Ruth] [Wilder, Ronald])

Comment: The reported accounting costs of the nuclear option are understated for the above reasons. For the EIS to be valid, it should quantify the dollar value of all the external costs, including risk of accidents and environmental damage. The EIS should also place a dollar value on all of the subsidies received by nuclear power when nuclear is compared with other, less subsidized options. I urge the NRC to draft an EIS that is independent, fair, and that carefully considers the issue of external costs and subsidies. (**0040-6** [Thomas, Ruth] [Wilder, Ronald])

Response: *The disclosure of the costs of the proposed action will rely on the best available estimate of financial costs with uncertainties noted. Associated costs that cannot be reliably quantified also will be discussed. Chapter 10 of the EIS will address the estimated overall internal and external benefits, costs, and associated environmental impacts of the proposed project.*

Comment: Nuclear generation of electricity has, and continues to be, subsidized by the federal government. Subsidies include the insurance benefits of the Price-Anderson Act, which provides liability insurance beyond that available in the commercial market. As a result, taxpayers shoulder nearly all of the risk of a major nuclear accident, and the accounting costs of electric utilities understate total costs. Those utilities using nuclear generation of electricity recognize that there is a very high liability risk in the event of a Chernobyl-type accident, and they would be unlikely to build reactors if the Price-Anderson subsidy were not available. Another major subsidy is the loan guarantee program for new reactors included in the Energy Policy Act of 2005, as well as research and development programs included in that Act. (**0040-4** [Thomas, Ruth] [Wilder, Ronald])

Response: *The NRC is not involved in establishing national energy policy, and issues related to the subsidization of nuclear power are outside the scope of the NRC's mission and authority.*

Appendix E

Draft Environmental Impact Statement Comments and Responses

Appendix E

Draft Environmental Impact Statement Comments and Responses

This appendix is intentionally left blank in the draft Environmental Impact Statement (EIS). In the final EIS, this appendix will include comments and responses received on the draft EIS.

Appendix F

Key Combined License Consultation Correspondence Regarding the Virgil C. Summer Nuclear Station Units 2 and 3 Combined License Application; and Biological Assessments

Appendix F

Key Combined License Consultation Correspondence Regarding the Virgil C. Summer Nuclear Station Units 2 and 3 Combined License Application; and Biological Assessments

Correspondence received during the evaluation process for the combined license application for the siting of Units 2 and 3 at the Virgil C. Summer Nuclear Station (VCSNS) in Fairfield County, South Carolina, is identified in Table F-1. The correspondence can be found in NRC's Agency Document Access and Management System (ADAMS), which is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room) (note that the URL is case-sensitive). ADAMS accession numbers are also provided in Table F-1. In addition, a full copy of the biological assessments prepared for the U.S. Fish and Wildlife Service and the National Marine Fisheries Service are included in this appendix.

Table F-1. Key Consultation Correspondence

Source	Recipient	Date of Letter and ADAMS Accession Number
U.S. Fish and Wildlife Service (Timothy Hall)	U.S. Nuclear Regulatory Commission	January 22, 2009 ML090330702
Advisory Council on Historic Preservation (Charlene Dwin Vaughn)	U.S. Nuclear Regulatory Commission (Gregory Hatchett)	February 17, 2009 ML090840377
South Carolina Department of Natural Resources (Ms. Vivianne Vejdani)	U.S. Nuclear Regulatory Commission	March 6, 2009 ML090840384
South Carolina Archives and History Center, State Historic Preservation Office (Ms. Caroline D. Wilson)	U.S. Nuclear Regulatory Commission (Tamsen Dozier)	October 20, 2009 ML0930803690

The South Carolina Archives & History Center
History & Heritage For All Generations

October 20, 2009

Tamsen Dozier
NRO/DSER/RAP1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: V.C. Summer Nuclear Plant Archaeological Site

Dear Ms Dozier:

Thank you for your e-mail of September 29, regarding the above referenced project. It is our understanding that a letter issued from our office on August 16, 2006 contained incorrect information on an archaeological site located at the V.C. Summer Nuclear Plant. The site that has been determined ineligible for listing on the National Register of Historic Places is 38FA322.

If you have any questions, please contact me at (803) 896-6169 or cwilson@scdah.state.sc.us.

Sincerely,

Caroline Dover Wilson
Review and Compliance Coordinator
State Historic Preservation Office

D083
NRO

S. C. Department of Archives & History • 8301 Parklane Road • Columbia • South Carolina • 29223-4905 • (803) 896-6100 • http://scdah.sc.gov

Preserving America's Heritage

February 17, 2009

Gregory P. Hatchett
Acting Branch Chief
Environmental Projects Branch 2
Division of Site and Environmental Reviews
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Ref: *Notification and request for consultation and participation in the scoping process for Units 2 and 3, combined license application review for the Virgil C. Summer Nuclear Station near Fairfield County, South Carolina*

Dear Mr. Hatchett:

On January 13, 2009, the Advisory Council on Historic Preservation (ACHP) received from the Nuclear Regulatory Commission (NRC) a notification pursuant to Section 800.8(c) of the ACHP's regulations, "Protection of Historic Properties" (36 CFR 800), regarding the referenced project. We appreciate receiving your notification, which establishes that NRC will use the process and documentation required for the preparation of an EA/FONSI or an EIS/ROD to comply with Section 106 of the National Historic Preservation Act in lieu of the procedures set forth in 36 CFR 800.3 through 800.6.

In addition to notification to the ACHP, NRC must also notify the South Carolina State Historic Preservation Officer and meet the standards in Section 800.8(c)(1)(i) through (v) for the following:

- identifying consulting parties;
- involving the public;
- identifying historic properties and assessing the undertaking's effects on historic properties; and
- consulting regarding the effects of the undertaking on historic properties with the SHPO/THPO, Indian tribes and Native Hawaiian organizations that might attach religious and cultural significance to affected historic properties, other consulting parties, and the ACHP, where appropriate, during NEPA scoping, environmental analysis, and the preparation of NEPA documents.

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

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To meet the requirement to consult with the ACHP as appropriate, the NRC should notify the ACHP in the event NRC determines, in consultation with the SHPO/THPO and other consulting parties, that the proposed undertaking(s) may adversely affect properties listed, or eligible for listing, on the National Register of Historic Places (historic properties). In addition, Section 800.8(c)(2)(i) requires that you submit to the ACHP any DEIS or EIS you prepare. Inclusion of your adverse effect determination in both the DEIS/EIS and in your cover letter transmitting the DEIS/EIS to the ACHP will help ensure a timely response from the ACHP regarding its decision to participate in consultation. Please indicate in your cover letter the schedule for Section 106 consultation and a date by which you require a response by the ACHP.

The regulations do not specifically require that an agency submit an EA to the ACHP. However, keep in mind that, in the case of an objection from the ACHP or another consulting party, Sections 800.8(c)(2)(ii) and (c)(3) provide for ACHP review of an EA (in addition to a DEIS or EIS) to determine whether preparation of the EA, DEIS or EIS has met the standards set forth in Section 800.8(c)(1) and/or to evaluate whether the substantive resolution of the effects on historic properties proposed in an EA, DEIS or EIS is adequate.

If NRC's determination of adverse effect will be documented in an EA, we request that you notify us of the adverse effect and provide adequate documentation for its review. The ACHP's decision to review an EA, DEIS or EIS will be based on the applicability of the criteria in Appendix A of the ACHP's regulations.

Thank you for your notification pursuant to Section 800.8(c). If you have any questions or if we may be of assistance, please contact Najah Duvall-Gabriel by phone at 202-606-8585 or via e-mail at ngabriel@achp.gov.

Sincerely,

Charlene Dwin Vaughn

Charlene Dwin Vaughn, AICP
Assistant Director
Federal Permitting, Licensing and Assistance Section
Office of Federal Agency Programs

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South Carolina Department of

Natural Resources

Vivianne Vejdani
DNR NRC Coordinator
Wildlife & Freshwater Fisheries Division
Office of Environmental Programs
1000 Assembly Street, Room 202
PO Box 167
Columbia, SC 29202
Office: 803-734-4199
Fax: 803-734-3766
vejdaniv@dnr.sc.gov

John E. Frampton
Director
Robert D. Perry
Director, Office of
Environmental Programs

March 6, 2009

Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
Mail Stop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

REFERENCE: REQUEST FOR PARTICIPATION IN THE SCOPING PROCESS AND LIST OF STATE LISTED PROTECTED SPECIES FOR THE ENVIRONMENTAL REVIEW FOR THE VIRGIL C. SUMMER NUCLEAR STATION, UNITS 2 AND 3, COMBINED LICENSE APPLICATION

Dear Chief, Rules and Directives Branch:

Reference is made to the Combined License Application (COL) submitted by South Carolina Electric and Gas Company (SCE&G) and South Carolina Public Service Company (Santee Cooper) in support of application for a combined license for construction and operation of two nuclear power plants at its Virgil C. Summer Nuclear Station (VCSNS) site. South Carolina Department of Natural Resources (DNR) staff reviewed the extensive COL. This correspondence includes comments on the COL, respectfully submitted.

The VCSNS site is co-owned by SCE&G and Santee Cooper and is located in Fairfield County, South Carolina on the Broad River. The VCSNS site currently has one operating pressurized light water reactor with the capacity to generate 966 megawatts of electricity. SCE&G proposes to construct two new nuclear units adjacent to the existing site. SCE&G has also identified the need for transmission line corridor expansion. The siting area for proposed transmission lines would include Calhoun, Chester, Colleton, Dorchester, Hampton, Lancaster, Lexington, Orangeburg, and Richland counties, in addition to Fairfield County.

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Chief, Rules and Directives Branch
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March 6, 2009

The Broad River is an outstanding resource of state and regional significance and is important habitat for the priority conservation species robust redhorse (*Moxostoma robustum*) and American shad (*Alosa sapidissima*), a wide diversity of freshwater fish and mussel species, and economically important recreational fisheries. The river also supports numerous populations of the rare and sensitive plant species rocky shoals spider lily (*Hymenocallis coronaria*). High quality natural areas and hardwood forests occur along the river corridor and are home to a diversity of game and non-game wildlife species. Many nesting populations of bald eagle (*Haliaeetus leucocephalus*) inhabit its floodplain and depend on the Broad as a source of food. The river is also an important water supply resource for municipalities, hydropower and various industries.

Overall the COL is thorough and the information is well organized, concise and clearly written. DNR recognizes and appreciates efforts by the licensee to avoid and minimize impacts to natural resources. However, our agency has identified a number of concerns regarding potential impacts of the planned facility, particularly those affecting water supply and aquatic habitat of the Broad River and associated water bodies. These concerns are described as follows, and reference the section of the COL to which they correspond:

CHAPTER 2 ENVIRONMENTAL DESCRIPTION

Sec. 2.2.2 Transmission Corridors and Off-Site Areas

The COL provides a broad overview of existing and proposed transmission line corridors. Final routes will be identified in the upcoming Phase 3 transmission line study. DNR requests consultation throughout Phase 3 and the final route selection process.

Sec. 2.3.1.1.1 Rivers and Streams

The COL refers to the calculation of mean daily and mean monthly flow in the Broad River using the Richtex, Alston and Carlisle USGS stream gauges. However, it is unclear what methods or additional data were used to estimate inflow into the Parr Reservoir. Were flows estimated using a combination of USGS gauge flow data, scaled down to the drainage area of the reservoir, or were they estimated with a water balance equation? A complete description of methodology is needed to evaluate flow estimates provided in the COL.

Sec. 2.3.1.1.3 Low Flows

The COL describes a seven-day average low flow of 156 cfs calculated from 2002 flow data from the Alston gauge, located approximately 1.2 miles downstream of Parr Shoals Dam. A 100-year daily mean flow of 125 cfs, and a 100-year seven-day average low flow of 430 cfs were also calculated for the Alston gauge. The seven-day average low flow at the Parr dam was estimated to be 190 cfs, also in 2002. A 7Q10 flow equaling 853 cfs was estimated from data from the Richtex and Alston gauges. There is no information on historical or estimated low

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inflow to the Parr Reservoir other than that provided from the Carlisle gauge, 21 miles upstream of the project site. According to the COL, historical daily mean flows in the Broad River at the

Alston gauge have been as low as 48 cfs (2002). The COL adds that this flow was *not considered representative of natural river flows because it was influenced by the upstream flow diversion from the Parr Reservoir to Fairfield Pumped Storage Facility*. This statement seems to suggest that downstream flows are run-of-river and not regulated by the operation of the Parr project and Fairfield Pumped Storage Facility (FPSF).

The COL states that *the state of South Carolina uses the 7Q10 flow to determine potential impacts*. This statement is misleading. The South Carolina Department of Health and Environmental Control uses the 7Q10 of a water body to determine the assimilative capacity of that water body when setting limits to effluents in National Pollutant Discharge Elimination System permits. DNR follows the guidelines of the South Carolina Water Plan (second edition, 2004) when evaluating potential impacts to state water resources. (www.dnr.sc.gov/water/hydro/water_plan.htm).

Sec. 2.3.1.1.4 Dams and Reservoirs

The COL states that the pan evaporation loss rate from the Parr Reservoir was estimated from data obtained from DNR, but the exact source of this data is not identified. In addition, there is no information provided on how evaporative loss was estimated for the Monticello Reservoir. Complete information is needed on the data and methods used to estimate pan evaporation loss rates for Parr and Monticello reservoirs.

This section provides a very general overview of the operation of the reservoirs and FPSF, stating that *pumping is normally done at maximum capacity*. There is no information on whether operation is modified during times of low flow. Is pumping curtailed during times of extreme low flows? Is operation of the Parr hydro facility modified during low flows? Information on how water is apportioned between reservoirs, the FPSF and the Broad river, particularly during low flow periods, is needed. If no provisions exist, then a drought response plan will need to be developed in consultation with regulatory and resource agencies.

DNR manages the Parr Reservoir and Monticello Reservoir Waterfowl Management Areas, and the Monticello Sub-Impoundment supports a recreational fishery. Water level fluctuations within the reservoirs and their potential impact on waterfowl habitat and fisheries are of concern. Increased temperatures during low flows have caused fish kills in the Monticello Reservoir. In the early to mid-1990s the licensee employed several mitigation measures, including dredging the discharge canal in 1993, to increase water circulation and cool water temperatures during low flow periods. No fish kills have been reported since that time. It is not known what, if any, impacts may accrue from increased reservoir fluctuations attributable to the addition of Units 2 and 3. Additional consultation throughout licensing is requested to address these concerns.

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Sec. 2.3.2.2 Local Surface Water Use

On page 2.3-21 the COL indicates that the licensee intends to request a license amendment of the Parr hydro project for increased water withdrawals for the operation of Units 2 and 3. Licensed flows for the Parr Hydro project are 1,000 cfs or average daily natural inflow (less evaporation)

during the striped bass spawning season of March, April and May, and 800 cfs (less evaporation) for the remainder of the year, with a minimum instantaneous flow release of 150 cfs. Estimated evaporative loss from Unit 1 alone is estimated at between 8.7% to 15% of the licensed minimum instantaneous flow of 150 cfs. Increased evaporative loss from the addition of Units 2 and 3 could have significant impacts on downstream flows, particularly during times of low flow. The state of South Carolina continues to experience drought conditions of unprecedented severity and duration. As of this writing, the entire state is in drought status ranging from "incipient" to "extreme". This fact underscores the supreme importance of carefully and thoroughly evaluating the hydrological impact of the proposed expansion.

Sec. 2.4.3.1 Rare/Sensitive Species

As noted in the COL, DNR stocks robust redhorse and smallmouth bass in the Broad River. Smallmouth bass have developed into a spawning population and fishery of increasing local and regional significance. Robust redhorse will continue to be stocked by DNR with the goal of creating a self-sustaining population. Both species were collected in the Monticello Reservoir in 2008. It is not known whether the intake area of the Parr Reservoir and FPSF is attracting these species, and there is a concern that increased pump-back operations may have an adverse impact on smallmouth bass and robust redhorse populations.

CHAPTER 4 IMPACTS OF CONSTRUCTION

General Comments

We recommend the licensee incorporate low impact procedures such as constructed wetlands, rain gardens, and double silt fencing throughout construction. Storm water detention facilities should be built well above floodplains and wetlands, and should not impound any streams. Detention facilities should discharge to constructed wetlands for further treatment of stormwater runoff. In shoreline areas, the applicant should use bioengineering techniques to the greatest extent possible. Maximum width buffers should be maintained between any construction site and any aquatic site. These buffers should be non-disturbance areas that are maintained in natural vegetation.

Sec. 4.3.1.1 The Site and Vicinity

The COL states that *a small portion of a small intermittent stream and its associated wetland extend slightly into the area in which the cooling towers would be located; a portion of this wetland would be impacted by construction activities*. During an interagency meeting with the

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licensee on February 5, 2009, anticipated impacts to intermittent stream and wetland were described as totaling approximately 600-700 linear feet and approximately 0.30 acre of wetland. We recommend avoiding all impacts to onsite streams and wetlands to the greatest practicable extent. An appropriate mitigation plan for unavoidable impacts to waters of the United States should be reviewed and approved by resource agencies and provided consistent with the Federal Mitigation Rule.

Sec. 4.3.2.1.1 Construction of Intake Structure and Blowdown Line

Two water intakes and one discharge are included as lake impacts. A raw water intake and a water treatment plant intake will be constructed in the Monticello Reservoir. Construction of the raw water intake will be accomplished in the dry with the assistance of a sheet pile coffer dam surrounded by silt curtains. The applicant has proposed to pump silt-laden water from behind the coffer dam into the space between the coffer dam and the silt curtain. Rather than pumping silt-laden water directly into Monticello, water should be filtered to remove silt and sediment before it is returned to the reservoir.

CHAPTER 5 IMPACTS OF STATION OPERATION

Sec. 5.1.2 Transmission Corridors and Off-Site Areas

See comment above, Sec. 2.2.2.

Sec. 5.3.2.1.2 Modeling of Blowdown Temperatures

The CORMIX model was used to model the extent of the thermal plume that would exceed applicable SCDHEC water quality standards of T > 90°F or ΔT of 5°F above ambient river temperatures. A variety of scenarios were modeled using input flows synthesized from Carlisle and Alston gauge flows. The "worst case scenario" was identified as follows: 2 cycles of concentration through cooling towers, 7Q10 flows, no operation of the FPSF, and max-ΔT(winter). The extent of the plume resulting from these conditions was modeled to be ~ 0.30 to 0.40 acre and would extend ~ 25% of the reservoir's width. Inflow to the Parr reservoir has been considerably lower than the modeled 7Q10 flow. Adverse impacts to aquatic resources can be significant if organisms are not able to avoid or find refugia from the thermal plume. More information is needed on the extent of the plume under very low flow conditions (e.g., flows less than the 7Q10 of 853 cfs). DNR requests additional consultation on the analysis of thermal impacts for low-flow conditions.

CHAPTER 10 PROPOSED ACTION CONSEQUENCES

Sec. 10.5.2 Cumulative Impacts of Operations

The COL indicates that during low flow periods the additional consumptive water loss associated with Units 2 and 3 would be mitigated by removing water from the reservoirs rather than *directly removing water from the Broad.* The COL also identifies the Lee Nuclear plant as a future

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March 6, 2009

upstream water user, adding that cumulative impacts of VC Summer and Lee nuclear plants will be *small* with the addition of any *water supply features and mitigation measures*. However, the COL does not indicate how water is to be allocated between the reservoirs and river, or how operation of the Parr project and FPSF will be modified, to mitigate low flows. The COL indicates a minimum reservoir elevation of 418 ft. What are the operational or physical constraints on minimum reservoir elevation? As stated above, it is of extreme importance that issues of water supply during low flows are thoroughly addressed and appropriate mitigation measures are clearly identified, in consultation with regulatory and resource agencies, during the licensing process.

In conclusion, because of nuclear energy's relatively non-existent green-house gas emissions DNR supports opportunities to consult, review and participate in discussions involving additional reliance on nuclear power for generation of electricity. In view of the magnitude of the above-listed potential impacts, DNR urges diligence and additional documentation/consultation with respect to potential project impacts. We appreciate the opportunity to participate in the scoping process.

Please contact me at 803-734-4199 if you have any questions regarding this matter or if we can be of further assistance.

Sincerely,

Vivianne Vejdani

Vivianne Vejdani,
DNR NRC Coordinator,
Wildlife and Freshwater Fisheries Division

c: Don Winslow
Bob Perry
Steve DeKozlowski
Bud Badr
Breck Carmichael
Hal Beard

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United States Department of the Interior

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

January 22, 2009

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Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
Mail Stop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RECEIVED
09 JAN 29 PM 2:47
RULES AND DIRECTIVES BRANCH

Re: Virgil C. Summer Nuclear Station, Units 2 & 3 Combined License Application, Fairfield County, SC, FWS Log No. 42410-2009-SL-0109

Dear Sir/Madam:

The U.S. Fish and Wildlife Service (Service) has received Nuclear Regulatory Commission's (NRC) request to participate in the environmental scoping process and for a list of protected species within the area proposed to construct two new nuclear reactors at the Virgil C. Summer Nuclear Station in Fairfield County, SC. The NRC is reviewing an application by South Carolina Electric and Gas (SCE&G) for a combined license for two new reactors, Units 2 and 3, adjacent to the Monticello Reservoir. Your request is being made as required by the National Environmental Policy Act of 1969, the Endangered Species Act of 1973; and the Fish and Wildlife Coordination Act of 1934 to facilitate the development of an Environmental Impact Statement (EIS) evaluating potential environmental issues and alternative considerations.

Your request is twofold, to solicit comments from the Service on potential environmental concerns and to obtain a list of threatened and endangered (T&E) species that may be present and affected by the project. This response from the Service will provide the list of T&E species requested, general scoping comments will be provided under separate letter within a timely manner.

Along with the two proposed reactor units, SCE&G identified a need to expand transmission line corridors outside of Fairfield County. The siting area identified includes nine additional counties located throughout the state; Calhoun, Chester, Colleton, Dorchester, Hampton, Lancaster, Lexington, Orangeburg and Richland Counties. Please find attached a list of T&E species that are known to or may occur within the counties identified in your letter. This list includes species of state and Federal concern. Reconnaissance efforts for the reactor construction and

SUNSI Review Complete
Template = ADM-013
E-RIDS = ADM-03
Add = S. Hylton (RTH)

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transmission line siting must include a search for the federally listed T&E species. We also recommend survey efforts include the state listed species in its biological assessment. Please contact the S.C. Department of Natural Resources for further information on these species and their habitat requirements. Please note that several streams within Lancaster County are considered critical habitat for the Carolina heelsplitter, *Lasmigona decorata*. Gills Creek, Flat Creek and the Lynches River are considered essential for the conservation of the heelsplitter and are afforded protection under section 7 of Endangered Species Act.

The Service appreciates the opportunity to provide this information for the development of this project. If you have any questions regarding the Service's comments, please do not hesitate to contact Mark Caldwell at (843) 727-4707 Ext. 215.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/MAC

cc: Mr. Mark Cantrell, USFWS, Asheville, NC

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South Carolina Distribution Records of
Endangered, Threatened, Candidate and Species of Concern
March 2008

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

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

CALHOUN COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Red-cockaded woodpecker	Picoides borealis	E	Possible
Shortnose sturgeon	Acipenser brevirostrum*	E	Known
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Least trillium	Trillium pusillum var. pusillum	SC	Known
Bachman's sparrow	Aimophila aestivalis	SC	Possible
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Painted bunting	Passerina ciris ciris	SC	Possible
Blueback herring	Alosa aestivalis*	SC	Known

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CHESTER COUNTY

Common Name	Scientific Name	Status	Occurrence
Carolina heelsplitter	Lasmigona decorate	E	Known
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Red-cockaded woodpecker	Picoides borealis	E	Possible
Georgia aster	Aster georgianus	C	Known
Dwarf aster	Aster mirabilis	SC	Possible
Shoals spider-lily	Hymenocallis coronaria	SC	Known
Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
Bachman's sparrow	Aimophila aestivalis	SC	Possible
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible

COLLETON COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Wood stork	Mycteria Americana	E	Known
Red-cockaded woodpecker	Picoides borealis	E	Known
Piping plover	Charadrius melodus	T, CH	Known
Kemp's ridley sea turtle	Lepidochelys kempii*	E	Known
Leatherback sea turtle	Dermochelys coriacea*	E	Known
Loggerhead sea turtle	Caretta caretta	T	Known
Green sea turtle	Chelonia mydas*	T	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Known
Pondberry	Lindera melissifolia	E	Possible
Canby's dropwort	Oxypolis canbyi	E	Known
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Angiosperm (no common name)	Elytraria caroliniensis	SC	Known
Godfrey's privet	Forestiera godfreyi	SC	Known
Pondspice	Litsea aestivalis	SC	Known
Boykin's lobelia	Lobelia boykinii	SC	Known
Carolina bird-in-a-nest	Macbridea caroliniana	SC	Known
Crested fringed orchid	Pteroglossaspis ecristata	SC	Known
Bachman's sparrow	Aimophila aestivalis	SC	Possible

4

1

Kirtland's Warbler	Dendroica kirtlandii	E	
Henslow's sparrow	Ammodramus henslowii	SC	Possible
Red knot	Calidris canutus	C	Possible
Black-throated green warbler	Dendroica virens	SC	Possible
Swallow-tailed kite	Elanoides forficatus forficatus	SC	Known
American kestrel	Falco sparverius	SC	Possible
American oystercatcher	Haematopus palliatus	SC	Known
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Black rail	Laterallus jamaicensis	SC	Possible
Painted bunting	Passerina ciris ciris	SC	Possible
Gull-billed tern	Sterna nilotica	SC	Known
Bluebarred pygmy sunfish	Elassoma okatie	SC	Known
Southern hognose snake	Heterodon simus	SC	Possible
Island glass lizard	Ophisaurus compressus	SC	Known
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known
Blueback herring	Alosa aestivalis*	SC	Known

DORCHESTER COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Wood stork	Mycteria Americana	E	Possible
Red-cockaded woodpecker	Picoides borealis	E	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Possible
Pondberry	Lindera melissifolia	E	Known
Canby's dropwort	Oxypolis canbyi	E	Possible
Bog asphodel	Narthecium americanum	C	Known
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Gopher frog	Rana capito	SC	Known
Chapman's sedge	Carex chapmanii	SC	Known
Angiosperm (no common name)	Elytraria caroliniensis	SC	Known
Savannah or Piedmont cowbane	Oxypolis ternate	SC	Known
Pineland plantain	Plantago sparsiflora	SC	Known

5

1

False coco	Pteroglossaspis ecristata	SC	Known
Least trillium	Trillium pusillum var. pusillum	SC	Known
Bachman's sparrow	Aimophila aestivalis	SC	Possible
Henslow's sparrow	Ammodramus henslowii	SC	Known
Black-throated green warbler	Dendroica virens	SC	Possible
Swallow-tailed kite	Elanoides forficatus forficatus	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Swainson's warbler	Limnothlypis swainsonii	SC	Known
Painted bunting	Passerina ciris ciris	SC	Possible
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known
Southeastern myotis	Myotis austroriparius	SC	Known
Gopher tortoise	Gopherus polyphemus	SC	Known
Southern hognose snake	Heterodon simus	SC	Possible
Blueback herring	Alosa aestivalis*	SC	Known

FAIRFIELD COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Carolina heelsplitter	Lasmigona decorate	E	Possible
Georgia aster	Aster georgianus	C	Known
Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
Bachman's sparrow	Aimophila aestivalis	SC	Possible
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Carolina darter	Etheostoma collis	SC	Known

HAMPTON COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Red-cockaded woodpecker	Picoides borealis	E	Known
Wood stork	Mycteria Americana	E	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Known

6

1

Canby's dropwort	Oxypolis canbyi	E	Known
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Gopher frog	Rana capito	SC	Known
Chapman's sedge	Carex chapmanii	SC	Known
Angiosperm (no common name)	Elytraria caroliniensis	SC	Known
Boykin's lobella	Lobelia boykinii	SC	Known
Carolina bogmint	Macbridea caroliniana	SC	Known
False coco	Pteroglossaspis ecristata	SC	Known
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
Swallow-tailed kite	Elanoides forficatus forficatus	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Painted bunting	Passerina ciris ciris	SC	Possible
Bluebarred pygmy sunfish	Elassoma okatie	SC	Known
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known
Southern hognose snake	Heterodon simus	SC	Possible
Northern pine snake	Pituophis melanoleucus melanoleucus	SC	Known
Blueback herring	Alosa aestivalis*	SC	Known

LANCASTER COUNTY

Common Name	Scientific Name	Status	Occurrence
Carolina heelsplitter	Lasmigona decorate	E, CH	Known
Little amphianthus	Amphianthus pusillus	T	Known
Smooth coneflower	Echinacea laevigata	E	Known
Schweinitz's sunflower	Helianthus schweinitzii	E	Known
Black-spored quillwort	Isoetes melanospora	E	Known
Dwarf aster	Aster mirabilis	SC	Possible
Sandhills milkvetch	Astragalus michauxii	SC	Known
Shoals spider-lily	Hymenocallis coronaria	SC	Known
Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
Loggerhead shrike	Lanius ludovicianus	SC	Possible

7

1

Brook floater	Alasmidonta varicosa	SC	Known
Blueback herring	Alosa aestivalis*	SC	Known

LEXINGTON COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Carolina heelsplitter	Lasmigona decorate	E	Possible
Red-cockaded woodpecker	Picoides borealis	E	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Possible
Smooth coneflower	Echinacea laevigata	E	Possible
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Dwarf aster	Aster mirabilis	SC	Possible
Shoal's spider-lily	Hymenocallis coronaria	SC	Known
Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
Piedmont cowbane	Oxypolis ternate	SC	Known
Wire-leaved dropseed	Sporobolus teretifolius	SC	Known
Pickering's morning-glory	Stylisma pickeringii var. pickeringii	SC	Known
Rayner's blueberry	Vaccinium crassifolium ssp sempervirens	SC	Known
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Painted bunting	Passerina ciris ciris	SC	Possible
Southern hognose snake	Heterodon simus	SC	Possible
Blueback herring	Alosa aestivalis*	SC	Known

ORANGEBURG COUNTY

Common Name	Scientific Name	Status	Occurrence
Bald eagle	Haliaeetus leucocephalus	T	Known
Red-cockaded woodpecker	Picoides borealis	E	Known
Flatwoods salamander	Ambystoma cingulatum	T	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Known
Canby's dropwort	Oxypolis canbyi	E	Known
Southern Dusky	Desmognathus auriculatus	SC	Possible

8

1

Salamander			
Gopher frog	Rana capito	SC	Known
Incised groovebur	Agrimonia incise	SC	Known
Wagner's spleenwort	Asplenium heteroresiliens	SC	Known
Pondspice	Litsea aestivalis	SC	Known
Boykin's lobelia	Lobelia boykinii	SC	Known
Carolina bogmint	Macbridea caroliniana	SC	Known
Awned meadowbeauty	Rhexia aristosa	SC	Known
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Painted bunting	Passerina ciris ciris	SC	Possible
Buff-breasted sandpiper	Tryngites subruficollis	SC	Possible
Southeastern myotis	Myotis austroriparius	SC	Known
Florida pine snake	Pituophis melanoleucus mugitus	SC	Known
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known
Blueback herring	Alosa aestivalis*	SC	Known

RICHLAND COUNTY

Common Name	**Scientific Name**	**Status**	**Occurrence**
Bald eagle	Haliaeetus leucocephalus	BGEPA	Known
Wood stork	Mycteria Americana	E	Possible
Red-cockaded woodpecker	Picoides borealis	E	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Known
Smooth coneflower	Echinacea laevigata	E	Known
Rough-leaved loosestrife	Lysimachia asperulaefolia	E	Known
Canby's dropwort	Oxypolis canbyi	E	Known
Carolina heelsplitter	Lasmigona decorate	E	Possible
Georgia aster	Aster georgianus	C	Known
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Sandhills milk-vetch	Astragalus michauxii	SC	Known
Purple balduina	Balduina atropurpurea	SC	Known
Shoals spider-lily	Hymenocallis coronaria	SC	Known
Creeping St. John's wort	Hypericum adpressum	SC	Known

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1

Bog spicebush	Lindera subcoriacea	SC	Known
Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
Carolina bogmint	Macbridea caroliniana	SC	Known
Algae-like pondweed	Potamogeton confervoides	SC	known
False coco	Pteroglossaspis ecristata	SC	Known
Awned meadowbeauty	Rhexia aristosa	SC	Known
Reclined meadow-rue	Thalictrum subrotundum	SC	Known
White false-asphodel	Tofieldia glabra	SC	Known
Rayner's blueberry	Vaccinium crassifolium ssp. Empervirens	SC	Known
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Known
Loggerhead shrike	Lanius ludovicianus	SC	Known
Painted bunting	Passerina ciris ciris	SC	Possible
Carolina darter	Etheostoma collis	SC	Known
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known
Southern hognose snake	Heterodon simus	SC	Known
Blueback herring	Alosa aestivalis*	SC	Known

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1

Biological Assessment

U.S. Fish and Wildlife Service

Virgil C. Summer Nuclear Station
Combined License Application

U.S. Nuclear Regulatory Commission Combined License Application
Docket No. 52-027 and 52-028

U. S. Army Corps of Engineers Permit Application
Permit Application No. SAC 2007-1852-SIR (Virgil C. Summer Nuclear Station Units 2 and 3, South Carolina Electric & Gas)

Fairfield County, South Carolina

April 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Charleston District

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from South Carolina Electric & Gas (SCE&G) for combined NRC-authorized construction permits and operating licenses (COLs) to build and operate two Westinghouse Electric Company, LLC (Westinghouse) Advanced Passive 1000 (AP1000) pressurized water reactors (Units 2 and 3) on the site of the Virgil C. Summer Nuclear Station (VCSNS) in Fairfield County, South Carolina. The U.S. Army Corps of Engineers (USACE) is reviewing an application from SCE&G for a Department of the Army (DA) Permit pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344) to perform site-preparation activities to build the reactors and supporting structures. The USACE is cooperating with NRC to prepare an environmental impact statement (EIS) under the National Environmental Policy Act of 1969, as amended, (NEPA) and ensure that the EIS is adequate to fulfill the requirements of USACE regulations; the Clean Water Act Section 404(b)(1) Guidelines, which contain the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into waters of the United States; and the USACE public interest review process. The NRC and the USACE have prepared this biological assessment to support a joint consultation with the U.S. Fish and Wildlife Service (FWS) in accordance with the Endangered Species Act of 1973, as amended (ESA). The USACE permit decision will be made following issuance of the final EIS.

Currently, there is one operating nuclear reactor, Unit 1, on the VCSNS site. Proposed Units 2 and 3 would be located approximately 4700 ft south and 1800 ft west, respectively, of the center of the existing Unit 1 containment building. The VCSNS is situated approximately 26 mi northwest of Columbia, South Carolina.

The USACE and the NRC are conducting a joint consultation and have prepared this biological assessment, which examines the potential impacts of building and operating the proposed Units 2 and 3 at the VCSNS site on threatened or endangered species pursuant to ESA Section 7(c). This biological assessment examines the effects of the proposed action on the Federally endangered species presented in Table 1-1, which are known to occur in the counties in South Carolina that include the VCSNS site or would be crossed by the proposed transmission system required to transmit power from the proposed new units. The proposed transmission routes are shown in Figure 1-1.

Table 1-1. Federally Listed Species Known to Occur in Counties That Include VCSNS Site and Vicinity or That Would Be Crossed by Proposed Transmission Lines

Scientific Name	Common Name	Legal Status	County
Birds			
Charadrius melodus	Piping plover	T	Colleton
Mycteria americana	Wood stork	E	Aiken, Bamberg, Colleton, Dorchester, Hampton, Newberry, Richland
Picoides borealis	Red-cockaded woodpecker	E	Aiken, Bamberg, Calhoun, Chester, Colleton, Dorchester, Hampton, Lexington, Orangeburg, Richland, Saluda
Amphibians			
Ambystoma cingulatum	Flatwoods salamander	T	Orangeburg
Mollusks			
Lasmigona decorata	Carolina heelsplitter	E	Chester, Fairfield, Lancaster, Richland, Newberry, Saluda, Lexington
Vascular Plants			
Amphianthus pusillus	Pool sprite	T	Lancaster, Saluda
Aster georgianus	Georgia aster	C	Chester, Fairfield, Richland
Echinacea laevigata	Smooth coneflower	E	Aiken, Lancaster, Lexington, Richland
Helianthus schweinitzii	Schweinitz's sunflower	E	Lancaster
Isoetes melanospora	Black-spored quillwort	E	Lancaster
Lindera melissifolia	Pondberry	E	Dorchester
Lysimachia asperulifolia	Rough-leaved loosestrife	E	Richland
Narthecium americanum	Bog asphodel	C	Dorchester
Oxypolis canbyi	Canby's dropwort	E	Bamberg, Colleton, Dorchester, Hampton, Orangeburg, Richland
Ptilimnium nodosum	Harperella	E	Aiken, Saluda
Trillium reliquum	Relict trillium	E	Aiken

Sources: SCDNR 2006a, FWS 2008a
T = Federal Threatened
E = Federal Endangered
C = Federal Candidate

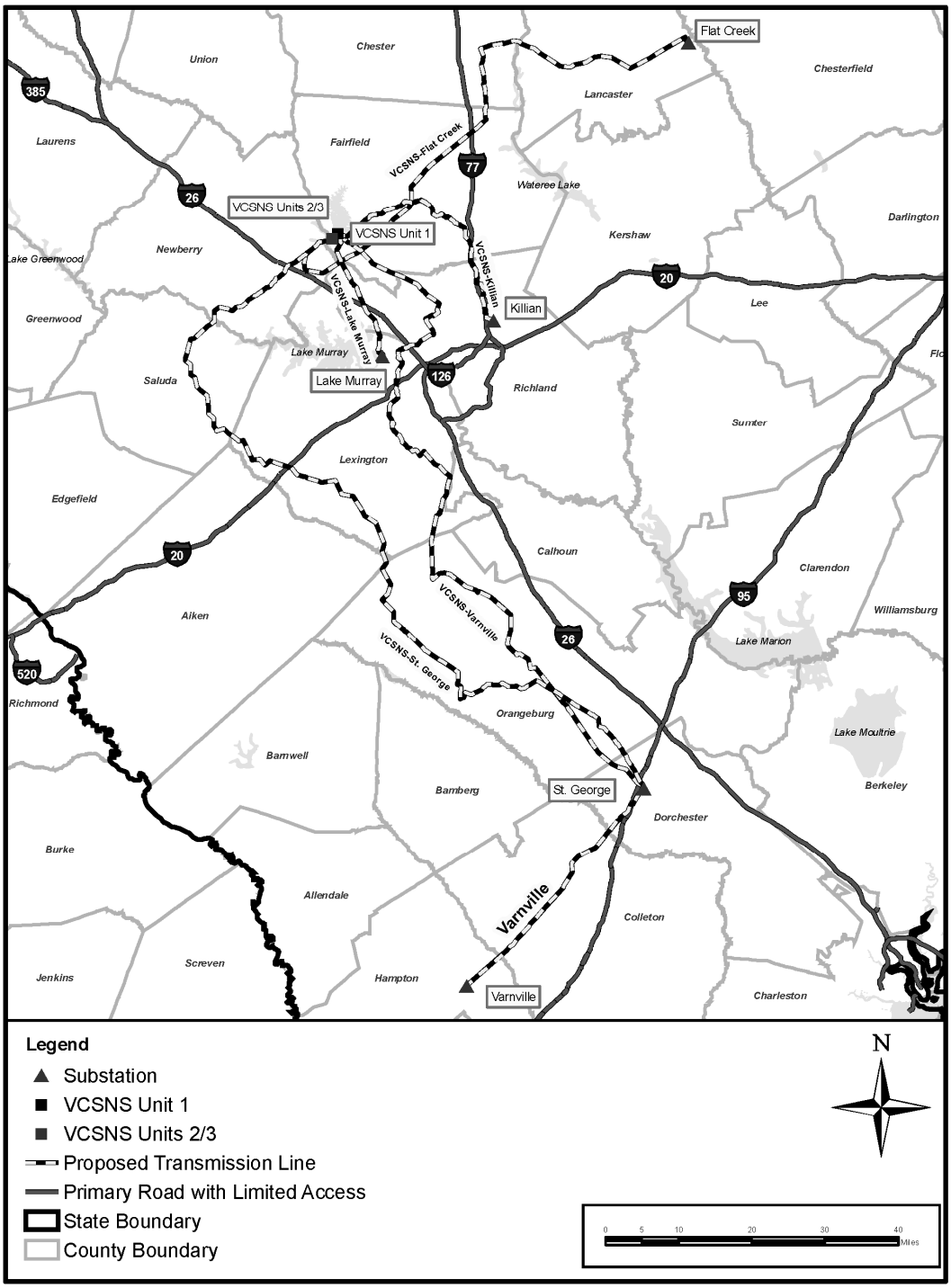

Figure 1-1. VCSNS Units 2 and 3 Potentially Affected Transmission-Line Corridors (SCE&G 2009a)

2.0 VCSNS Site Description

The VCSNS site is located in Fairfield County, South Carolina, approximately 26 mi northwest of Columbia, South Carolina (Figure 2-1). The site is in a sparsely populated, largely rural area, with forests and small farms composing the dominant land use.

2.1 Terrestrial Habitats – Site and Vicinity

The terrestrial communities found on the VCSNS site and vicinity are characteristic of those found in the Southern Outer Piedmont ecoregion (Griffith et al. 2002). The surrounding landscape consists of gently rolling hills and valleys dissected by an abundance of streams. Vegetation communities common in the Southern Outer Piedmont ecoregion include mixed oak forest and oak-hickory-pine forest. The dominant cover types present on the VCSNS site are pine and mixed pine-hardwood forests, with a small portion of hardwood forests associated with steep slopes and stream bottoms (SCE&G 2009a). The VCSNS site is primarily a human-altered system that has changed dramatically since the damming of the Broad River and Frees Creek, which created Parr and Monticello reservoirs, respectively. Wetlands present on the VCSNS site are typical of those found in the South Carolina Piedmont and include both palustrine (marshes, bogs, fens, etc.) and lacustrine (on the shores of lakes and/or reservoirs) wetlands. Most of the wetlands are forested and are associated with small streams, seeps, and beaver ponds (SCE&G 2009a).

Terrestrial wildlife species found on the VCSNS site are typical of those found in the Southern Outer Piedmont ecoregion of South Carolina. A variety of species inhabit the forested, wetland, and open water habitats present, including amphibians, reptiles, birds, and mammals. Recent biological surveys of the site have been conducted in support of VCSNS Unit 1 license renewal (SCE&G 2002) and more recently to provide information regarding potential occurrences of threatened and/or endangered species on the VCSNS site (Tetra Tech NUS, Inc. 2008, 2009; Nelson 2006, 2007). Informal observations of wildlife and vegetation were made and noted during those surveys. Ecological monitoring data collected in the early 1970s to mid-1980s were also reviewed to provide additional information regarding the wildlife likely to be observed on the VCSNS site and vicinity. The proposed project site for VCSNS Units 2 and 3 is within the current VCSNS Unit 1 plant boundary just south of existing Unit 1, in an area that was cleared and used for storage, spoils disposal, and laydown areas during the building of Unit 1 (SCE&G 2009a).

2.2 Aquatic Habitats – Site and Vicinity

The major aquatic environments within the vicinity of proposed VCSNS Units 2 and 3 include the Broad River, Monticello and Parr reservoirs, and Mayo Creek. Mayo Creek is the largest stream within the site vicinity and it receives drainage from several small seasonal tributary channels. The Monticello and Parr reservoirs are the largest waterbodies near the site (Figure 2-2).

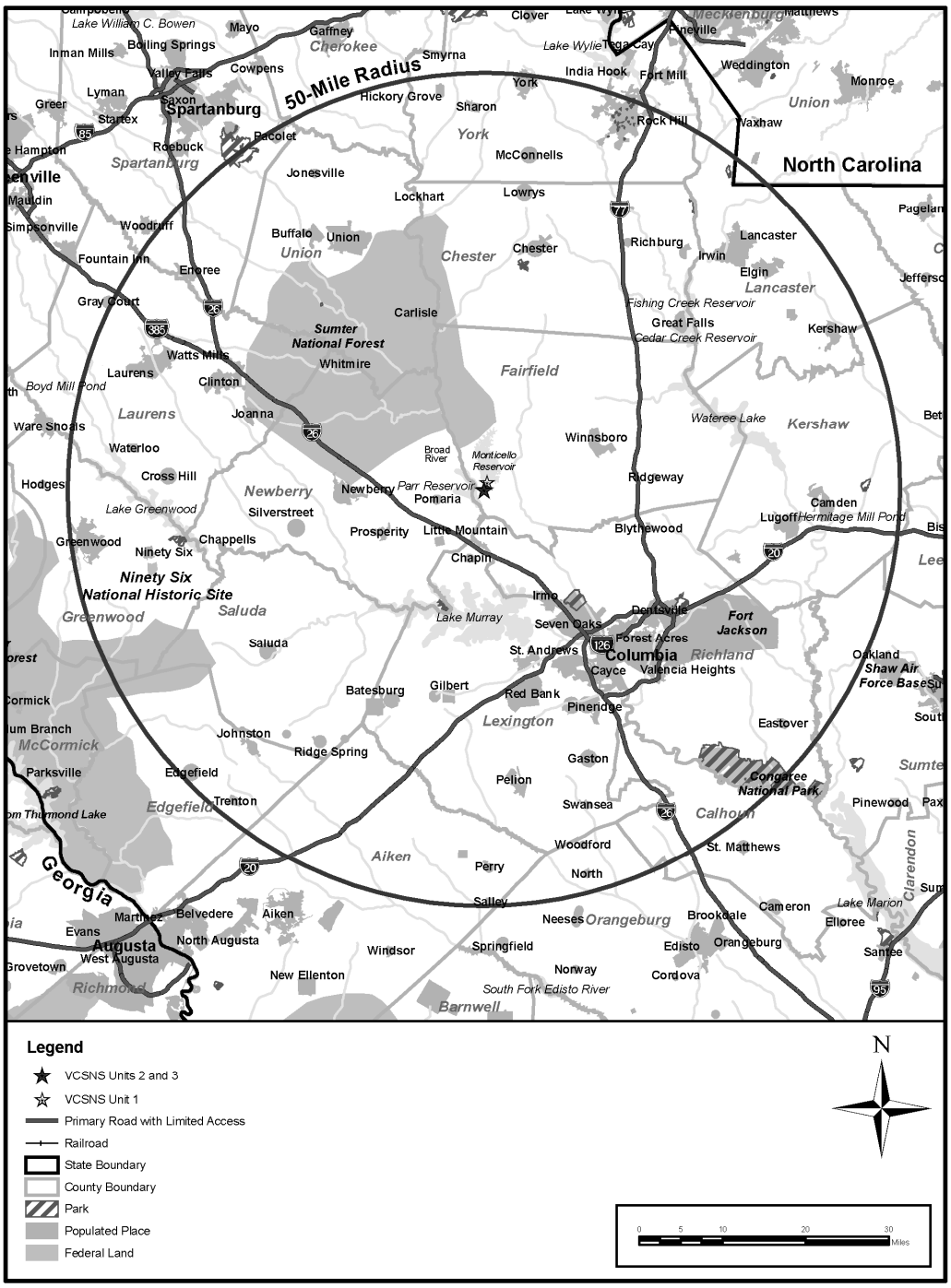

Figure 2-1. VCSNS Site Location in Relationship to the Counties and Cities Within a 50-Mi Radius of the Site (SCE&G 2009a).

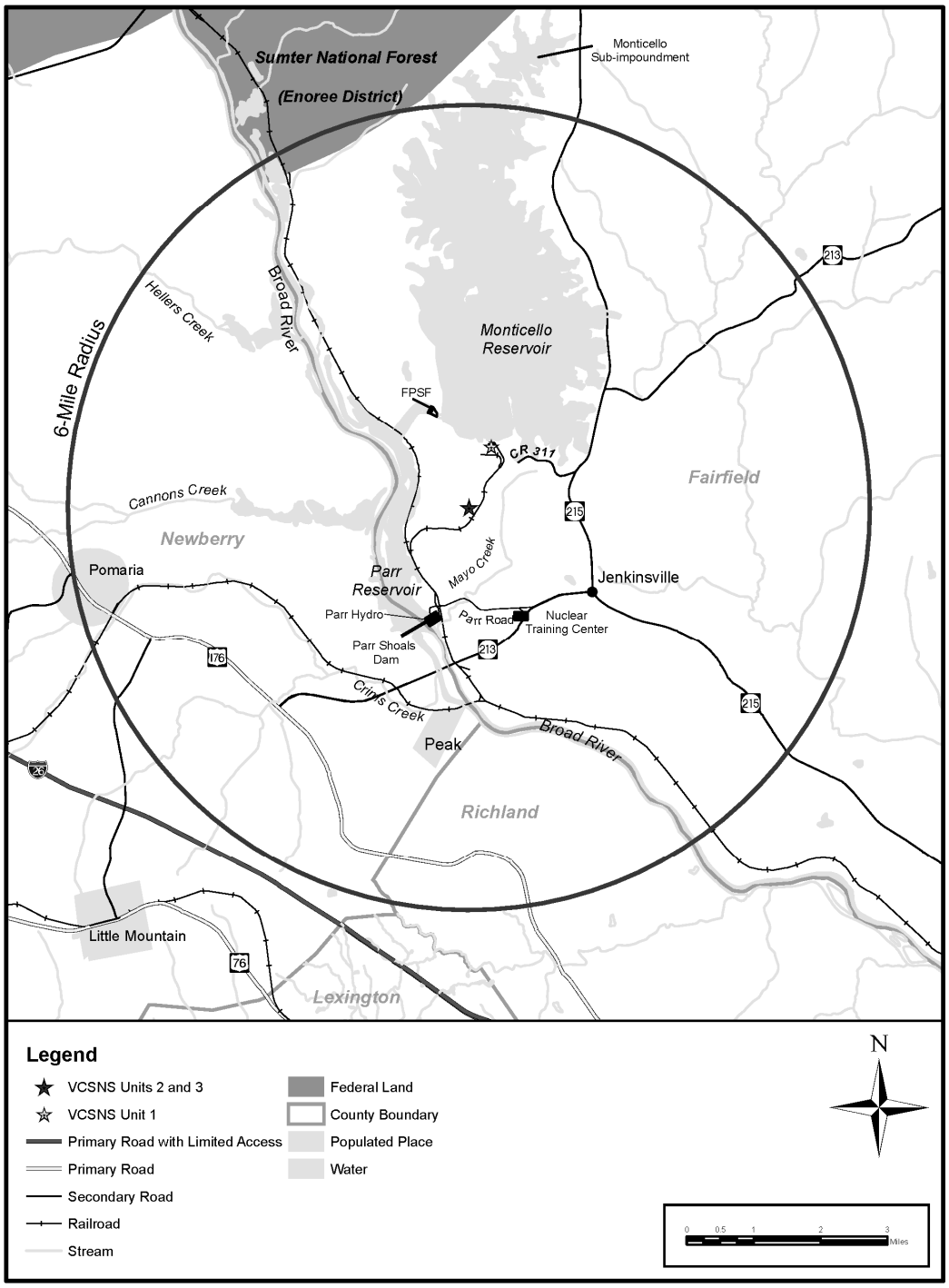

Figure 2-2. Map of the VCSNS Site and Vicinity Within a 6-Mi Radius (SCE&G 2009a).

2.2.1 Broad River

The Broad River basin encompasses approximately 2400 mi^2 and 27 watersheds within the State of South Carolina and includes almost 2800 mi of streams and more than 14,500 ac of lakes. The basin falls within the boundaries of seven counties in the state: Cherokee, Spartanburg, York, Union, Chester, Fairfield, and Richland (SCDHEC 2007). Within the State of South Carolina, the Broad River basin is entirely within the Piedmont ecoregion. The Piedmont is characterized by gently rolling to hilly terrain, with relatively confined stream valleys, and elevations ranging from 375 to 1000 ft above mean sea level. Major tributaries of the Broad River basin include the Tyger and Enoree rivers, which intersect the Broad River from the west (SCE&G 2009a). Of the 1.5 million ac associated with the basin, more than 60 percent are forested, with approximately 24 percent used for agriculture, and less than 10 percent classified as urban development (SCDHEC 2007). As shown in Figure 2-2, the Broad River flows south along the Sumter National Forest and flows to the west of the VCSNS site. A run-of-the-river impoundment along the Broad River near the vicinity of the VCSNS forms the Parr Reservoir.

2.2.2 Parr Reservoir

As described by SCE&G (2009a), the Parr Reservoir was created in 1914 by installing a 2000-ft-long dam across the Broad River at Parr Shoals (Figure 2-2). The purpose of the dam was to provide a pool for the original Parr Hydroelectric Generating Station (or Parr Hydroelectric Plant). Before 1977, the surface area of the reservoir was 1850 ac. In 1977, the reservoir level was raised 9 ft, which increased the surface area to approximately 4400 ac, to accommodate the operation of the Fairfield Pumped Storage Facility (FPSF) (SCE&G 2009a). Parr Reservoir is approximately 7 mi long and has an average water depth of 15 ft (SCE&G 2009a). Because of the operation of the FPSF, hydrologic patterns in the Parr Reservoir are variable. Generally, water from the Monticello Reservoir is released through the FPSF into Parr Reservoir throughout the day and early evening to provide hydroelectric power at Parr Shoals Dam, resulting in a net southward flow in Parr Reservoir. During the night, when electrical demand is lower, water from Parr Reservoir is pumped upward into the Monticello Reservoir, reversing the flow to the north in Parr Reservoir (SCE&G 2009a).

Water-quality monitoring was performed at an upstream site, above the intake/discharge canal for the FPSF and at a downstream site in the forebay near the Parr Shoals Dam. According to South Carolina Department of Health and Environmental Control (SCDHEC 2007) water-monitoring results, water conditions were not optimal to support aquatic life at these two stations on Parr Reservoir. The total phosphorus concentrations at the upstream site above the intake/discharge canal for the FPSF were found to exceed the standards for supporting optimal use by aquatic life. At the downstream site, elevated copper concentrations were deemed to exceed the aquatic life criterion, and therefore were not optimal to support aquatic life at this site (SCDHEC 2007).

Between 2006 and 2009, SCE&G conducted intermittent inventories of fish community composition near the vicinity of the VCSNS site near the proposed discharge location (see Figure 2-3). Sampling efforts used a combination of boat electrofishing, gillnets, and hoop nets and documented 28 species of fish in Parr Reservoir. Gizzard shad (*Dorosoma cepedianum*) was the most abundant species, representing over 18 percent of the total catch, with bluegill (*Lepomis macrochirus*), threadfin shad (*D. petenense*), channel catfish (*Ictalurus punctatus*), and white perch (*Morone americana*) also caught in abundance (data derived from Normandeau 2007, 2008, 2009; Quattlebaum 2008a).

To examine the benthic community in Parr Reservoir, Carnagey Biological Services (CBS) collected benthic invertebrates near the proposed location of the discharge structure for Units 2 and 3 (approximately 1 km upstream of Parr Shoals Dam) and at an upstream control station approximately 9 km upstream of Parr Shoals Dam. Sediments were characterized as sandy. Seasonal (e.g., quarterly) monitoring occurred for 1 year between 2008 and 2009 (CBS 2008a, c, 2009c, d). The bioassessment metrics included taxa richness, various biotic indices (e.g., Ephemeroptera, Plecoptera, and Trichoptera [EPT] index, North Carolina biotic index), and comparisons of functional groups and abundances described by Plafkin et al. (1989) in *Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish*. The survey efforts yielded at least 22 different taxa from 8 orders. The Asian clam (*Corbicula fluminea*) and a species of pea clam (family Sphaeriidae) were the only mollusks collected during these benthic surveys (CBS 2008a, c, 2009c, d).

2.2.3 Monticello Reservoir

The Monticello Reservoir was formed in 1977 by damming Frees Creek, a small tributary of the Broad River that flowed into Parr Reservoir approximately 1 mi upstream from the Parr Shoals Dam SCE&G (2009a). The reservoir is hydraulically connected to the Parr Reservoir via the FPSF and it serves both as an upper pool for the FPSF and as a cooling pond for VCSNS Unit 1 (NRC 2004) (Figure 2-2). To the northeast, the reservoir contains a subimpoundment (Figure 2-4), which is a 300-ac area owned by SCE&G and co-managed by SCE&G and the South Carolina Department of Natural Resources (SCE&G 2009a; SCDNR 2002) The Monticello Reservoir, excluding the subimpoundment, is approximately 6 mi long and has a total surface area of 6500 ac. The average water depth is 59 ft and the maximum depth is approximately 126 ft (SCE&G 2009a).

Between 2000 and 2004, the SCDHEC evaluated the water quality in the Broad River basin to assess the overall health and condition of aquatic areas throughout the basin. Three stations within Monticello Reservoir (excluding the subimpoundment) were assessed for dissolved oxygen, pH, turbidity, chemicals, and nutrients. Benzoic acid, cadmium, nickel, chromium, copper, zinc, bis(n-octyl) phthalate, and derivatives of pesticides were detected in the sediment samples. Despite the occurrence of these chemical constituents, recreational use was not restricted and water conditions were considered optimal for aquatic life near these stations (SCDHEC 2007).

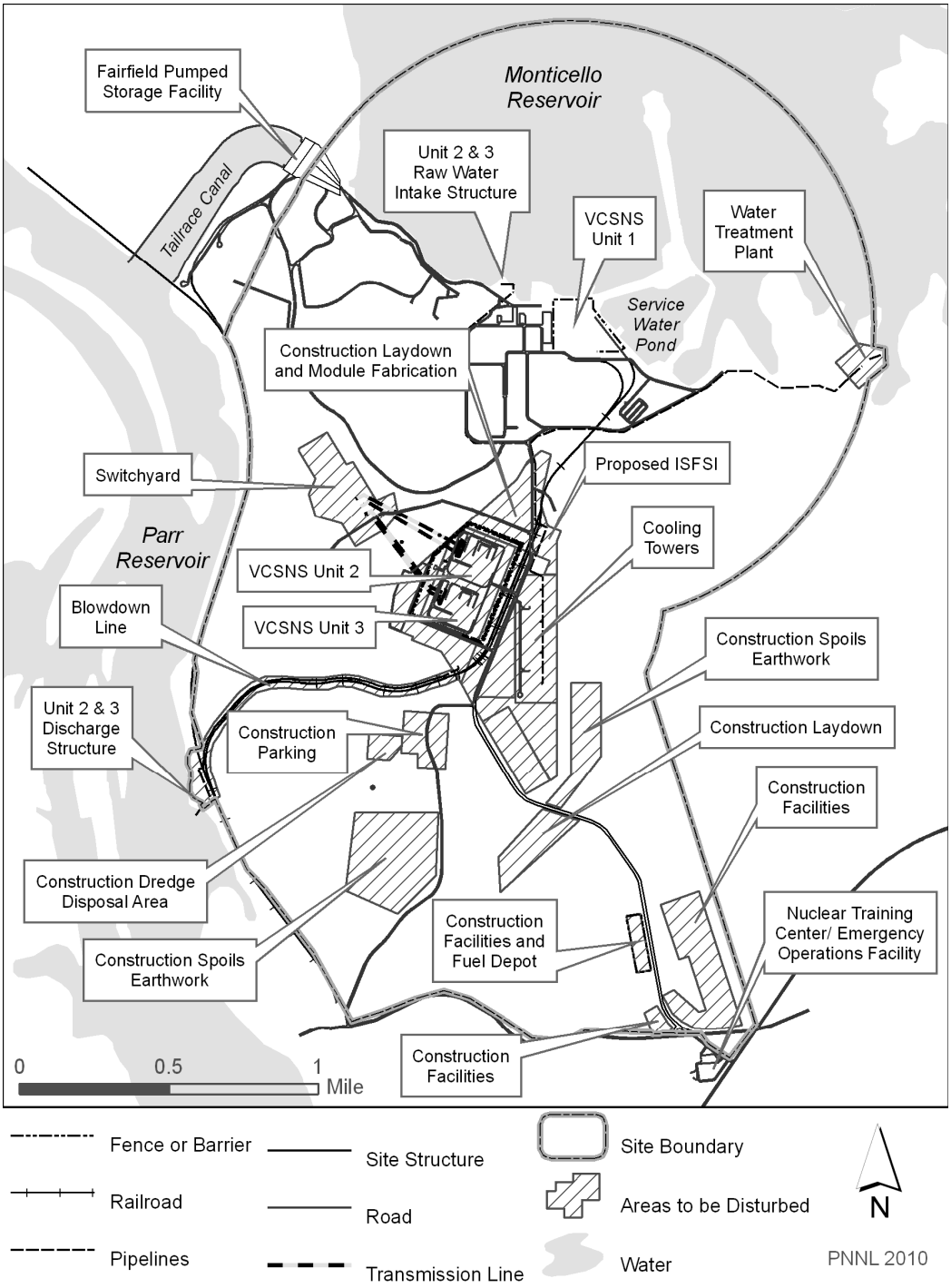

Figure 2-3. SCE&G's Proposed Location for VCSNS Units 2 and 3

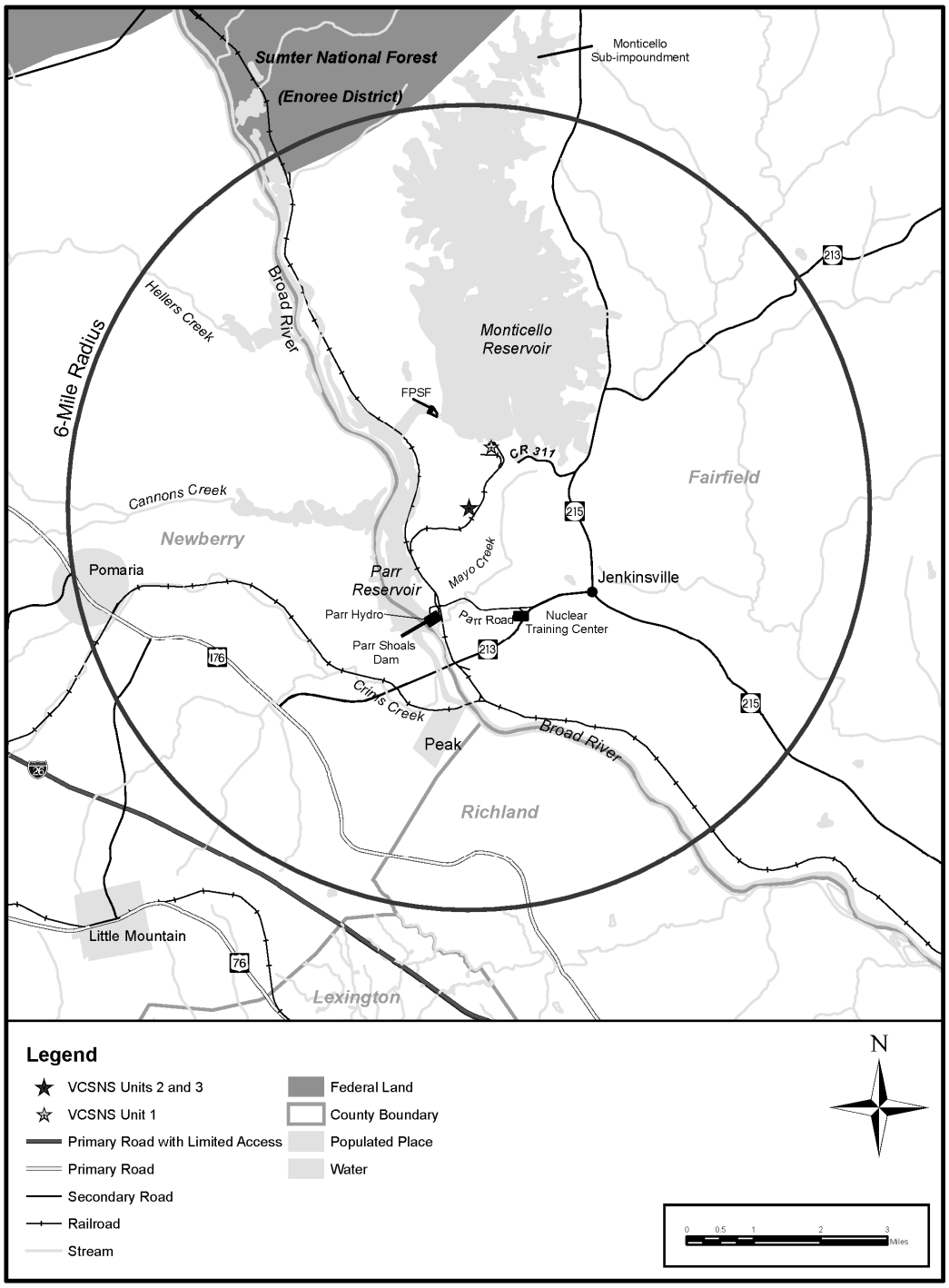

Figure 2-4. Map of the VCSNS Site and Vicinity Within the 6-Mi Radius (SCE&G 2009a)

Between 2006 and 2009, SCE&G initiated inventories of fish community composition near the vicinity of the VCSNS site. The sampling effort used a combination of boat electrofishing, gillnets, and hoop nets and documented 24 fish species in Monticello Reservoir, excluding the subimpoundment. The most predominant species captured in the Monticello Reservoir between 2006 and 2009 included bluegill (29 percent of the total catch), gizzard shad (25 percent), blue catfish (*Ictalurus furcatus*) (13 percent), and white perch (10 percent) (Normandeau 2007, 2008, 2009).

To examine the benthic community in Monticello Reservoir, CBS collected macroinvertebrate samples at three stations in the reservoir. The reference station was located approximately 3 mi northwest of the VCSNS site. Two additional stations were located at the south end of the reservoir near the proposed Units 2 and 3 water-treatment intake and raw-water intake structures, respectively (CBS 2009d). Sediments were characterized as a mixture of sand and clay. Seasonal (e.g., quarterly) monitoring occurred from July 2008 to April 2009 (CBS 2008a, c, 2009c, d). Results were evaluated using a combination of bioassessment metrics and analyzed using statistical comparison techniques. The survey efforts yielded at least 15 different taxa from 11 orders (CBS 2008a, c, 2009c, d). The Asian clam, the eastern elliptio (*Elliptio complanata*), and the eastern floater (*Pyganodon cataracta*) were the only mollusks collected during these benthic surveys (CBS 2008a, c, 2009c, d).

2.2.4 Onsite Streams

There are 49,288 linear feet of streams within the VCSNS site boundary. Most onsite streams are seasonal. Mayo Creek is the primary perennial stream located on the VCSNS site. Tetra Tech NUS, Inc. (2007) describes Mayo Creek as a typical Piedmont stream characterized by flowing through a mixed hardwood forest, almost completely shaded by tree canopy. The creek originates 0.5 mi southeast of VCSNS Unit 1 and flows approximately 3.6 mi southwest before draining into the Broad River, downstream of the Parr Shoals Dam (Figure 2-2). The Mayo Creek drainage area is approximately 6 mi^2 and encompasses mixed hardwood forests that may mitigate surface-water temperatures during warm summer months (Tetra Tech NUS, Inc. 2007; SCE&G 2009a). In addition to Mayo Creek, there are intermittent and seasonal stream channels within the VCSNS site vicinity. Mayo Creek is characterized by sandy sediments in pools along small tributaries, and gravel/cobble mixture on sand in stream locations with well-developed canopy with riffle-run habitats (Tetra Tech NUS, Inc. 2009).

The results of water-quality parameters measured in conjunction with four seasonal sampling events that occurred between July 2006 and July 2009 indicate that all sampling stations in Mayo Creek met the SCDHEC quality standards for temperature and dissolved oxygen in freshwater habitats (Tetra Tech NUS, Inc. 2007, 2009; Quattlebaum 2008b; CBS 2008b, 2009a, b). The SCDHEC freshwater classification standards, which are approved by the U.S. Environmental Protection Agency (EPA) (in accordance with Section 303(c) of the Clean Water

Act and Title 40 of the Code of Federal Regulations [CFR] Part 131), indicate the suitability of a waterbody for various purposes including the sustainability of aquatic biota (SCDHEC 2004).

Fish surveys were conducted in Mayo Creek throughout the lower, middle, and upper stream segments and within a tributary channel of the creek. Methods for fish sampling included minnow traps and backpack electrofishing over sampling transects ranging from166 to 205 ft (Tetra Tech NUS, Inc. 2007, 2009; Quattlebaum 2008b). A total of 16 taxa were sampled during the 2006–2009 fish surveys. Predominant species included yellowfin shiner (*Notropis lutipinnis*), bluehead chub (*Nocomis leptocephalus*), sandbar shiner (*Notropis scepticus*), and redbreast sunfish (*Lepomis auritus*) the predominant species.

Benthic macroinvertebrates were sampled seasonally from three stations in Mayo Creek between July 2008 and April 2009. The intent of the assessments was to evaluate the community of macroinvertebrates and assess stream conditions (CBS 2008b, d, 2009a, b). The first station was the most upstream site sampled on Mayo Creek and located approximately 1 mi upstream of Parr Road. The second site was approximately 0.12 mi upstream of Parr Road on Mayo Creek, and the third station was located 164 ft downstream of Parr Road (CBS 2009b). Results were evaluated using a combination of bioassessment metrics and analyzed using statistical comparison techniques. During the survey efforts at least 43 taxa were encountered, representing 14 orders. The Asian clam was the only mollusk collected during the CBS sampling efforts (CBS 2008b, d, 2009a, b), and only Asian clam shells were collected during the fish and mussel surveys in 2009 by Tetra Tech NUS, Inc. (2009).

2.3 Terrestrial and Aquatic Habitats − Transmission Line Corridors

The delivery of power associated with VCSNS Units 2 and 3 would require upgrading existing transmission-line corridors and installing new corridors, transmission lines, and substations. Two entities, SCE&G and Santee Cooper (the State-owned electric and water utility, formally called the South Carolina Public Service Authority), are responsible for identifying the proposed locations associated with new and upgraded transmission lines. In total, six new 230-kV lines are proposed for the transmission of electricity associated with proposed VCSNS Units 2 and 3. The six new lines cover five proposed corridors that occur in the Southern Outer Piedmont, Sandhills and Coastal Plain ecoregions, and span areas containing only freshwater features with no marine waters (FP&S 2008; MACTEC 2008). Systematic terrestrial and aquatic surveys were not included as part of the transmission-line site-selection process. In the absence of empirical data, reconnaissance-level information pertaining to species designated as endangered or threatened associated with the counties in which the transmission lines would occur was derived from the FWS records (FWS 2008a) and the South Carolina Heritage Trust Program (SCDNR 2006a).

3.0 Proposed Federal Actions

The proposed Federal actions are NRC's issuance of two COLs for the construction and operation of two new nuclear reactors at the VCSNS site pursuant to 10 CFR Part 52 and the USACE's issuance of a DA permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899.

Prerequisites to certain NRC-authorized construction activities include, but are not limited to, documentation of existing site conditions within the VCSNS site and acquisition of the necessary permits (e.g., COL, local building permits, a National Pollutant Discharge Elimination System [NPDES] permit [40 CFR Part 122], a Clean Water Act Section 404 permit, a General Stormwater Permit, and other State and local permits). After these prerequisites are completed, planned building activities could proceed and would include all or some of the activities pursuant to 10 CFR 50.10(e)(1). Following building, the planned operation of the new reactors would be authorized if the Commission finds, under 10 CFR 52.103(g), that all acceptance criteria in the COLs are met.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" to the activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erecting support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this biological assessment; they are being discussed together as construction activities in this Section 7 consultation.

The USACE regulatory program was originally established pursuant to the Rivers and Harbors Appropriation Acts of 1890 (superseded) and 1899 (33 USC Sec. 401 et seq.). Various sections establish permit requirements to prevent unauthorized obstruction or alteration of any navigable water of the United States, with the most frequently exercised USACE authority contained in Section 10 (33 USC Sec. 403). This section covers construction, excavation, or deposition of materials in, over, or under such waters, or any work that would affect the course, location, condition, or capacity of those waters. In 1972 and in 1977, amendments to the Federal Water Pollution Control Act (FWPCA), known as the Clean Water Act, added "Section 404" authority (33 USC Sec. 1344) authorizing the USACE to issue permits for the discharge of material into waters of the United States at specified disposal sites. Selection of such sites must be in accordance with guidelines developed by the EPA in conjunction with the DA. These guidelines

are known as the 404(b)(1) Guidelines for the specification of disposal sites for dredged or fill material. The discharge of all other pollutants into waters of the United States is regulated under Section 402 of the FWPCA.

Briefly, the construction and operation activities that could affect the protected terrestrial and freshwater species based on habitat affinities and life-history characteristics, and the nature and spatial and temporal considerations of the activity are as follows:

- Terrestrial
  - Construction
    - Onsite clearing, grading, and other site-preparation and construction activities
    - Clearing for expansion of existing transmission-line corridors
    - Clearing for new transmission-line corridors
    - Installation of new or upgraded transmission lines and towers
  - Operation
    - Vegetation control in transmission-line corridors
    - Transmission line repairs or upgrades

- Aquatic
  - Construction
    - Installation of raw-water intake and water-treatment intake in Monticello Reservoir
    - Installation of cooling-water blowdown discharge structure in Parr Reservoir
    - Preparation of stormwater ponds
    - Filling of headwater tributary to Mayo Creek
    - Clearing for expansion of existing transmission-line corridors
    - Clearing for new transmission-line corridors
    - Installation of new or upgraded transmission lines and towers
  - Operation
    - Impingement and entrainment of organisms at raw-water and water-treatment intakes in Monticello Reservoir
    - Discharge plume from the cooling-water system (thermal, chemical, and physical effects)
    - Vegetation control in transmission-line corridors
    - Transmission-line repairs or upgrades.

3.1 Impacts from Construction and Operation Onsite

The impacts from the proposed construction and operation on onsite terrestrial and aquatic resources were assessed, as described in the following sections.

3.1.1 Terrestrial

Impacts on terrestrial resources on the VCSNS site would include loss of habitat (temporary and permanent), presence of humans, heavy equipment operation, traffic, noise, avian collisions, outdoor lighting, and fugitive dust. These activities would likely displace or destroy wildlife that inhabits the development areas. Larger and more mobile animals would likely flee the area, while less mobile animals such as reptiles, amphibians, and small mammals would be at greater risk of incurring mortality. Although the surrounding forest and wetland habitat would be available for displaced animals, the movement of wildlife into surrounding areas would increase competition for available space and could result in increased predation and decreased fecundity for certain species. These conditions could lead to a temporary localized reduction in population size for particular species. When site preparation and construction activities are completed, species that can adapt to disturbed or developed areas may readily re-colonize portions of the site where suitable habitat remains, is replanted, or restored.

The construction footprint for proposed Units 2 and 3 and all associated facilities would encompass approximately 490 ac within the plant boundary (SCE&G 2009a). Approximately 137 ac outside the plant boundary would be used for temporary facilities, laydown areas, and spoils-disposal areas (SCE&G 2009a). Approximately 120 ft of shoreline on the Parr Reservoir would be temporarily disturbed to install the blowdown discharge structure, and installation of the raw- (makeup-) water intake from Monticello Reservoir would temporarily disturb approximately 175 ft of shoreline (SCE&G 2009a). In addition, approximately 1916 ac of new transmission-line corridor land would be cleared of forest and planted with grass to accommodate the proposed six new 230-kV transmission lines. No Federally listed threatened or endangered species are known to occur in, or are likely to inhabit, the affected or directly adjoining habitats.

SCE&G stated it would develop and follow a Construction Environmental Controls Plan, which would include compliance with applicable local, State, and Federal ordinances, laws, etc., to prevent or minimize potential impacts (SCE&G 2009a). Other environmental-management controls, such as meeting the requirements of existing permits and use of best management practices (BMPs), would be implemented through existing SCE&G VCSNS procedures and modified as necessary. The plan would cover topics such as protection of sensitive resources, stormwater management, erosion and sediment control, noise and vibration, air quality (fugitive dust), spill prevention and response, and cleanup and restoration. In addition, all construction personnel would be required to take environmental awareness training covering the aforementioned topics prior to being allowed to work onsite (SCE&G 2009a).

No areas designated as critical habitat for endangered species exist at the VCSNS site (NRC 2004). SCE&G conducted surveys for threatened and endangered species at the VCSNS site and in transmission-line corridors associated with Unit 1 and none were found on the VCSNS site or in the transmission-line corridors (SCE&G 2002; Nelson 2006, 2007). Threatened, endangered, and other special-status species that may occur in the vicinity of the VCSNS site and in proposed associated transmission-line corridors are listed in Table 1-1 (FWS 2008a; SCDNR 2006a).

Impacts on terrestrial communities and species that could result from operation of the proposed units are generally related to either cooling-system operations or transmission-system operations. The operation of the cooling towers transfers heat to the atmosphere in the form of water vapor and can result in icing, fogging, increased humidity, increased noise levels, and the deposition of dissolved solids (i.e., cooling-tower drift). Permanent structures introduce a risk of avian collision mortality. The potential impacts of operating proposed VCSNS Units 2 and 3 on vegetation, birds, and terrestrial, wetland, and shoreline habitats are likely to be minimal.

3.1.2 Aquatic

Potential impacts on aquatic resources are related to reservoir intakes, reservoir discharge, onsite streams, and stormwater management.

3.1.2.1 Monticello Reservoir Intakes

The installation of two water-intake structures on the Monticello Reservoir may affect aquatic biota from dredging activities that may temporarily increase turbidity, siltation, and noise in the vicinity of the construction areas. SCE&G has proposed to install a new raw-water intake structure approximately 1250 ft west of the existing VCSNS Unit 1 intake structure to supply makeup cooling water for Units 2 and 3. Water for plant operations (service water system, makeup and potable, fire protection, and demineralized water systems) would also be derived from Monticello Reservoir, but would be obtained from the water-treatment plant intake structure to be installed approximately 5500 ft east of the existing VCSNS Unit 1 intake structure (Figure 3-1) (SCE&G 2009a). Proposed activities associated with the installation of intake structures include the installation of a sheet-pile cofferdam and the subsequent dewatering of the construction area (SCE&G 2009a). Prior to the installation of the cofferdam, plans include the installation of a turbidity curtain around the perimeter of the installation area (SCE&G 2009a). Turbidity curtains are often used in conjunction with activities that cause increased sedimentation and turbidity and are a tool for implementing BMPs (Francingues and Palermo 2005).

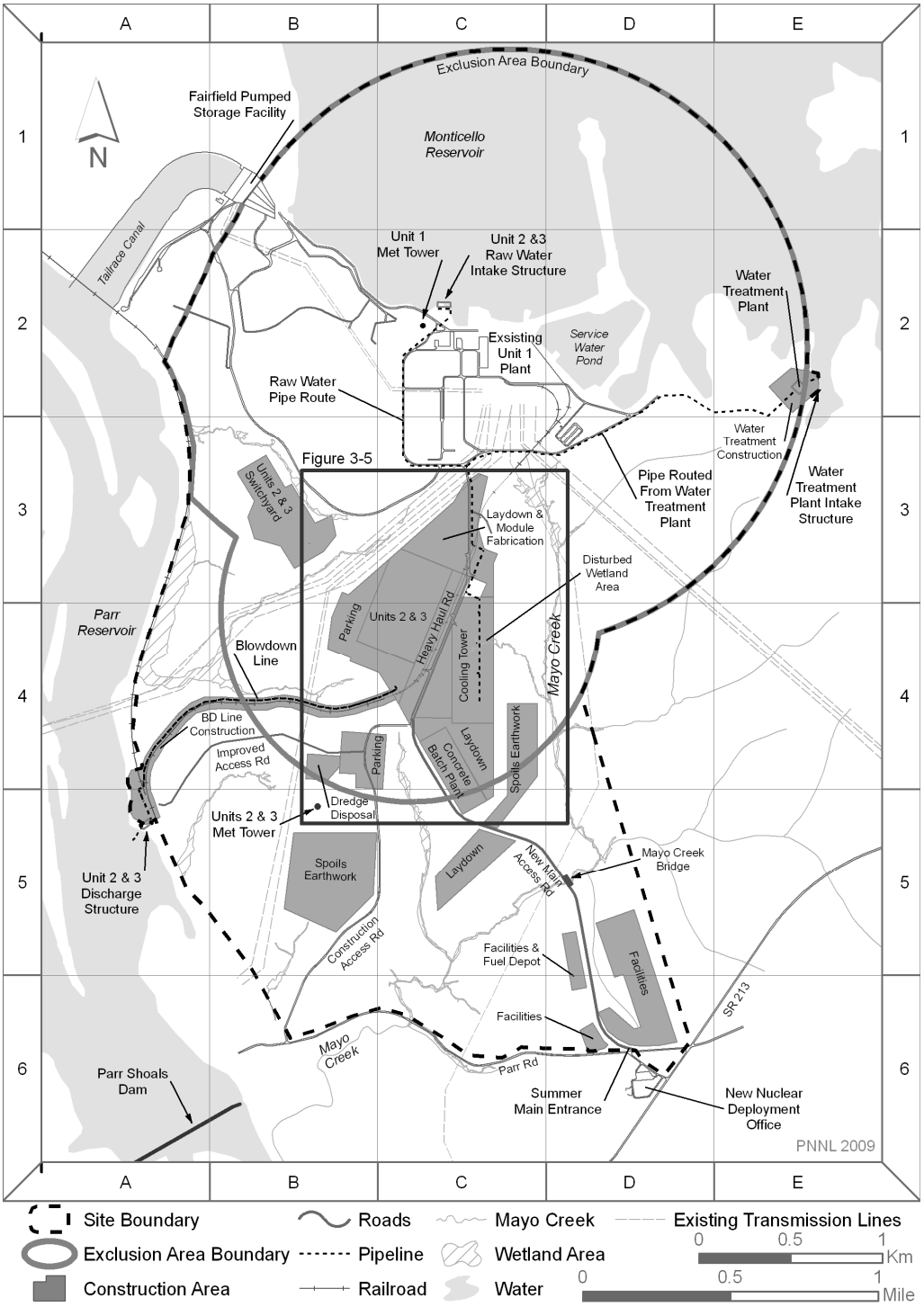

Figure 3-1. Map Showing the Location of Two New Intake Structures in Monticello Reservoir and the Blowdown Line in Parr Reservoir

The intake design through-screen velocity greatly influences the rate of impingement of fish and shellfish at a facility. The higher the through-screen velocity, the greater the number of biota impinged. The EPA has established a national standard for the maximum design through-screen velocity of no more than 0.5 foot per second (fps) (66 FR 65256). Impingement and entrainment impacts from operation of VCSNS Unit 1 were determined to be small during license renewal assessment (NRC 2004). Given that the impingement and entrainment rates for Unit 1 are based on a flow rate of 1190 cubic feet per second (cfs), and the circulating-water system flow rates for Units 2 and 3 would require between 81 and 131 cfs, the reduced flow rates should result in lower impingement rates compared with Unit 1 (SCE&G 2009a, Figure 5-1). Based on the planned low through-screen intake velocity (less than or equal to 0.5 fps), flow rates that are at least 9 times less than those of existing Unit 1, and the high fecundity of the species sampled in the Unit 1 impingement studies, the review team concludes that impacts from impingement of fish related to the proposed VCSNS Units 2 and 3 would be minor.

3.1.2.2 Parr Reservoir Discharge

Installation activities associated with a discharge structure proposed to be located in Parr Reservoir include dredging and pile driving, which can cause noise impacts as well as increased sedimentation and runoff (Figure 3-1). The specifications pertaining to the discharge structure have not been finalized, but the proposed discharge pipe and diffuser line would extend approximately 100 ft from the shoreline into the reservoir and would be stabilized with rip-rap. The diffuser line would contain multiple ports with the discharge points approximately 3 ft above the bottom of the reservoir (SCE&G 2009a). Activities associated with the installation of the blowdown line and discharge structure include pile driving and excavation of the land extending from the uplands to the water's edge to facilitate an adequate slope of the blowdown line (SCE&G 2009a). Preparation and installation of the discharge structure at Parr Reservoir include installation of sedimentation and turbidity control structures such as turbidity curtains and cofferdams, excavation and dredging in the vicinity of the diffuser structure, and disposal of dredged materials (SCE&G 2009a).

Blowdown and other liquid effluent would discharge to Parr Reservoir at a normal discharge flow rate of 21 cfs (assuming four cycles of concentration) and at maximum blowdown temperature of 91.8°F (SCE&G 2009a). Under normal operations with low flow conditions between November and April, the thermal plume would exceed the 5°F difference between ambient and plume temperature if the mixing zone occurs across 10 percent or less of the Parr Reservoir channel. If the mixing zone was extended to 25 percent, the thermal plume differential with ambient water would be less than 5°F. Under extreme 7Q10 (lowest flow for 7 consecutive days expected to occur once per decade) conditions in the summer, none of the scenarios for mixing zone width violate criteria set by SCDHEC to not exceed 90°F, or be more than 5°F above ambient water temperature for the mixing zone (SCDHEC 2008). The flow reversal by FPSF operation is not expected to exceed the results presented above as representative of

extreme flow conditions (see EIS Section 5.2.3.1 for a more detailed discussion). Under the previous extreme assumptions used to assess the extent of the 5°F above ambient isotherm, a mixing zone that would occupy one-half of the Parr Reservoir channel width would still allow motile aquatic biota to avoid the affected mixing zone area. The most abundant fish in Parr Reservoir include gizzard shad, threadfin shad, bluegill, and white perch, which are all prolific spawners (Dames and Moore 1985). Because at least three-quarters of the width of the Parr Reservoir channel would be unaffected by thermal plume impacts, it is not expected that these populations would see noticeable impacts in reductions of eggs and larvae.

Another factor related to thermal discharges that may affect aquatic biota is cold shock. Cold shock occurs when aquatic organisms that have been acclimated to warm water, such as fish in a power plant's discharge canal, are exposed to a sudden temperature decrease. This sometimes occurs when single-unit power plants shut down suddenly in winter. Cold shock mortalities at U.S. nuclear power plants have typically involved small numbers of fish and did not result in population-level effects (NRC 1996). Cold shock may also occur under extreme weather events and may adversely affect aquatic biota. For example, in January 1984 an extreme cold event resulted in the mortality of a large number of young-of-year gizzard shad within Monticello Reservoir (Dames and Moore 1985). Impacts on aquatic biota stemming from cold shock most often occur in winter months. Life-history stages that can be particularly sensitive to perturbations in water temperature include larval and juvenile stages as well as spawning and egg development. Fish within the Parr Reservoir do not typically undergo these vulnerable life stages and life-history events during the winter months.

Another discharge-related impact includes the chemical treatment of the cooling water. The environmental report (ER) indicates that chemicals would be added to the circulating-water and service-water systems that would be discharged into the blowdown lines and ultimately into Parr Reservoir. Biofouling would be controlled using metered pumps that inject chemicals into the raw-water pipeline and into the service-water pump discharge (SCE&G 2009a). Chemical treatments proposed for use during the operation of VCSNS Units 2 and 3 are outlined in EIS Table 3-5. These chemicals are the same as those used for VCSNS Unit 1 (SCE&G 2009a). The water flow from the Parr Reservoir would further dilute the concentration of these chemicals. The use of chemicals in the existing VCSNS Unit 1 is regulated by an NPDES permit, which is granted under permit number SC0030856. The chemical concentrations at the outfall for the existing units meet the NPDES limits (SCE&G 2009a). A new NPDES permit would likely be needed for the new discharge into Parr Reservoir. Sampling efforts in Monticello Reservoir since the operation of Unit 1 have not indicated any impacts associated with chemical toxicity (Christie and Stroud 1996, 1997, 1998, 1999; Normandeau 2007, 2008, 2009). Therefore, chemical discharges associated with proposed Units 2 and 3 to the Parr Reservoir would likely be minor.

Physical impacts can occur from discharge in the form of scouring, siltation, sediment transport, increased dissolved oxygen, eutrophication, and increased turbidity. The maximum discharge velocity at the diffuser ports is anticipated to range from 6.9 to 11.3 fps, depending on the mode of operation (Toblin 2007, Section 5.3.2.2.3). The diffuser line would be located near the bottom of the reservoir; approximately 10 ft below the normal minimum water surface (SCE&G 2009a). Rip-rap placed on the bottom of the reservoir to stabilize the diffuser would also likely reduce localized scouring. The maximum extent of scouring as a result of the discharge system, is expected to encompass an area equal to 0.3 ac, or roughly one-sixth of the width of Parr Reservoir at the point of discharge (SCE&G 2009a). Within this localized area, the benthic invertebrate community would likely be altered.

3.1.2.3 Onsite Streams

Site-preparation activities associated with onsite streams include permanent and temporary impacts on aquatic environments. The designated location of cooling towers associated with proposed VCSNS Units 2 and 3 would require filling Stream L, a seasonal headwater stream that drains into Mayo Creek (SCE&G 2009a). Filling of this headwater stream would result in the permanent loss of 774 linear ft of stream habitat (SCE&G 2009a).

3.1.2.4 Stormwater Management

Installing a stormwater-management system at the VCSNS would include site grading, ditches, swales, and basins. The current and proposed stormwater-retention basins in the immediate vicinity of the site are shown in Figure 3-2. Outflow from these basins would eventually drain into several unnamed creeks to the west and into Mayo Creek to the east. Once drainage enters Mayo Creek it would flow south, then west around the southern base of the powerblock area (SCE&G 2009a).

During the period of operation of the proposed VCSNS Units 2 and 3, onsite streams (Mayo Creek and intermittent streams) as well as Monticello and Parr reservoirs could be affected by stormwater drainage. SCE&G has an existing stormwater pollution prevention plan (SWPPP) to manage stormwater prior to its discharge to Monticello Reservoir. SCE&G would revise the existing VCSNS Unit 1 SWPPP to reflect the addition of new paved areas and facilities and changes in drainage patterns (SCE&G 2009a). The review team concludes that based on the use of a stormwater system comparable to the sufficient system currently used for the VCSNS Unit 1 site, the impacts on onsite streams (Mayo Creek and intermittent streams) as well as Monticello and Parr reservoirs from operation of proposed VCSNS Units 2 and 3 would be minimal.

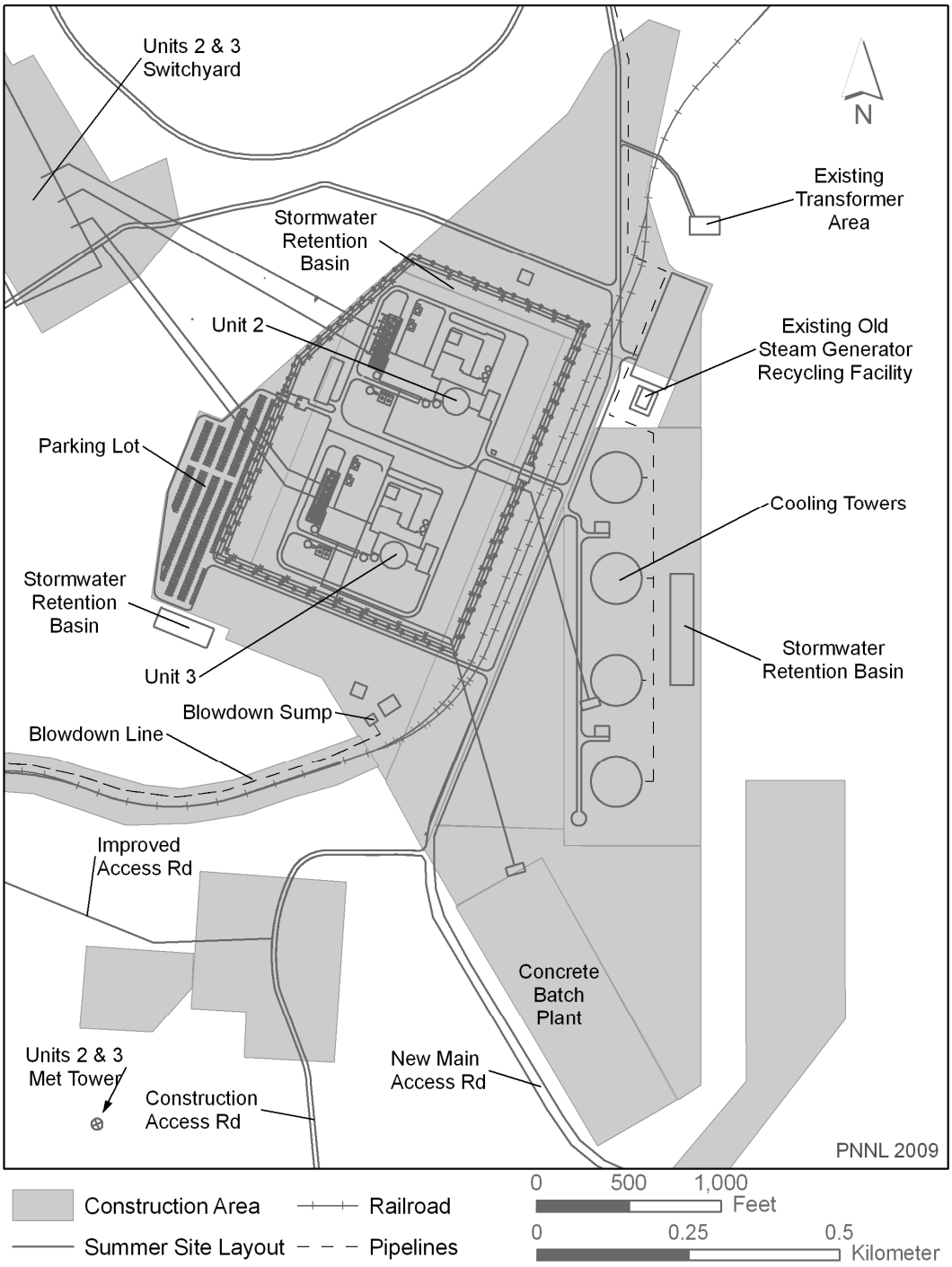

Figure 3-2. Site Layout with Stormwater-Retention Basins

3.2 Impacts from Construction and Operation in Proposed Transmission-Line Corridors

The existing transmission system for VCSNS is owned by SCE&G and Santee Cooper. Six new 230-kV transmission lines would be required in addition to the existing transmission infrastructure for transmission of electricity generated by VCSNS with the addition of Units 2 and 3 (SCE&G 2009a). Two of the six new transmission lines would be built and operated by Santee Cooper, and the remaining four new transmission lines would be built and operated by SCE&G. Two of the new SCG&E transmission lines would be built within a shared corridor, hence the six new transmission lines would occupy only five corridors (two Santee Cooper corridors and three SCE&G corridors). Activities associated with building the new transmission lines would include clearing land, installing new poles, hanging new conductors, and upgrading existing transmission lines. Figure 3-3 shows the proposed routing for the six new lines in the five transmission-line corridors. The corridors are as follows:

- VCSNS-Flat Creek – This line is owned by Santee Cooper and crosses Fairfield, Chester, and Lancaster Counties.
- VCSNS-Varnville – This line is owned by Santee Cooper and crosses Fairfield, Newberry, Richland, Lexington, Calhoun, Orangeburg, Dorchester, Colleton, and Hampton Counties.
- VCSNS-Killian – This line is owned by SCE&G and crosses Fairfield and Richland Counties
- VCSNS-Lake Murray – This line is owned by SCE&G and crosses Fairfield, Richland, and Lexington Counties.
- VCSNS-St. George – These lines are double circuit lines (two lines in a shared corridor) and are owned by SCE&G. The corridor crosses Fairfield, Newberry, Saluda, Lexington, Aiken, Calhoun, Orangeburg, and Dorchester Counties.

Most of the new transmission-line mileage would be built within existing transmission-line rights-of-way or require only the widening of existing rights-of-way. However, completely new rights-of-way would have to be cleared to build approximately 18 mi of the VCSNS-Killian transmission line and 68 mi of the VCSNS-St. George transmission lines (total of approximately 86 mi of new right-of-way). The exact locations (routes) for the new rights-of-way have not yet been finalized by SCE&G. Thus, the routes depicted in Figure 3-3 are considered provisional and subject to change (FP&S 2008). Field surveys for Federally listed threatened and endangered species have not yet been conducted in the proposed corridors because the exact routes (new, existing, or widened) have not been determined. Once siting studies are updated and final routes are determined, both SCE&G and Santee Cooper have stated that they would conduct field surveys along each of the final routes (FP&S 2008; MACTEC 2008).

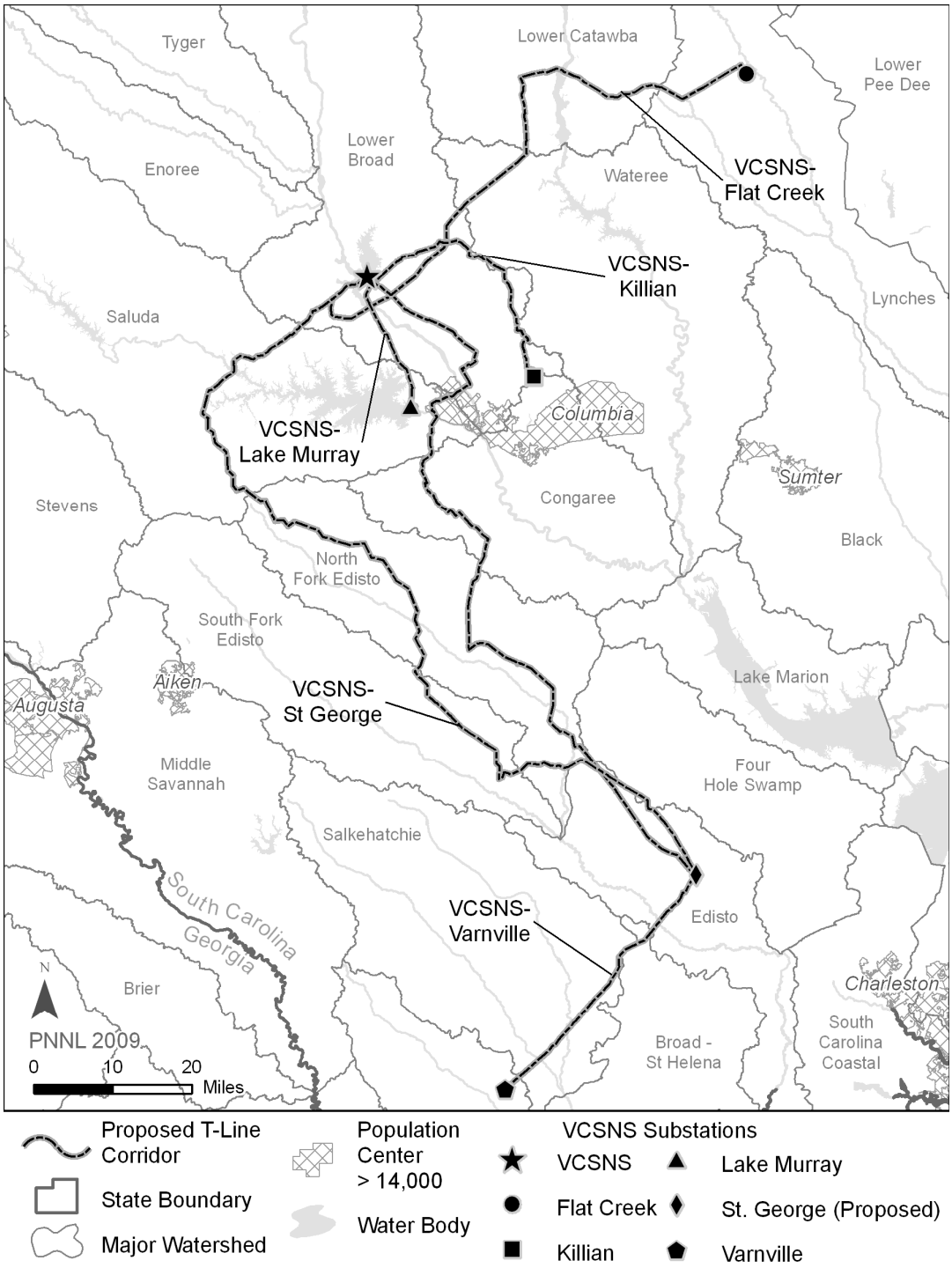

Figure 3-3. Proposed SCE&G and Santee Cooper Transmission-Line Corridors in Relation to Crossings of Major Waterbodies

The proposed VCSNS-Varnville and VCSNS-St. George transmission lines cross several counties and ecoregions. Both begin in the Southern Outer Piedmont and cross the Sandhills into the Coastal Plain ecoregion. Brief descriptions of the habitat types for both ecoregions are provided below.

The Sandhills ecoregion is the inland portion of the Coastal Plain that forms a discontinuous belt of varying widths of deep sands across the middle of the state (SCDNR 2005a). The sandy soils create a xeric environment that supports a distinctive type of vegetation dominated by longleaf pines and turkey oaks (*Quercus laevis*). High-frequency, low-intensity fires in the past created and supported fire-adapted longleaf pine-wiregrass communities, characterized by longleaf pine and loblolly pine with a midstory of oaks, mostly turkey oak along with blackjack oak (*Q. marilandica*), upland willow oak (*Q. incana*), and post oak (*Q. stellata*). However, fire suppression in the last several decades has allowed succession to proceed to oak-hickory forests similar to those of the Piedmont. Logging activities and fire suppression created large tracts of even-aged pine plantations and forests that do not provide high-quality wildlife habitat (SCDNR 2005a, b). Vegetation community types in the Sandhills ecoregion include grassland and early successional habitats, Sandhills pine woodland, seepage slopes, ponds and depressions, blackwater stream systems, and river bottoms. Common wildlife species found in the Sandhills ecoregion are white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*). A variety of bird species also inhabit the region and include wild turkey (*Meleagris gallopavo*), northern mockingbird (*Mimus polyglottos*), and several species of warblers. There is also a high diversity of reptiles and amphibians that reside in the various habitats present in this region (SCDNR 2005a; Griffith et al. 2002).

The Coastal Plain, the largest ecoregion in South Carolina, consists of two different landscapes. The inner portion bordering the Sandhills is largely agricultural, with small patches and hardwood remnant forests along creeks. The flatwoods make up the outer portion, which is primarily pine-dominant forest. There are large floodplains that cross both portions and a majority of them are forested. The most dominant vegetation habitat types are grassland and early successional habitats, pine woodland, and river bottoms (SCDNR 2005a). The southern floodplain forests include bottomland hardwood forest consisting of bottomland oaks, red maple, sweetgum, green ash (*Fraxinus pennsylvanica*), bitternut hickory (*Carya cordiformis*), and cypress-gum swamps dominated by water tupelo (*Nyssa aquatica*), swamp tupelo (*Nyssa biflora*), bald cypress (*Taxodium distichum*), and pond cypress (*Taxodium ascendens*) (Griffith et al. 2002). Although understory vegetation in the cypress-gum swamp community is sparse, a variety of wildlife species – from amphibians to mammals – use this habitat. Common wildlife species found in this region include many game species – white-tailed deer, eastern cottontail, gray squirrel, opossum, raccoon, wild turkey, northern bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*), red fox (*Vulpes vulpes*), gray fox (*Urocyon*

cinereoargenteus), wood duck (*Aix sponsa*), mink (*Mustela vision*), otter (*Lontra canadensis*), and beaver (*Castor Canadensis*) (SCE&G 2009a; SCDNR 2005a).

3.2.1.1 Terrestrial

Santee Cooper Transmission Lines

The following descriptions of the proposed actions associated with the Santee Cooper transmission lines were derived from the MACTEC (2008) transmission-line siting study. The VCSNS-Flat Creek and VCSNS-Varnville lines would add approximately 235 mi of transmission line, of which approximately 99 percent would be built within existing transmission-line corridors (MACTEC 2008). The remaining 1 percent (2.44 mi) would require widening an existing transmission line right-of-way in the vicinity of the VCSNS site by 100-ft (MACTEC 2008) (Figure 3-3). Impacts on habitats and wildlife in these areas would be the same as impacts onsite and would be mitigated by the use of BMPs (MACTEC 2008). A total of 45 ac of new transmission-line right-of-way would be cleared (SCE&G 2009c; MACTEC 2008).

A wetland delineation was completed along the 2.44 mi of proposed new transmission-line corridor (approximately 45 acres of new right-of-way) in July 2008 and it was determined that site preparation would result in the conversion of approximately 552 linear ft of forested stream to nonforested stream conversion of 0.60 ac of forested wetlands to nonforested wetlands (SCE&G 2009b). Santee Cooper stated that all clearing would be done using BMPs and that no mechanized clearing or grubbing would be necessary (SCE&G 2009b).

Construction activities that would occur in the existing transmission-line corridors that may cause temporary impacts would be limited to replacement of existing structures and installation of new lines. Santee Cooper stated that it would install new structures on or adjacent to existing footprints whenever possible and that disturbance from these activities would not create impacts greater than those that occur during ongoing transmission-line corridor maintenance activities (MACTEC 2008). Santee Cooper has also stated that it would take measures to minimize impacts on wetlands by following recommendations from the USACE to mitigate temporary impacts from construction such as the use of mulches, hay bales, turbidity curtains, and other erosion-control methods. Engineering controls and existing procedures are also in place to address unavoidable disturbances. All construction activities would be performed by Santee Cooper in compliance with applicable Federal, State, and local laws, regulations, and permit requirements.

The potential impacts of transmission-line corridor maintenance and similar impacts on important habitats including floodplains and wetlands, birds, and biota because of electromagnetic fields are considered minimal, assuming that BMPs are followed and State and Federal agencies are consulted, as appropriate.

3.2.1.2 SCE&G Transmission Lines

The final locations for the majority of the SCE&G proposed transmission-line corridors have yet to be determined; proposed routes are shown in Figure 3-3. The following descriptions of the proposed actions associated with the SCE&G transmission lines were derived from the Facilities Planning & Siting, PLLC (FP&S 2008) transmission-line siting study.

The VCSNS-Lake Murray line would be upgraded and 100 percent routed entirely within existing transmission-line corridors. Because the entire line resides within Fairfield, Richland, and Lexington Counties (the same counties used in the site and vicinity analysis for VCSNS Units 2 and 3), the habitat types and wildlife are assumed to be similar. There would be no clearing for the Lake Murray line; only structure replacement and restringing of lines would occur (FP&S 2008). Construction activities would be performed by SCE&G in compliance with applicable Federal, State, and local laws, regulations, and permit requirements (SCE&G 2009a).

For the remaining two SCE&G lines (the VCSNS-Killian line [single-circuit] and the VCSNS-St. George line [double-circuit]), the exact routing is not yet determined, so the extent and type of wildlife within the proposed new transmission-line corridors are not known at the time of this writing. A siting study was conducted to identify optimal viable routes that would minimize impacts on important habitats and species that may occur. Both lines would require widening of existing corridors and creation of new corridors. Where the new lines are parallel to existing SCE&G transmission lines, the existing transmission-line corridor width would be increased by 70 ft. Where new lines require new right-of-way, the width of the corridor would be 100 ft (FP&S 2008). The VCSNS-Killian transmission-line siting study area encompasses 144,640 ac (226 mi^2), which has an approximate linear distance of 37 mi, of which approximately 19 mi would run parallel to existing electrical transmission lines. The remaining approximately 18 mi of line would require the clearing of new corridor. The VCSNS-St. George transmission-line siting study area encompasses 874,888 ac (1367 mi^2), which encompasses an approximate linear distance of 134 mi, of which approximately 66 mi would be routed parallel to existing transmission-line corridors and approximately 68 mi would require the clearing of new corridor (see EIS Table 3-1). Within the larger study areas for both lines, hypothetical transmission-line right-of-way routes were presented for the VCSNS-Killian line and the VCSNS-St. George line to use for analysis.

The proposed VCSNS-Killian line would be approximately 37 mi long with a total of approximately 380 ac of transmission-line right-of-way in Fairfield and Richland Counties. The proposed VCSNS-St. George line would be approximately 134 mi long with a total of approximately 1491 ac and the siting study area is within Aiken, Bamberg, Calhoun, Colleton, Dorchester, Fairfield, Lexington, Newberry, Orangeburg, and Saluda Counties (FP&S 2008). For the VCSNS-Killian line, the total acreage of wetland (all palustrine) to be affected by land clearing within a wetland would be approximately 18 ac, which represents approximately 4.7 percent of the 380-ac corridor (SCE&G 2009c). The total acreage of wetland (all palustrine) to

be disturbed in the VCSNS-St. George line would be approximately 201 ac within the 1491-ac corridor, which represents approximately 13.5 percent of the corridor (SCE&G 2009c).

3.2.1.3 Aquatic

Santee Cooper Transmission Lines

Santee Cooper transmission lines would cross navigable waters of the State of South Carolina at 18 locations (Figure 3-3). Permitting approval would be required by the USACE, through Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403), and SCDHEC.

The Flat Creek Line is approximately 72 mi long and is located within the Piedmont ecoregion of the state. This line crosses 55 perennial streams and 13 watersheds within the Broad, Catawba, and Pee Dee river basins. Approximately 0.7 mi of existing corridor would need to be widened, and no new corridor clearing would be required. The largest water crossings associated with the Flat Creek line occur at an unnamed impoundment near Winnsboro (1200 ft wide) and the Fishing Creek Reservoir (1300 ft wide) in Fairfield County.

The Varnville line is approximately 163 mi long and is located within the Piedmont and Coastal Plain ecoregions of the state. It crosses 85 perennial streams within 23 watersheds and falls within the Salkehatchie, Edisto, Saluda, and Broad river basins. It crosses the Saluda River at a point that is 240 ft wide and also crosses the Broad River at two discrete locations (475 ft and 500 ft wide). The installation of transmission lines across waterbodies would be done in accordance with SCDHEC consultation and permitting and, for the majority of installation activities, would be done in existing corridors. The 2.44 mi of new right-of-way proposed by Santee Cooper would require that approximately 45 ac of forest be cleared next to an existing corridor for spanning 2500 ft of the Parr Reservoir located in Fairfield and Newberry Counties (MACTEC 2008). Two transmission structures are currently in place within this span; one located on an island within Parr Reservoir and the other within the Parr Reservoir itself. However, these are in the adjacent corridor, and Santee Cooper has indicated that one or two new structures may need to be installed within Parr Reservoir (MACTEC 2008). Placement of pile foundations in the Parr Reservoir would be required for installation of new transmission towers, but no dredging activities would be required (MACTEC 2008).

SCE&G Transmission Lines

The final locations for the majority of the SCE&G proposed transmission-line corridors have yet to be determined; proposed routes are shown in Figure 3-3. The following descriptions of the proposed actions associated with the SCE&G transmission lines were derived from the FP&S (2008) transmission-line siting study.

The SCE&G transmission system would cross numerous streams and rivers throughout the State of South Carolina, which includes the Piedmont and Coastal Plain ecoregions (Figure 3-3). Pole structures would be spaced 500 to 800 ft apart and would be expected to span all waterbodies (FP&S 2008). The proposed VCSNS-Lake Murray line would include upgrading an existing transmission-line corridor along 19 mi with no new corridor or expansion activities (FP&S 2008).

The VCSNS-Killian line would require almost 19 mi of expansion in existing corridors, and approximately 18 mi of new corridor. An estimated 24.2 ac of corridor would be cleared within 100 ft of a stream, river, lake, or pond for the VCSNS-Killian line. Only 0.6 ac of river, lake, stream, or pond habitat is within the proposed VCSNS-Killian corridor (FP&S 2008). There are no marine waters associated with this corridor. For the 134 mi VCSNS-St. George line, 66 mi of existing corridor would be expanded and over 68 mi of new corridor would be prepared. Over 131 ac would be cleared within 100 ft of a stream, river, lake, or pond habitat, and 19.4 ac of freshwater habitat is within the proposed corridor (FP&S 2008). There are no marine waters associated with this corridor. For both the VCSNS-Killian and VCSNS-St. George corridors, SCE&G has indicated that exact positioning of corridors would avoid running in close parallel to streams so that stream buffer zones would be preserved and impacts on bodies of freshwater would be minimized (FP&S 2008).

Impacts on the waterways associated with transmission-line activities include erosion of soils, potential for pollutant discharge from equipment, and temporary disturbance and/or displacement of aquatic biota. Both SCE&G and Santee Cooper plan to implement BMPs to minimize adverse conditions for aquatic biota and habitats during transmission-line installation activities such as installation and replacement of transmission structures on the banks at river and stream crossings in such a way that runoff would be diverted, resulting in minimal impacts on adjacent streams and rivers (MACTEC 2008; FP&S 2008). SCE&G has proposed to follow State and Federal guidelines involving BMPs for limiting impacts on waterbodies (USACE 2007) during transmission system installation activities, which includes leaving low-growing vegetation intact to provide stream buffer zones (FP&S 2008). In addition, both SCE&G and Santee Cooper have acknowledged the need to acquire State and Federal permits and incorporate BMPs and SWPPPs into said permits (MACTEC 2008; FP&S 2008). SCE&G states that "SCE&G will comply with the S.C. Stormwater Management and Sediment Reduction Act related to water quality protection and will comply with the recommendations of various regulatory agencies, including the S.C. Department of Natural Resources, S.C. Department of Health and Environmental Control, the U.S. Army Corps of Engineers, etc." (FP&S 2008).

Maintenance activities along the six new 230-kV transmission lines could lead to temporary impacts on the waterways being crossed. However, it is assumed that the same vegetation-management practices currently used by SCE&G and Santee Cooper for the existing transmission-line corridors would be applied to the proposed new and upgraded transmission-

line corridors (MACTEC 2008; FP&S 2008). SCE&G and Santee Cooper practices and procedures were developed to prevent impacts on aquatic habitats so that impacts on aquatic ecosystems from operation and maintenance of transmission lines would be minimal. Santee Cooper would continue to use its Right-of-Way Management Unit Plan, which addresses vegetation clearing or maintenance for stream buffer zones (MACTEC 2008). Methods would include selective application of herbicides aimed at the removal of large woody vegetation that may ultimately interfere with the operation of transmission lines. Only EPA-approved herbicides registered for use in wetlands or aquatic sites would be used and their application would be limited to selective low-volume treatments aimed at controlling undesirable woody vegetation while still promoting low-growing, native vegetation (MACTEC 2008). Maintenance of low-growing vegetation along shorelines would be maintained as buffer zones (MACTEC 2008). Both SCE&G and Santee Cooper restrict the use of heavy equipment around wetlands and stream crossings to prevent erosion and sedimentation (SCE&G 2009a).

4.0 Protected Species Descriptions

This section lists Federally listed terrestrial and freshwater species that may occur in or near the VCSNS proposed transmission-line corridors (Table 1-1) and describes their life history and habitat use.

Piping plover (*Charadrius melodus*). The piping plover is a small shorebird that is listed as threatened and known to occur in Colleton County, one of the counties crossed by the proposed VCSNS-Varnville Line (FWS 2008a). Populations of this species are found in three regions in the United States: the Atlantic Coast, the Northern Great Plains, and the Great Lakes (FWS 2001). Critical habitat in South Carolina has been identified in Horry, Georgetown, Charleston, Colleton and Beaufort Counties (FWS 2001) Piping plovers nest on sparsely vegetated coastal beaches, sandflats, and barrier islands in South Carolina. Because neither the site nor any of the transmission lines are in coastal areas, the proposed action would not affect this shorebird.

Wood stork (*Mycteria americana*). The wood stork is listed as endangered and is known to occur in several counties crossed by the proposed transmission-line corridors, including Aiken, Colleton, Hampton, and Richland Counties (FWS 2008a). This species is not known to occur in Fairfield County, or in the immediate vicinity of the site. A variety of wetlands are used by this species for nesting, feeding, and roosting, and in South Carolina, colony sites are surrounded by extensive palustrine forested wetlands. Wood storks are known to nest in the upper branches of black gum or cypress trees that are located in standing water (swamps). Shallow, open water is required for successful foraging (FWS 1986; SCDNR 2005c).

Red-cockaded woodpecker (*Picoides borealis*). The red-cockaded woodpecker is endangered and is known to occur in Lexington and Richland Counties, which would be crossed by the proposed transmission-line corridors (FWS 2008a). Populations of this species are distributed across the southeastern United States and managed by distinct recovery units. Red-cockaded woodpeckers are dependent on open, mature pine forests and savannahs for prime foraging and nesting habitat. The large, old pines are needed because the birds excavate cavities in the living trees completely within the heartwood to roost and nest in. The cavity trees must be in homogeneous stands of pine with little to no midstory present. Red-cockaded woodpeckers require 75 to 200 ac of foraging habitat (large mature pines) with a well-developed herbaceous layer that includes native bunchgrasses and forbs. There is no suitable habitat for this species on the VCSNS site (NRC 2004).

Flatwoods salamander (*Ambystoma cingulatum*). The flatwoods salamander is threatened and is known to occur in Orangeburg County (FWS 2008a). Populations of this species are distributed throughout the lower Southeastern Coastal Plain from southern South Carolina through southern Georgia to northern Florida and southwestern Alabama (Palis 1997).

Flatwoods salamander habitat includes generally open-canopied pine savannas and flatwoods of the southeastern coastal plain with cypress swamps present for breeding (Palis 1997). Critical habitat in South Carolina has been identified by the FWS in three counties: Jasper County (approximately 346 ac), Berkley County (approximately 622 ac within Francis Marion National Forest), and Charleston County (approximately 162 ac within Santee Coastal Reserve) (FWS 2008a).

Carolina heelsplitter (*Lasmigona decorata*). Historically, the Carolina heelsplitter could be found within small-to-large rivers, streams and ponds within the Savannah, Santee, Catawba, and Pee Dee river basins along shaded banks, and sometimes within the main channel of smaller streams. Preferred substrate types include sand, gravel, and cobble in oxygen-rich, free-flowing waters. This species is now reduced from its historic range to eight populations in North Carolina and South Carolina, largely due to habitat degradation from silviculture, agriculture, and development activities that introduce sedimentation and pollutants into creeks and streams (SCDNR 2006b). The Carolina heelsplitter was listed as endangered in June of 1993 (58 FR 34926). The complete life history of the Carolina heelsplitter is largely unknown. The remaining populations are currently found in shallow streams and filter feed on microscopic plants and organisms. Reproduction involves a glochidial larvae stage, but no fish host has been identified for this species. Critical habitat was established for the Carolina heelsplitter in 2002. Critical habitats in South Carolina for this species include Gills Creek (Catawba River system), Lancaster County; Flat Creek (Pee Dee River system), Lancaster County; Lynches River (Pee Dee River system), Lancaster, Chesterfield, and Kershaw Counties; Mountain and Beaverdam Creeks (Savannah River system), Edgefield County; Turkey Creek (Savannah River system), Edgefield and McCormick Counties; and Cuffytown Creek (Savannah River system), Greenwood and McCormick Counties (67 FR 44502). Although reported as present in the Saluda River system at one time, the Carolina heelsplitter has not been collected from this habitat since 1991 (FWS 1996).

Georgia aster (*Aster georgianus*). The Georgia aster, a candidate for listing in Chester, Fairfield and Richland Counties, is found in dry, open woodlands and disturbed areas, such as roadsides and utility rights-of-way that are regularly mowed. Populations are known to occur in Fairfield County, which includes the VCSNS site, and Chester and Richland Counties, which would be crossed by the proposed transmission-line corridors (FWS 2008a). However, previous field surveys associated with relicensing activities and surveys recently conducted in support of the VCSNS COL have shown that although some suitable habitat exists to support this species, none have been recorded to occur on the VCSNS site or in existing Unit 1 transmission-line corridors (SCE&G 2002; Nelson 2006, 2007).

Pool sprite (*Amphianthus pusillus*). Pool sprite, also known as little amphianthus, is listed as threatened and is known to occur in Lancaster and Saluda Counties, which would be crossed by the proposed transmission-line corridors (FWS 2008a; SCDNR 2006a). This aquatic plant

occurs in small (usually less than 1 m^2) shallow pools on the crests and flattened slopes of granite outcrops and requires ideal moisture and light conditions for successful seed germination (FWS 2008b). Pool sprite is endemic to open flat granite rocks, with enough surface area to allow the development of shallow pools that fill with water during spring rainy periods when the seeds germinate, followed by rapid growth, flowering, and fruit setting (NRC 2003). The entire life span of this delicate plant is only 3 to 4 weeks (FWS 2008a).

Smooth coneflower (*Echinacea laevigata*). Smooth coneflower is listed as endangered and is known to occur in Richland County and may possibly occur in Lexington County (SCDNR 2006a; FWS 2008a). Both counties are crossed by the proposed transmission-line corridors. This species is found in meadows and open woodlands on basic or near neutral soils, often with eastern redcedar (*Juniperus virginiana*). Questions remain concerning the biology and natural distribution of this species in South Carolina (Nelson 2006). It is rare throughout its range and has sustained significant habitat loss, at least in part due to fire-suppression activities (Porcher and Rayner 2001). Smooth coneflower was not observed in the study area (Figure 4-1) during surveys and the likelihood of it being present on the VCSNS site is marginal due to the lack of appropriate soils present (Nelson 2007).

Schweinitz's sunflower (*Helianthus schweinitzii*). Schweinitz's sunflower is listed as endangered and is known to occur in Lancaster County, which would be crossed by the proposed VCSNS-Flat Creek Line corridor (FWS 2008a). It is a shade-intolerant perennial herb that produces solitary stems, up to 2 m tall and bears yellow flower heads in late summer and early autumn. This species requires full to partial sun and prefers Piedmont longleaf pine forest clearings and edges. Adapted to high-frequency, low-intensity fires, this species occurs mostly in transmission-line corridors and along roadsides because fire-suppression activities throughout its range have depleted suitable natural habitat (NatureServe 2009).

Black-spored quillwort (*Isoetes melanospora*). The black-spored quillwort is listed as endangered and is known to occur in Lancaster County at Forty-Acre Rock (FWS 2008a; NatureServe 2009). This granite outcrop species is an inconspicuous plant, generally under 8 cm tall. Like the pool sprite, another granite outcrop species, it is restricted to shallow, flat-bottomed depressions on granitic outcrops, where water collects after a rain. These depressions are less than 1 cm deep and usually contain soil at least 2 cm deep (NatureServe 2009). The depressions, sometimes called vernal pools, solution pits, or weather pits, are formed naturally by erosion over millions of years. Plants rarely occur in shallow pools formed by quarrying activities (FWS 2008a).

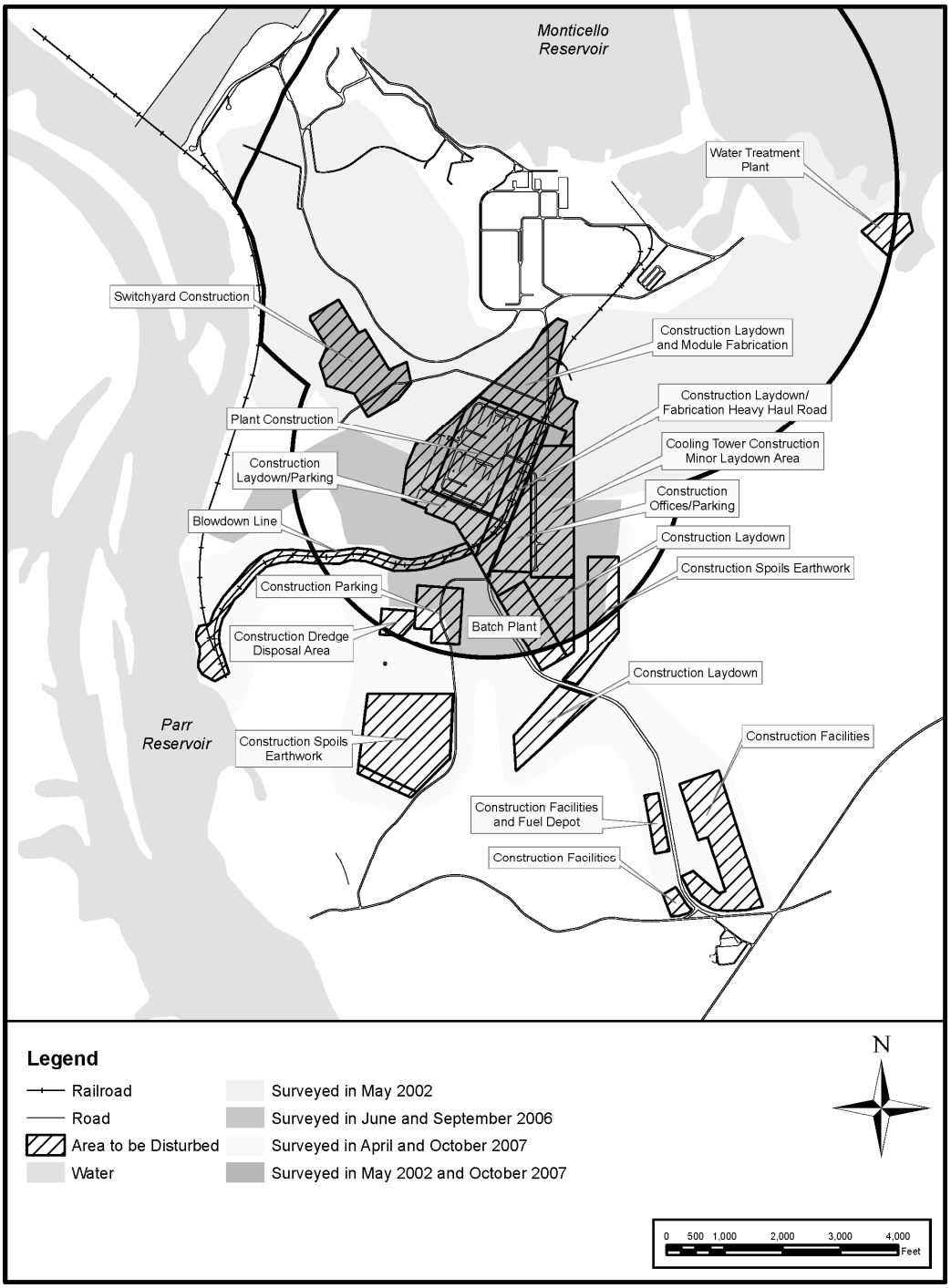

Figure 4-1. Threatened and Endangered Species Survey Locations at the VCSNS Site (SCE&G 2009a)

Pondberry (*Lindera melissifolia*). Pondberry is listed as endangered and is known to occur in Dorchester County (FWS 2008a). This deciduous aromatic shrub ranges from 0.5 to 2 m tall and usually grows in clumps in a variety of seasonal wetland habitats throughout the region (NatureServe 2009). Its flowering period is from late February to mid-March; its fruiting period is from August to early October. Searches for this species can be performed throughout the entire growing season, because masses of yellowish flowers are produced prior to leafing out, making the thicket-forming shrubs conspicuous, and leaves are diagnostic when combined with growth habit and/or fruit (USDA 2009). Habitat alteration and loss are the most considerable threat to this species (NatureServe 2009).

Rough-leafed loosestrife (*Lysimachia asperulifolia*). The rough-leaved loosestrife is listed as endangered and is known to occur in Richland County, which would be crossed by the proposed transmission-line corridors (FWS 2008a; SCDNR 2006a). This perennial herb occurs in ecotones between longleaf pine uplands and pond pine pocosins in moist, sandy, or peaty soils with low vegetation. Rough-leaved loosestrife has also been found to occur in disturbed areas such as roadside depressions, powerline rights-of-way, firebreaks, and trails (NatureServe 2009). There are no recorded occurrences of this species at or near the VCSNS site (NRC 2004) and none were encountered during surveys conducted in 2006 and 2007 (Nelson 2006, 2007).

Canby's dropwort (*Oxypolis canbyi*). Canby's dropwort is listed as endangered and is known to occur in Richland County, which would be crossed by the proposed transmission-line corridors (FWS 2008a). This perennial herb grows in wet meadows, wet pine savannahs, shallow pineland ponds, and cypress-pine swamps (NRC 2004). There are no recorded occurrences of this species at or adjacent to the VCSNS site or along the existing Unit 1 transmission lines (NRC 2004; Nelson 2006, 2007).

Harperella (*Ptilimnium nodosum*). Harperella is listed as endangered and is known to occur in Aiken and Saluda Counties, which would be crossed by the proposed transmission-line corridors (FWS 2008a). This annual herb can grow up to 120 cm tall and produces broad clusters of small white flowers in July and August (NatureServe 2009). Typical habitat for this annual herb is saturated rocky or gravel shoals, margins of swift-flowing streams, and edges (bays) of intermittent pineland ponds (NatureServe 2009). The most recent observation of this population in the SCDNR database was from 1985 (NRC 2003). There are no recorded occurrences of this species on the VCSNS site (SCE&G 2009a; Nelson 2007). Threats to this species include development, logging, draining and/or filling of wetlands, alterations of wetland hydrology, sedimentation, and non-native species invasion (NatureServe 2009).

Relict trillium (*Trillium reliquum*). The relict trillium is listed as endangered and is known to occur in Aiken County, a portion of which would be crossed by the proposed VCSNS-St. George transmission-line corridor (FWS 2008a). This perennial herb has three leaves and produces a three-petaled flower at the apex of the stem in early spring (NatureServe 2009). Relict trillium is

a species of mesic hardwood forests and can be found on various slopes, aspects, and inclines as well as on bottomlands and floodplains (NatureServe 2009). This shallow-rooting species is found on soils ranging from rocky clays to alluvial sands containing high organic content in the soil rhizosphere (NatureServe 2009). There have been no recorded occurrences of this species on the VCSNS site (NRC 2003; Nelson 2006, 2007).

5.0 Potential Environmental Effects of the Proposed Actions

This section describes the potential impacts from construction and operation of the proposed Units 2 and 3 to species presented in Table 1-1.

5.1 Construction Impacts

5.1.1 Site and Vicinity

Species within the site and vicinity were reviewed for possible impacts from construction are described here.

Wood stork (*Mycteria americana*). Although the wood stork is listed as endangered in nearby Richland and Newberry Counties, there are no recorded occurrences on or near VCSNS site (FWS 2008a; SCDNR 2006a; SCE&G 2002; NRC 2003). Therefore, the review team has determined that construction and preconstruction at the VCSNS site would have no effect on the wood stork.

Red-cockaded woodpecker (*Picoides borealis*). The red-cockaded woodpecker is endangered and is known to occur in nearby Lexington and Richland Counties (FWS 2008a). However, because it is not listed in Fairfield County, appropriate habitat does not exist on the VCSNS site, and it has never been recorded on or near the VCSNS site, the review team has determined that construction and preconstruction at the VCSNS site would have no effect on the red-cockaded woodpecker (SCE&G 2002; SCDNR 2005a; NRC 2003).

Carolina heelsplitter (*Lasmigona decorata*). The Carolina heelsplitter has not been observed or collected near the VCSNS site, or in the Parr Reservoir, Monticello Reservoir, Mayo Creek, or other onsite streams. Habitats in both Parr and Monticello reservoirs are suboptimal with a lack of shaded stable bank habitat with free-flowing water in Monticello Reservoir and lack of shaded stable bank habitat along the shores of Parr Reservoir (MACTEC 2008). Mayo Creek has reaches of habitat with gravel or cobble bottom and well-developed canopy. However, no mussels other than the Asian clam have been observed in Mayo Creek. Therefore, it is anticipated that there would be no impacts from site and vicinity construction and preconstruction at the VCSNS site on the Carolina heelsplitter.

Georgia aster (*Aster georgianus*). The Georgia aster is a candidate for listing in Fairfield and Richland Counties and populations are known to occur in both counties (FWS 2008a). However, previous field surveys associated with relicensing activities and targeted threatened and endangered species surveys recently conducted in support of this COL have shown that

although suitable habitat exists, there have been no recorded occurrences on the VCSNS site (SCE&G 2002; Nelson 2006, 2007). Therefore, the review team has determined that construction and preconstruction activities at the VCSNS site would have no effect on the Georgia aster.

Smooth coneflower (*Echinacea laevigata*). Smooth coneflower is listed as endangered and is known to occur in Richland County and may possibly occur in Lexington County (SCDNR 2006a; FWS 2008a). Smooth coneflower was not observed in the study area during targeted threatened and endangered plant surveys conducted on the VCSNS site and the likelihood of it being present is unlikely due to the lack of appropriate soils (Nelson 2007; NRC 2003). Therefore, the review team has determined that construction and preconstruction at the VCSNS site are unlikely to have an effect on the smooth coneflower.

Rough-leafed loosestrife (*Lysimachia asperulifolia*). The rough-leaved loosestrife is listed as endangered and is known to occur in Richland County (FWS 2008a; SCDNR 2006a). There are no recorded occurrences of this species at or near the VCSNS site (NRC 2004) and none were encountered during targeted threatened and endangered plant surveys conducted in 2002, 2006, and 2007 (SCE&G 2002; Nelson 2006, 2007). Therefore, the review team has determined that construction and preconstruction at the VCSNS site are unlikely to have an effect on the rough-leafed loosestrife.

Canby's dropwort (*Oxypolis canbyi*). Canby's dropwort is listed as endangered and is known to occur in nearby Richland County (FWS 2008a). There are no recorded occurrences of this species at or adjacent to the VCSNS site and none were found during targeted threatened and endangered plant surveys conducted previously (SCE&G 2002; NRC 2004; Nelson 2006, 2007). Therefore, the review team has determined that construction and preconstruction at the VCSNS site are unlikely to have an effect on Canby's dropwort.

5.1.2 Transmission-Line Corridors

Although the final siting and exact locations of transmission-line corridors have not been finalized, SCE&G expects that the current siting studies to be representative of the most likely corridors for expansion, clearing, and upgrades for transmission systems necessary for VCSNS Units 2 and 3 (FP&S 2008; MACTEC 2008). In the absence of on-the-ground field surveys for threatened and endangered species along the proposed routes, SCE&G and Santee Cooper overlaid the SCDNR Heritage Trust Program digital database showing documented occurrences of protected species in all proposed corridors that would be routed within or parallel to existing corridors, and both siting study areas that would require new rights-of-way (VCSNS-St. George and VCSNS-Killian lines) (FP&S 2008). Both utilities have stated that once final routes are determined, on-the-ground field surveys would be conducted for each line. SCE&G and Santee Cooper have also both stated they would implement BMPs to minimize impacts on threatened

and endangered species and habitats during transmission-line installation activities (FP&S 2008; MACTEC 2008).

Species within the transmission-line corridors were reviewed for possible impacts and are described below.

Piping plover (*Charadrius melodus*). The piping plover is listed as threatened and known to occur in Colleton County (FWS 2008a). Critical habitat in South Carolina has been identified in coastal areas of Horry, Georgetown, Charleston, Colleton and Beaufort Counties (FWS 2001). Because none of the transmission lines is routed in coastal areas, the review team has determined that construction of the proposed transmission lines is unlikely to have an effect on this shorebird.

Wood stork (*Mycteria americana*). The wood stork is listed as endangered and is known to occur in counties crossed by the proposed transmission-line corridors and more specifically in the VCSNS-St. George line study area (FWS 2008a; SCDNR 2006a; FP&S 2008). Most of the documented occurrences are located in the southern portion of the study area in Colleton County where suitable habitat exists (FP&S 2008; SCDNR2005c). Colony sites are surrounded by extensive palustrine forested wetlands and are in the areas where new rights-of-way, habitat loss through clearing, and forest fragmentation would occur. The wood stork could potentially occur wherever suitable habitat exists along the proposed transmission-line route. Therefore, the review team has determined that construction in the proposed transmission-line corridors may affect the wood stork. However, if SCE&G and Santee Cooper conduct surveys to identify whether wood stork nesting sites and/or habitat exist along or adjacent to the proposed transmission-line corridors, use flexibility in routing to avoid such sites, implement BMPs to minimize impacts, and adhere to Federal and State laws, construction is not likely to adversely affect the woodstork.

Red-cockaded woodpecker (*Picoides borealis*). The red-cockaded woodpecker is endangered and is known to occur in counties crossed by the proposed transmission lines (FWS 2008a). There are several documented occurrences within the southern portion of the VCNSS-St. George siting study area (FP&S 2008). This species might occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction in the proposed transmission-line corridors may affect the red-cockaded woodpecker. However, if SCE&G and Santee Cooper conduct surveys to identify whether red-cockaded woodpecker nesting sites and/or habitat exist along or adjacent to the proposed transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect the red-cockaded woodpecker.

Flatwoods salamander (*Ambystoma cingulatum*). The flatwoods salamander is threatened and is known to occur in Orangeburg County, which is crossed by two of the proposed transmission lines (FWS 2008a; MACTEC 2008; FP&S 2008). Natural Heritage records only exist for Berkeley, Charleston, and Jasper Counties (NatureServe 2009). The flatwoods salamander could occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes that go through Orangeburg County. Therefore, the review team has determined that construction in the proposed transmission-line corridors may affect the flatwoods salamander. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect the flatwoods salamander.

Carolina heelsplitter (*Lasmigona decorata*). The installation of transmission systems associated with the Santee Cooper lines is targeted for two corridors: VCSNS-Flat Creek and VCSNS-Varnville. The VCSNS-Flat Creek line crosses Fairfield, Chester, and Lancaster Counties and contains critical habitat for the Carolina heelsplitter in Gills Creek, Flat Creek, and the Lynches River (67 FR 44502). No new corridor clearing would occur within this proposed corridor route because existing corridor would be used for new transmission-line installation. The installation activities within the corridor that pass through Chester and Lancaster Counties cross Flat Creek, but not Gills Creek or the Lynches River (MACTEC 2008). To minimize impacts on critical habitat from sedimentation and erosion, Santee Cooper would follow its Right-of-Way Management Unit Plan to limit the effects from installation activities (MACTEC 2008). The VCSNS-Varnville line crosses Fairfield, Newberry, Richland, Lexington, Calhoun, Orangeburg, Dorchester, Colleton, and Hampton Counties. No specific populations of Carolina heelsplitter are known to occur in these counties, but habitats may occur that are favorable for its survival. New corridor preparation across Parr Reservoir would be required for installation of new transmission towers in Parr Reservoir. Santee Cooper reports that “Carolina heelsplitter was included in the habitat survey of the 2.44 mi of proposed new [right-of-way]” (MACTEC 2008). Habitat was characterized as receiving no shade, and it was therefore expected that Carolina heelsplitter would not be affected by installation of transmission towers in Parr Reservoir. Following an October 2007 meeting of FWS and Santee Cooper representatives, the FWS requested a sampling plan be submitted by Santee Cooper that identifies habitat suitable for protected species within transmission-line corridors. After approval of the project, Santee Cooper intends to finalize the transmission line design as well as coordinate with FWS (MACTEC 2008).

SCE&G has proposed to install, expand, or upgrade three transmission-line corridors: VCSNS-Killian, VCSNS-Lake Murray, and VCSNS-St. George. The VCSNS-Killian corridor crosses only Fairfield and Richland Counties, while the VCSNS-Lake Murray corridor crosses Fairfield, Richland, and Lexington Counties. The VCSNS-St. George corridor crosses Fairfield,

Newberry, Saluda, Lexington, Aiken, Calhoun, Orangeburg, and Dorchester Counties. No specific populations of Carolina heelsplitter are known to occur in these counties, but habitats may occur that are favorable for its survival. SCE&G plans to implement BMPs to minimize adverse conditions for aquatic biota and habitats during transmission-line installation activities such as installation and replacement of transmission structures at river and stream crossings on the banks in such a way that runoff would be diverted, resulting in minimal impacts on these waterbodies (FP&S 2008). If SCE&G follows State and Federal BMPs associated with water quality and habitat preservation, the review team concludes that the impacts of the preparation for and installation of new transmission-line corridors would be minimal for the Carolina heelsplitter.

Georgia aster (*Aster georgianus*). The Georgia aster is known to occur in Chester, Fairfield, and Richland Counties (FWS 2008a). It is of potential occurrence in suitable habitat along the yet undetermined proposed transmission-line corridor routes that cross those counties. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect the Georgia aster. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect the Georgia aster.

Pool sprite (*Amphianthus pusillus*). The pool sprite is known to occur within Saluda and Lancaster Counties (FWS 2008a; SCDNR 2006a), which are crossed by the proposed transmission lines associated with the VCSNS site. Only one occurrence of this plant is known from Saluda County (NRC 2003). It is of potential occurrence in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect the pool sprite. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on those species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect the pool sprite.

Smooth coneflower (*Echinacea laevigata*). Smooth coneflower is known to occur in Richland County and may possibly occur in Lexington County (SCDNR 2006a; FWS 2008a). It is of potential occurrence in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect the smooth coneflower. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical

habitats, implement BMPs to minimize impacts on species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect the smooth coneflower.

Schweinitz's sunflower (*Helianthus schweinitzii*). Schweinitz's sunflower is known to occur in Lancaster County and possibly occurs in Lexington County (FWS 2008a). It may occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect Schweinitz's sunflower. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect Schweinitz's sunflower.

Black-spored quillwort (*Isoetes melanospora*). Black-spored quillwort is known to occur in Lancaster County (FWS 2008a). The VCSNS-Flat Creek line crosses Lancaster County so it may occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes. The proposed VCSNS-Flat Creek line would be routed almost entirely within existing transmission-line corridors, so potential impacts would be similar to those associated with right-of-way maintenance activities. Therefore, the review team has determined that transmission-line upgrade activities in the proposed transmission-line corridor would not likely affect the black-spored quillwort.

Pondberry (*Lindera melissifolia*). Pondberry is known to occur in Dorchester County (FWS 2008a). The proposed VCSNS-Varnville line, which is routed entirely within existing corridors, passes through the northern portion of Dorchester County (see Figure 1-1). The proposed VCSNS-St. George line, which requires approximately 68 mi of new right-of-way and the construction of a substation, terminates in northern Dorchester County. Pondberry may occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that activities in the proposed transmission-line corridors may affect pondberry. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect pondberry.

Rough-leafed loosestrife (*Lysimachia asperulifolia*). Rough-leaved loosestrife is known to occur in Richland County (FWS 2008a; SCDNR 2006a). It may occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect rough-leafed loosestrife. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts

on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect rough-leafed loosestrife.

Canby's dropwort (*Oxypolis canbyi*). Canby's dropwort is known to occur in Richland County (FWS 2008a). It is of potential occurrence in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect Canby's dropwort. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect Canby's dropwort.

Harperella (*Ptilimnium nodosum*). Harperella is known to occur in Aiken and Saluda Counties (FWS 2008a). There is one recorded population of harperella approximately 0.5 mi west of the Summer-Graniteville transmission-line corridor in Saluda County (NRC 2003). The most recent observation of this population in the SCDNR database was from 1985 (NRC 2003). It is of potential occurrence in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect harperella. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect harperella.

Relict trillium (*Trillium reliquum*). The relict trillium is known to occur in Aiken County (FWS 2008a). It may occur in suitable habitat along the yet undetermined proposed transmission-line corridor routes. Therefore, the review team has determined that construction activities in the proposed transmission-line corridors may affect relict. However, if SCE&G and Santee Cooper conduct surveys to identify individuals on or adjacent to transmission-line corridors, use flexibility in routing to avoid threatened or endangered species and critical habitats, implement BMPs to minimize impacts on the species and habitats, and adhere to Federal and State laws, construction is not likely to adversely affect Canby's dropwort.

5.2 Operations Impacts

Species were reviewed within the site and vicinity and transmission-line corridors.

5.2.1 Site and Vicinity

The impacts of operation on species within the site and vicinity were determined, as described below.

Wood stork (*Mycteria americana*). Although the wood stork is listed as endangered in nearby Richland and Newberry Counties, there are no recorded occurrences of this species on or near VCSNS site (FWS 2008a; SCDNR 2006a; SCE&G 2002; NRC 2003). Therefore, the review team has determined that operation at the VCSNS site would have no effect on the wood stork.

Red-cockaded woodpecker (*Picoides borealis*). The red-cockaded woodpecker is endangered and is known to occur in nearby Lexington and Richland Counties (FWS 2008a). However, because it is not listed in Fairfield County, appropriate habitat does not exist on the VCSNS site, and it has never been recorded on or near the VCSNS site, the review team has determined that operation at the VCSNS site would have no effect on the red-cockaded woodpecker (SCE&G 2002; SCDNR 2005a; NRC 2003).

Carolina heelsplitter (*Lasmigona decorata*). The Carolina heelsplitter has not been observed or collected near the VCSNS site, or in the Parr Reservoir, Monticello Reservoir, Mayo Creek, or other onsite streams. Habitats in both Parr and Monticello reservoirs are suboptimal with a lack of shaded stable bank habitat with free-flowing water in Monticello Reservoir and a lack of shaded stable bank habitat along the shores of Parr Reservoir (MACTEC 2008). Mayo Creek has reaches of habitat with gravel or cobble bottom and well-developed canopy. However, no mussels other than the Asian clam have been observed in Mayo Creek. Therefore, the review team concludes that there would be no impacts from site and vicinity operation on the Carolina heelsplitter.

Georgia aster (*Aster georgianus*). The Georgia aster, a candidate for listing in Fairfield and Richland Counties and populations are known to occur in both counties (FWS 2008a). However, previous field surveys associated with relicensing activities and targeted threatened and endangered species surveys recently conducted in support of this COL have shown that although some suitable habitat exists, there have been no recorded occurrences on the VCSNS site (SCE&G 2002; Nelson 2006, 2007). Therefore, the review team has determined operation at the VCSNS site would have no effect on the Georgia aster.

Smooth coneflower (*Echinacea laevigata*). Smooth coneflower is listed as endangered and is known to occur in Richland County and may possibly occur in Lexington County (SCDNR 2006a; FWS 2008a). Smooth coneflower was not observed in the study area during targeted threatened and endangered plant surveys conducted on the VCSNS site and the likelihood of it being present is unlikely due to the lack of appropriate soils (Nelson 2007; NRC 2003). Therefore, the review team has determined that operation at the VCSNS site would have no effect on the smooth coneflower.

Rough-leafed loosestrife (*Lysimachia asperulifolia*). The rough-leaved loosestrife is listed as endangered and is known to occur in Richland County (FWS 2008a; SCDNR 2006a). There are no recorded occurrences of this species at or near the VCSNS site (NRC 2004) and none were encountered during targeted threatened and endangered plant surveys conducted in 2002,

2006, and 2007 (SCE&G 2002; Nelson 2006, 2007). Therefore, the review team has determined that operation at the VCSNS site would have no effect on the rough-leafed loosestrife.

Canby's dropwort (*Oxypolis canbyi*). Canby's dropwort is listed as endangered and is known to occur in nearby Richland County (FWS 2008a). There are no recorded occurrences of this species at or adjacent to the VCSNS site or along the existing transmission lines and none were found during targeted threatened and endangered plant surveys conducted previously (SCE&G 2002; NRC 2004; Nelson 2006, 2007). Therefore, the review team has determined that operation at the VCSNS site would have no effect on Canby's dropwort.

5.2.2 Transmission-Line Corridors

The impacts of operation on terrestrial and aquatic species within transmission-line corridors were determined, as described below.

5.2.2.1 Terrestrial

Electric power transmission systems have the potential to affect terrestrial ecological resources through corridor maintenance, bird collisions with transmission lines and structures, electrocution, and electromagnetic fields. Vegetation control in the proposed transmission-line corridors would be the primary source of potential impacts on threatened and endangered species. Both SCE&G and Santee Cooper have established maintenance procedures for power transmission systems (SCE&G 2006; Sott 2006; MACTEC 2008). Transmission-line corridors must be kept clear of woody growth through maintenance practices that prevent growth from becoming a safety hazard or potentially interrupting service. SCE&G and Santee Cooper have maintenance cycles for tree trimming that range from 1 to 7 years depending on the activity. Both utilities use chemical and mechanical control methods appropriate for the location, terrain, and vegetation or habitat present. Chemical methods include the use of nonrestricted-use herbicides (only herbicides registered by the EPA) to control any vegetation that may interfere with the transmission-line corridor. In general, both companies spray herbicides on a 3-year rotation. The consistent use of herbicides results in the growth of low-growing, nonwoody vegetation such as grasses and other native plants. Mechanical methods of vegetation control include hand clearing, pruning, mowing, and felling (SCE&G 2009a; Sott 2006; MACTEC 2008).

The impact of transmission-line corridor maintenance on wildlife and habitats, including floodplains and wetlands, was evaluated in the V.C. Summer generic EIS for license renewal (NRC 2004), and the impact was found to be of minimal significance at operating nuclear power plants with associated transmission-line corridors of variable widths (NRC 2004). SCE&G and Santee Cooper have procedures in place that minimize adverse impacts on wildlife and important habitats such as floodplains and wetlands (SCE&G 2009a). Corridor maintenance would be performed by Santee Cooper and SCE&G (in their respective corridors) in compliance

with applicable Federal, State, and local laws, regulations, and permit requirements. Therefore, the potential effects on threatened and endangered species from transmission-line maintenance in existing and new transmission-line corridors would not likely adversely affect those species listed above.

5.2.2.2 Aquatic

Carolina heelsplitter (*Lasmigona decorata*). Maintenance activities along the six new 230-kV transmission lines in the five proposed corridors could lead to periodic temporary impacts on the waterways being crossed. However, it is assumed that the same vegetation-management practices currently used by SCE&G and Santee Cooper for the existing facility transmission-line corridors would be applied to the proposed five transmission-line corridors. SCE&G and Santee Cooper practices and procedures were developed to prevent impacts on aquatic habitats so that impacts on aquatic ecosystems from operation and maintenance of transmission lines would be minimal. Methods used by SCE&G and Santee Cooper would include not disturbing root mats in steam buffer zones; leaving low-growing vegetation intact, to the maximum extent practicable, in stream buffer zones; not changing wetland contours; not building access roads in wetlands; minimizing soil disturbance and rutting in wet areas; and using erosion-control measures and BMPs to comply with the S.C. Stormwater Management and Sediment Reduction Act (FP&S 2008) (MACTEC 2008). Only EPA-approved herbicides registered for use in wetlands or aquatic sites would be used and their application would be limited to selective low-volume treatments aimed at controlling undesirable woody vegetation while still promoting low-growing native vegetation (MACTEC 2008). Both SCE&G and Santee Cooper restrict the use of heavy equipment around wetlands and stream crossings to prevent erosion and sedimentation (SCE&G 2009a). The review team concludes that based upon the right-of-way vegetation management and maintenance plans followed by SCE&G and Santee Cooper, the impacts of transmission-line corridor maintenance activities on aquatic resources would not adversely affect the Carolina heelsplitter and its critical habitat, and additional mitigation beyond that described above would not be warranted.

6.0 Cumulative Effects

Future activities in the vicinity of the proposed transmission-line corridors that may affect threatened and endangered terrestrial species would include the continued expansion of the existing transmission system and other development activities, residential and commercial, in the vicinity of the proposed transmission-line corridors. This would result in further loss of habitat and increased forest fragmentation that would affect species that inhabit those areas.

Anthropogenic activities such as residential or industrial development near the vicinity of the proposed transmission-line corridors may introduce additional constraints on aquatic resources. Future activities may include shoreline development (i.e., removal of habitat), increased water needs, and increased discharge of effluents into the river basins of South Carolina. Climate change is expected to affect the Southeastern United States by decreasing rainfall, increasing water temperature, and increasing shoreline erosion (Karl et al. 2009). VCSNS transmission-line corridor construction and maintenance would not add to these potential impacts and there would be no cumulative adverse effect on protected species.

7.0 Conclusions

The potential impacts of building and operating the proposed Units 2 and 3 at the VCSNS site plus the associated off-site transmission lines on the species listed in Table 1-1 are listed in Table 7-1. The known distributions and records of these species, the potential ecological impacts of the construction and operation to the species, their habitat, and their prey have been considered in this biological assessment. Building and operating the subject facilities at the VCSNS site are not likely to affect any species or critical habitat listed under the Federal Endangered Species Act. Clearing forest vegetation for new or widened rights-of-way in some of the possible routes for proposed transmission lines, while a preconstruction activity that is not a part of the NRC action, could affect individuals of several species indicated in Table 7-1. This clearing, however, is not expected to adversely affect populations of these species.

Table 7-1. Species Potentially Affected by Construction and Operation of Proposed VCSNS Units 2 and 3

Scientific Name	Common Name	Status	Determination
Birds			
Charadrius melodus	Piping plover	T	No effect
Mycteria americana	Wood stork	E	May affect; not likely to adversely affect
Picoides borealis	Red-cockaded woodpecker	E	May affect; not likely to adversely affect
Amphibians			
Ambystoma cingulatum	Flatwoods salamander	T	May affect; not likely to adversely affect
Mollusks			
Lasmigona decorata	Carolina heelsplitter	E	May affect, not likely to adversely affect
Vascular Plants			
Amphianthus pusillus	Pool sprite	T	May affect; not likely to adversely affect
Echinacea laevigata	Smooth coneflower	E	May affect; not likely to adversely affect
Helianthus schweinitzii	Schweinitz's sunflower	E	May affect; not likely to adversely affect
Isoetes melanospora	Black-spored quillwort	E	May affect; not likely to adversely affect
Lindera melissifolia	Pondberry	E	May affect; not likely to adversely affect
Lysimachia asperulifolia	Rough-leaved loosestrife	E	May affect; not likely to adversely affect
Oxypolis canbyi	Canby's dropwort	E	May affect; not likely to adversely affect
Ptilimnium nodosum	Harperella	E	May affect; not likely to adversely affect
Trillium reliquum	Relict trillium	E	May affect; not likely to adversely affect

8.0 References

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

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

40 CFR Part 122. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 122, “EPA Administered Permit Programs: the National Pollutant Discharge Elimination System.”

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Biological Assessment

National Marine Fisheries Service

Virgil C. Summer Nuclear Station
Combined License Application

U.S. Nuclear Regulatory Commission Combined License Application
Docket No. 52-027 and 52-028

U. S. Army Corps of Engineers Permit Application
Permit Application No. SAC 2007-1852-SIR (Virgil C. Summer Nuclear Station Units 3 and 4, South Carolina Electric & Gas)

Fairfield County, South Carolina

April 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Charleston District

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from South Carolina Electric & Gas (SCE&G) for combined NRC-authorized construction permits and operating licenses (COLs) to build and operate two new nuclear reactors on the site of the Virgil C. Summer Nuclear Station (VCSNS). The U.S. Army Corps of Engineers (USACE) is reviewing an application from SCE&G for a Department of the Army (DA) Permit pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 and Section 404 of the Clean Water Act (33 USC 1251) to perform site-preparation activities and build supporting facilities for two proposed nuclear power-generation units (Units 2 and 3) with two Westinghouse Electric Company, LLC (Westinghouse) Advanced Passive 1000 (AP1000) pressurized water reactors. The USACE is cooperating with the NRC to verify that the information presented in the National Environmental Policy Act of 1969, as amended (NEPA) document is adequate to fulfill the requirements of USACE regulations; the Clean Water Act Section 404(b)(1) Guidelines, which contain the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into waters of the United States; and the USACE public-interest review process. The NRC and the USACE have prepared this biological assessment to support their joint consultation with the National Marine Fisheries Service (NMFS) in accordance with Section 7(c) of the Endangered Species Act of 1973, as amended (ESA). The USACE permit decision will be made following issuance of the final environmental impact statement.

Currently, there is one operating nuclear reactor, Unit 1, on the VCSNS site. Proposed Units 2 and 3 would be located approximately 4700 ft south and 1800 ft west, respectively, of the center of the existing Unit 1 containment building. The VCSNS is approximately 26 mi northwest of Columbia, South Carolina.

The USACE and the NRC are conducting a joint consultation and have prepared this biological assessment, which examines the potential impacts of building and operating the proposed VCSNS Units 2 and 3, including proposed transmission lines, on threatened or endangered species pursuant to the ESA. This biological assessment examines the effects of the proposed action on five Federally threatened or endangered aquatic species presented in Table 1-1, which are known to occur in several counties in South Carolina proposed for transmission-line corridor routing for transmission of power from VCSNS Units 2 and 3.

Table 1-1. Federally Listed Aquatic Species Occurring in Aiken, Calhoun, Colleton, Dorchester, Hampton, Lexington, Orangeburg, or Richland Counties, South Carolina

Scientific Name	Common Name	Federal Status	County of Occurrence
Acipenser brevirostrum	Shortnose sturgeon	Endangered	Aiken, Calhoun, Colleton, Dorchester, Hampton, Lexington, Orangeburg, Richland
Caretta caretta[(a)]	Loggerhead sea turtle	Threatened	Colleton
Lepidochelys kempii[(a)]	Kemp's ridley sea turtle	Endangered	Colleton
Chelonia mydas[(a)]	Green sea turtle	Threatened	Colleton
Dermochelys coriacea[(a)]	Leatherback sea turtle	Endangered	Colleton

Data Source: FWS 2008

(a) All construction and operation for VCSNS Units 2 and 3 will occur in noncoastal areas of Colleton County, thus avoiding any potential for impacts to sea turtle species. Therefore, these species are not discussed further in this biological assessment.

2.0 VCSNS Site Description

The VCSNS site is located in Fairfield County, South Carolina, approximately 26 mi northwest of Columbia, South Carolina (Figure 2-1). The site is in a sparsely populated, largely rural area, with forests and small farms comprising the dominant land uses. The major aquatic environments within the vicinity of proposed VCSNS Units 2 and 3 include the Broad River, Monticello and Parr reservoirs, and Mayo Creek. Mayo Creek is the largest stream within the site and vicinity and it receives drainage from several small seasonal tributary channels. The Monticello and Parr reservoirs are the largest waterbodies near the site (Figure 2-2).

2.1 Broad River

The Broad River basin encompasses approximately 2400 mi^2 and 27 watersheds within the State of South Carolina, and includes almost 2800 mi of streams and more than 14,500 ac of lakes. The basin falls within the boundaries of seven counties in the state: Cherokee, Spartanburg, York, Union, Chester, Fairfield, and Richland (SCDHEC 2007). Within the State of South Carolina, the Broad River basin is entirely within the Piedmont ecoregion. The Piedmont is characterized by gently rolling to hilly terrain, with relatively confined stream valleys, and elevations ranging from 375 to 1000 ft above mean sea level (msl). Major tributaries of the Broad River basin include the Tyger and Enoree rivers, which intersect the Broad River from the west (SCE&G 2009). Of the 1.5 million ac associated with the basin, more than 60 percent are forested, with approximately 24 percent used for agriculture, and less than 10 percent classified as urban development (SCDHEC 2007). As shown in Figure 2-2, the Broad River flows south along the Sumter National Forest and flows to the west of the VCSNS site. A run-of-the-river impoundment along the Broad River near the vicinity of the VCSNS forms the Parr Reservoir.

2.2 Parr Reservoir

As described by SCE&G (2009), the Parr Reservoir was created in 1914 by installing a 2000-ft-long dam across the Broad River at Parr Shoals to provide a pool for the original Parr Hydroelectric Generating Station (also Parr Hydroelectric Plant or Parr Hydro) (Figure 2-2). Before 1977, the surface area of the reservoir was 1850 ac. In 1977, the reservoir level was raised 9 ft, which increased the surface area to approximately 4400 ac, to accommodate the operation of the Fairfield Pumped Storage Facility (FPSF) (SCE&G 2009). Parr Reservoir is approximately 7 mi long and has an average water depth of 15 ft (SCE&G 2009). Because of the operation of the FPSF, hydrologic patterns in the Parr Reservoir are variable. Generally, water from the Monticello Reservoir is released through the FPSF into Parr Reservoir throughout the day and early evening to provide hydroelectric power at Parr Shoals Dam, resulting in a net southward flow in Parr Reservoir. During the night, when electrical demand is lower, water from Parr Reservoir is pumped upward into the Monticello Reservoir, reversing the flow to the north in Parr Reservoir (SCE&G 2009).

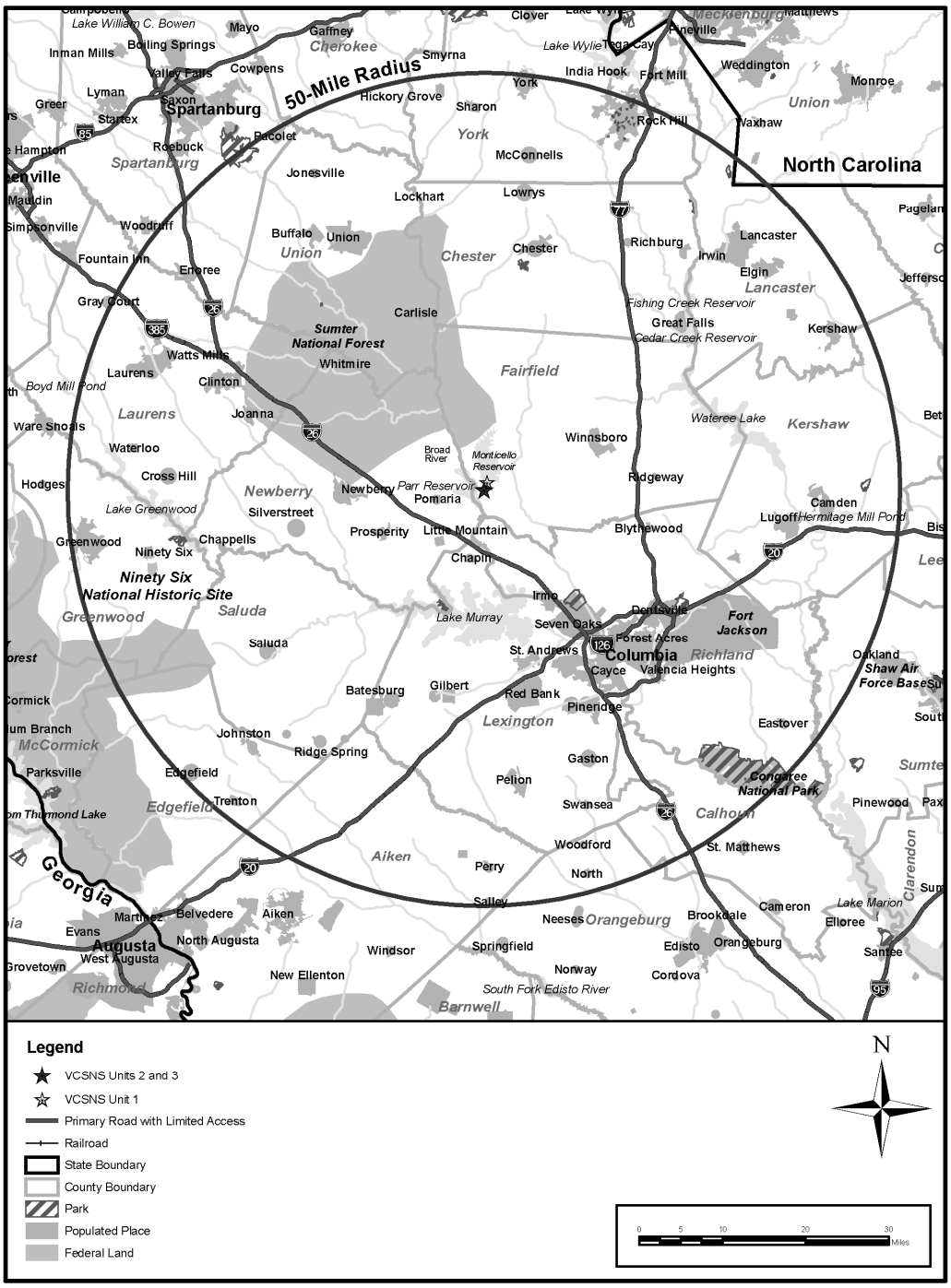

Figure 2-1. VCSNS Site Location in Relationship to the Counties and Cities Within a 50-Mi Radius of the Site (SCE&G 2009).

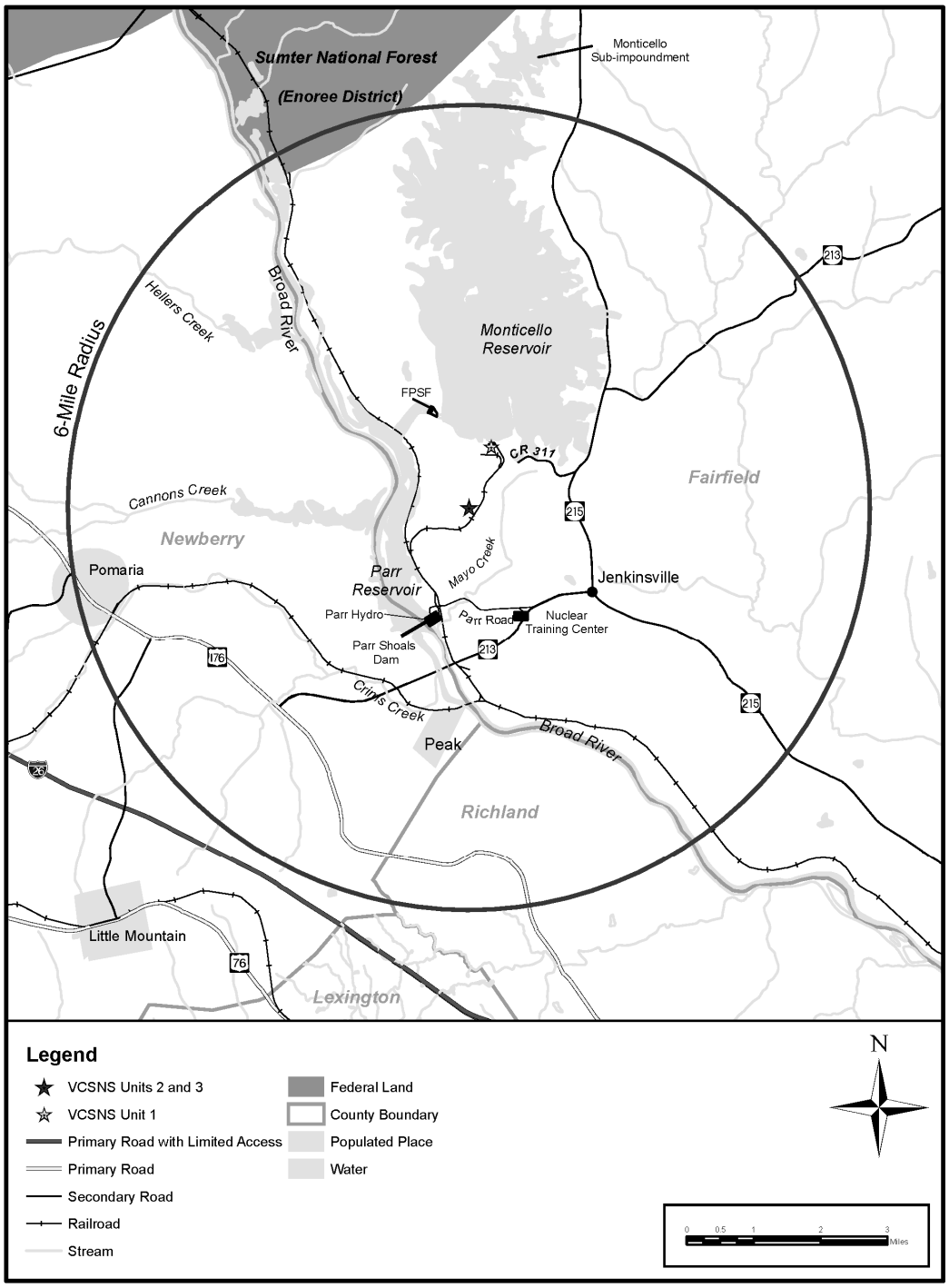

Figure 2-2. Map of the VCSNS Site and Vicinity Within a 6-Mi Radius (SCE&G 2009).

2.3 Monticello Reservoir

The Monticello Reservoir was formed in 1977 by damming Frees Creek, a small tributary of the Broad River that flowed into Parr Reservoir approximately 1 mi upstream from the Parr Shoals Dam (SCE&G 2009). The reservoir is hydraulically connected to the Parr Reservoir via the FPSF, and it serves both as an upper pool for the FPSF and as a cooling pond for VCSNS Unit 1 (Figure 2-2). To the northeast, the reservoir contains a subimpoundment, which is a 300-ac area owned by SCE&G and co-managed by SCE&G and the South Carolina Department of Natural Resources (SCDNR) (SCE&G 2009; SCDNR 2002). The Monticello Reservoir, excluding the subimpoundment, is approximately 6 mi long and has a total surface area of 6500 ac. The average water depth is 59 ft and the maximum depth is 126 ft (SCE&G 2009).

2.4 Onsite Streams

Mayo Creek is the primary perennial stream located on the VCSNS site. The creek originates 0.5 mi southeast of VCSNS Unit 1 and flows approximately 3.6 mi southwest before draining into the Broad River, downstream of the Parr Shoals Dam (Figure 2-2). The Mayo Creek drainage area is approximately 6 mi^2 and encompasses mixed hardwood forests that may mitigate surface-water temperatures during warm summer months (Tetra Tech NUS, Inc. 2007; SCE&G 2009). In addition to Mayo Creek, there are intermittent and seasonal stream channels within the VCSNS site vicinity. Fish have been noted in residual pools associated with intermittent tributary channels, but there may be insufficient water to maintain connectivity between habitats and perpetuate aquatic biota (Tetra Tech NUS, Inc. 2007).

2.5 Offsite Lakes, Streams, and Ponds

The delivery of power associated with VCSNS Units 2 and 3 would require upgrading existing transmission-line corridors and installing new corridors, transmission lines, and substations. Two entities, SCE&G and Santee Cooper (the State-owned electric and water utility, formally called South Carolina Public Service Authority), are responsible for identifying the proposed locations associated with new and upgraded transmission lines. In total, six new 230-kV lines are proposed for the transmission of electricity associated with proposed VCSNS Units 2 and 3. The six new lines cover five proposed corridors that occur in the Southern Outer Piedmont, Sandhills, and Coastal Plain ecoregions and cover a total of 97.85 ac of fresh water and no marine waters (FP&S 2008; MACTEC 2008). Systematic aquatic surveys are not included as part of the transmission-line site-selection process. In the absence of empirical data, reconnaissance-level information pertaining to species designated as endangered, threatened, or species of concern associated with the counties in which the transmission lines would occur was derived from the U.S. Fish and Wildlife Service (FWS) records (FWS 2008) and the South Carolina Heritage Trust Program (SCDNR 2006).

3.0 Proposed Federal Actions

The proposed Federal actions are NRC's issuance of two COLs for the construction and operation of two new nuclear reactors at the VCSNS site pursuant to Title 10 of the Code of Federal Regulations (CFR) Part 52 and the USACE's issuance of a DA permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899.

Prerequisites to certain NRC-authorized construction activities include, but are not limited to, documentation of existing conditions within the VCSNS site and acquisition of the necessary permits (e.g., COL, local building permits, a National Pollutant Discharge Elimination System (NPDES) permit (40 CFR Part 122), a Clean Water Act Section 404 permit, a General Stormwater Permit, and other State and local permits). After these prerequisites are completed, planned building activities could proceed and would include all or some or all the activities pursuant to 10 CFR 50.10(e)(1). Following building, the planned operation of the new reactors would be authorized if the Commission finds, under 10 CFR 52.103(g), that all acceptance criteria in the COLs are met.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" to those activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erection of support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this biological assessment; they are being discussed together as construction activities for this Section 7 consultation.

The USACE regulatory program was originally established pursuant to the Rivers and Harbors Appropriation Acts of 1890 (superseded) and 1899 (33 USC Sec. 401, et seq.). Various sections establish permit requirements to prevent unauthorized obstruction or alteration of any navigable water of the United States, with the most frequently exercised USACE authority contained in Section 10 (33 USC Sec. 403). This section covers construction, excavation, or deposition of materials in, over, or under such waters, or any work that would affect the course, location, condition, or capacity of those waters. In 1972 and in 1977, amendments to the Federal Water Pollution Control Act, known as the Clean Water Act, added "Section 404" authority (33 USC 1344) authorizing the USACE to issue permits for the discharge of material into waters of the United States at specified disposal sites. Selection of such sites must be in

accordance with guidelines developed by the Environmental Protection Agency (EPA) in conjunction with the DA. These guidelines are known as the 404(b)(1) Guidelines for the specification of disposal sites for dredged or fill material. The discharge of all other pollutants into waters of the United States is regulated under Section 402 of the Clean Water Act.

Briefly, the construction and operation activities that could affect the protected estuarine and marine species, based on habitat affinities and life-history characteristics and the nature and spatial and temporal considerations of the activity are as follows:

- Construction
  - Clearing for expansion of existing transmission-line corridors
  - Clearing for new transmission-line corridors
  - Installation of new or upgraded transmission lines and towers
- Operation
  - Vegetation control in transmission-line corridors
  - Transmission-line repairs or upgrades.

3.1 Transmission-Line Corridors

The existing transmission system for VCSNS is owned by SCE&G and Santee Cooper. Six new 230-kV transmission lines would be required in addition to the existing transmission infrastructure for transmission of electricity generated by VCSNS with the addition of Units 2 and 3 (SCE&G 2009). Activities associated with the SCE&G and Santee Cooper transmission systems would include clearing land, installing new poles, hanging new lines, and upgrading existing lines. Figure 3-1 shows the proposed routing for the six new lines in five transmission-line corridors. The corridors described below are as follows:

- VCSNS-Flat Creek – This line is owned by Santee Cooper and crosses Fairfield, Chester, and Lancaster Counties.
- VCSNS-Varnville – This line is owned by Santee Cooper and crosses Fairfield, Newberry, Richland, Lexington, Calhoun, Orangeburg, Dorchester, Colleton, and Hampton Counties.
- VCSNS-Killian – This line is owned by SCE&G and crosses Fairfield and Richland Counties
- VCSNS-Lake Murray – This line is owned by SCE&G and crosses Fairfield, Richland, and Lexington Counties.
- VCSNS-St. George – This line would be a double-circuit line (two lines); owned by SCE&G and it would cross Fairfield, Newberry, Saluda, Lexington, Aiken, Calhoun, Orangeburg, and Dorchester Counties.

3.1.1 Santee Cooper Transmission Lines

The following descriptions of the proposed actions associated with the Santee Cooper transmission lines were derived from the MACTEC (2008) transmission-line siting study. Santee Cooper proposed the addition of 232 mi of transmission lines on the VCSNS-Flat Creek and VCSNS-Varnville lines, with nearly all (98.9 percent) of the additions occurring within existing transmission-line corridors. Santee Cooper transmission lines would cross navigable waters of the State of South Carolina at 18 locations (Figure 3-1). Permitting approval would be required by the USACE through Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403) and the South Carolina Department of Health and Environmental Control (SCDHEC).

The Flat Creek Line is 72 mi long and is located within the Piedmont ecoregion of the state. This line crosses 55 perennial streams and 13 watersheds within the Broad, Catawba, and Pee Dee river basins. Approximately 0.7 mi of existing corridor would need to be widened, and no new corridor clearing would be required. The largest water crossings associated with the Flat Creek line occur at an unnamed impoundment near Winnsboro (1200 ft wide) and the Fishing Creek Reservoir (1300 ft wide) in Fairfield County.

The Varnville line is 163 mi long and is located within the Piedmont and Coastal Plain ecoregions of the state. The Varnville line crosses 85 perennial streams within 23 watersheds and falls within the Salkehatchie, Edisto, Saluda, and Broad river basins. The Varnville line crosses the Saluda River at a point that is 240 ft wide and also crosses the Broad River at two discrete locations (475 ft and 500 ft wide). The installation of transmission lines across waterbodies would be done in accordance with SCDHEC consultation and permitting, and for the majority of installation activities it would be done in existing corridors. The 2.44 mi of new right-of-way proposed by Santee Cooper would require a 100-ft-wide transmission-line corridor to be cleared next to an existing corridor for spanning 2500 ft of the Parr Reservoir located in Fairfield and Newberry Counties (MACTEC 2008). Two transmission structures are currently in place within this span; one is located on an island within Parr Reservoir, and the other is within the Parr Reservoir itself. However, these are in the adjacent corridor, and Santee Cooper has indicated that one or two new structures may need to be installed within Parr Reservoir. Placement of pile foundations in the Parr Reservoir would be required for installation of new transmission towers, but no dredging activities would be required (MACTEC 2008).

3.1.2 SCE&G Transmission Lines

The final locations for the majority of the proposed SCE&G transmission-line corridors have yet to be determined. The following descriptions of the proposed actions associated with the SCE&G transmission lines were derived from the FP&S (2008) transmission-line siting study. The SCE&G transmission system would cross numerous streams and rivers throughout the State of South Carolina, which includes the Piedmont and Coastal Plain ecoregions (Figure 3-1). Pole structures would be spaced 500 to 800 ft apart and would be expected to

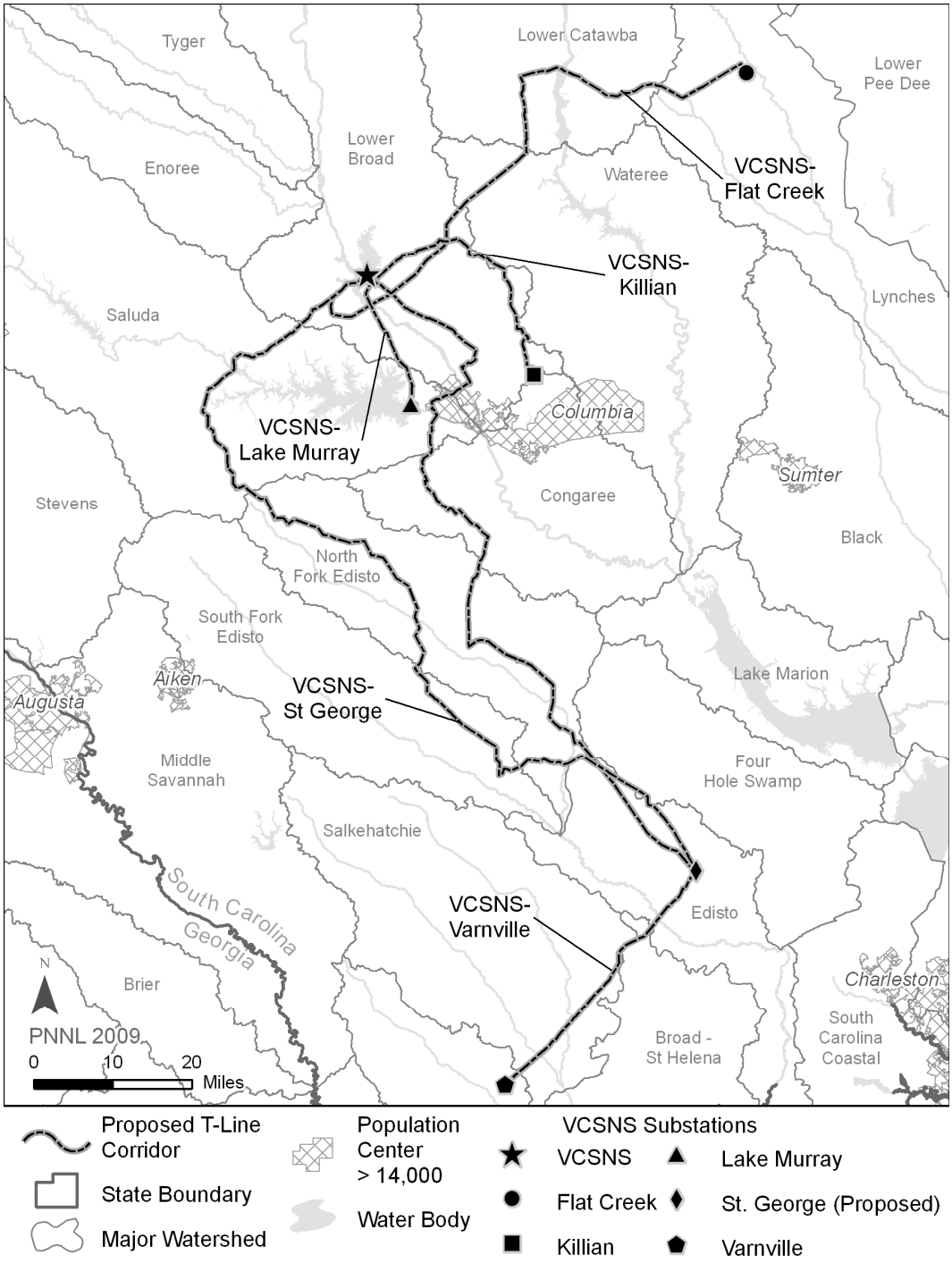

Figure 3-1. Proposed SCE&G and Santee Cooper Transmission-Line Corridors in Relation to Crossings of Major Waterbodies

span all waterbodies (FP&S 2008). The proposed VCSNS-Lake Murray line would include upgrading an existing transmission-line corridor along 19 mi with no new corridor or expansion activities (FP&S 2008).

The VCSNS-Killian line would require almost 19 mi of expansion in existing corridors, and approximately 18 mi of new corridor. An estimated 24.2 ac of corridor would be cleared within 100 ft of a stream, river, lake, or pond for the VCSNS-Killian line. Only 0.6 ac of river, lake, stream, or pond habitat is within the proposed VCSNS-Killian corridor (FP&S 2008). There are no marine waters associated with this corridor. For the 134-mi VCSNS-St. George line, 66 mi of existing corridor would be expanded and over 68 mi of new corridor would be prepared. Over 131 ac would be cleared within 100 ft of a stream, river, lake, or pond habitat, and 19.4 ac of freshwater habitat is within the proposed corridor (FP&S 2008). There are no marine waters associated with this corridor. For both the VCSNS-Killian and VCSNS-St. George corridors, SCE&G has indicated that exact positioning of corridors would avoid running in close parallel to streams so that stream buffer zones would be preserved and impacts to bodies of freshwater would be minimized (FP&S 2008).

Impacts on the waterways associated with transmission-line activities would include erosion of soils, potential for pollutant discharge from equipment, and temporary disturbance and/or displacement of aquatic biota. Both SCE&G and Santee Cooper plan to implement best management practices (BMPs) to minimize adverse conditions for aquatic biota and habitats during transmission-line installation activities such as installation and replacement of transmission structures on the banks at river and stream crossings in such a way that runoff would be diverted, resulting in minimal impacts on adjacent streams and rivers (MACTEC 2008; FP&S 2008). In addition, both SCE&G and Santee Cooper have acknowledged the need to acquire State and Federal permits and incorporate BMPs and stormwater pollution prevention plans into said permits (MACTEC 2008; FP&S 2008). SCE&G states, “SCE&G will comply with the S.C. Stormwater Management and Sediment Reduction Act related to water quality protection and will comply with the recommendations of various regulatory agencies, including the S.C. Department of Natural Resources, S.C. Department of Health and Environmental Control, the U.S. Army Corps of Engineers, etc.” (FP&S 2008).

Maintenance activities along the six new 230-kV transmission lines could lead to temporary impacts on the waterways being crossed (Figure 3-1). However, it is assumed that the same vegetation-management practices currently used by SCE&G and Santee Cooper for the existing transmission-line corridors would be applied to the proposed new and upgraded transmission-line corridors (MACTEC 2008; FP&S 2008). SCE&G and Santee Cooper practices and procedures were developed to prevent impacts on aquatic habitats so that impacts on aquatic ecosystems from operation and maintenance of transmission lines would be minimal. Santee Cooper would continue to use its Right-of-Way Management Unit Plan, which addresses vegetation clearing or maintenance for stream buffer zones (MACTEC 2008). Only EPA-

approved herbicides registered for use in wetlands or aquatic sites would be used and their application would be limited to selective low-volume treatments aimed at controlling undesirable woody vegetation while still promoting low-growing native vegetation (MACTEC 2008). Low-growing vegetation along shorelines would be maintained as buffer zones (MACTEC 2008). Both SCE&G and Santee Cooper restrict the use of heavy equipment around stream crossings to prevent erosion and sedimentation (SCE&G 2009).

4.0 Protected Species Descriptions

This section describes the life history and habitat use for Federally listed estuarine and marine species that may occur in or near the VCSNS proposed transmission-line corridors (Table 1-1).

4.1 Shortnose Sturgeon (*Acipenser brevirostrum*)

The shortnose sturgeon is a member of the Order Acipenseriformes, which includes the long-lived sturgeons and paddlefishes. The species is listed as Federally endangered and ranges along the western Atlantic coast from the Saint John River, New Brunswick, to the St. Johns River, Florida (NOAA 1998). Shortnose sturgeon inhabit coastal rivers and migrate between freshwater and estuarine river habitats. The NMFS describes 19 shortnose-sturgeon population units along its range, which is divided into northern and southern regions (NOAA 1998). The southern region includes populations starting in the Carolinas from about the Cape Fear River, North Carolina, southward.

The shortnose sturgeon has experienced severe declines in abundance that are largely attributable to pollution, overfishing, and damming of rivers used for spawning habitat (NOAA 1998). The FWS listed the shortnose sturgeon as endangered in 1967 (NOAA 1998). NMFS assumed responsibility for the species in 1974, and a recovery plan was prepared in 1998 (NOAA 1998). Nineteen population units are considered by NMFS, based on linkages between major rivers or estuaries along the Atlantic coast and differences in life-history properties among populations, and were assumed to represent genetically discrete populations (Kynard 1997). Wirgin et al. (2005) found that genetic data supported the possible existence of many genetically distinct subpopulations of shortnose sturgeon in tributaries along the western Atlantic coast. A more recent study generally supported the population segments identified by NMFS. However, Santee River sturgeon differed significantly from the nearby Winyah Bay populations, but not from Cooper River shortnose sturgeon, suggesting that Cooper River shortnose sturgeon are descendants of Santee River populations and are unable to access natal spawning habitats (Wirgin et al. 2009). NMFS initiated a status review for the shortnose sturgeon in November 2007 to update the biological information on the status of the species and to consider whether shortnose sturgeon should be identified and assessed as Distinct Population Segments rather than as a single unit (72 FR 67712).

4.1.1 Shortnose Sturgeon Biology

Shortnose sturgeon are primarily amphidromous freshwater fish, living primarily in their natal freshwater river system and low-salinity estuaries with occasional migrations into higher-salinity coastal waters to feed (Bemis and Kynard 1997; NOAA 1998). While there are variations in

specific life-history characteristics across its range, the following information is based on southern-region populations.

Larvae develop normal swimming attributes by 9 to 12 days post-hatch and may seek out deep waters within their natal freshwater habitats where they feed and develop into juveniles in about 3 years. Juveniles move back and forth between freshwater and estuarine habitats within natal river systems, seeking out cooler, deeper waters during summer months (Collins et al. 2002). This pattern continues into adulthood; however, Parker (2007) indicates that this species may have river-specific migration patterns developed to accommodate habitat fluctuations indigenous to that area. Shortnose sturgeon from southern regions tend to grow faster than those in more northern habitats. Adults reach about 4 ft in length. For South Carolina, males spawn between 3 and 5 years of age and females before 6 years of age (Dadswell et al. 1984). Sturgeon may spawn over a period of a few weeks in 2- or 3-year intervals, and spawning habitat is most often characterized as the most upstream reach of the natal river during the late winter/early spring (Hall et al. 1991). Preferred spawning substrate for the Congaree River shortnose sturgeon is characterized as hard bottom (Collins et al. 2003).

4.1.2 Shortnose Sturgeon in South Carolina Rivers

In South Carolina, populations of shortnose sturgeon exist in the Savannah, Ashepoo, Combahee, and Edisto rivers (flowing to St. Helena Sound), the Cooper, Santee, and the Pee Dee, Waccamaw, and Black rivers (flowing to Winyah Bay). There is also a small landlocked population in the Santee-Cooper Lake System (Collins et al. 2003). With the exception of the Savannah River, the South Carolina river populations of shortnose sturgeon are less studied than populations in more northern regions. River drainages inhabited by shortnose sturgeon that lie in counties with proposed transmission-line corridors for VCSNS Units 2 and 3 include only the Ashepoo, Combahee, and Edisto rivers, and the Santee-Cooper Lake System including the Congaree River (Figure 4-1). A study by Collins et al. (2003) investigated the reproductive potential of the shortnose sturgeon population in the Congaree River within the Santee-Cooper System (SCS) because this population was effectively landlocked when a dam was constructed on the Santee River in 1941. This same study documented the migration of Lake Marion shortnose sturgeon to a spawning site on the Congaree River just south of Columbia, South Carolina. Genetic studies further confirmed the assumption that the SCS shortnose sturgeon are derived from the Santee and Cooper river populations, and have become isolated above the Lake Marion dam (Collins et al. 2003). Shortnose sturgeon have been reported in the Ashepoo and South Edisto rivers within the ACE (Ashepoo, Combahee, Edisto) river basin, but no other life-history characteristics or effective-population sizes have been documented for these populations (Collins and Smith 1997).

Figure 4-1. Santee River Drainage Showing Locations of VCSNS Site (white circle) in Relation to Congaree River and the Santee-Cooper System

5.0 Potential Environmental Effects of the Proposed Actions

This section describes the potential impacts from construction and operation of the proposed Units 2 and 3 on shortnose sturgeon in Aiken, Calhoun, Colleton, Dorchester, Hampton, Lexington, Orangeburg, and Richland Counties in South Carolina.

5.1 Impacts of Construction

Although the final siting and exact locations of transmission-line corridors have not been finalized, SCE&G expects that the current siting studies are representative of the most likely corridors for expansion, clearing, and upgrades for transmission systems necessary for VCSNS Units 2 and 3 (FP&S 2008; MACTEC 2008).

The installation of transmission systems associated with the Santee Cooper lines is proposed for two corridors: VCSNS-Flat Creek and VCSNS-Varnville. The VCSNS-Flat Creek line crosses Fairfield, Chester, and Lancaster Counties and contains no waterbodies that are known habitat for shortnose sturgeon. The VCSNS-Varnville line crosses Fairfield, Newberry, Richland, Lexington, Calhoun, Orangeburg, Dorchester, Colleton, and Hampton Counties. Shortnose sturgeon are known to inhabit the Congaree River, which runs along Lexington, Richland, and Calhoun Counties. The proposed new corridor segment for this line does not occur in these counties along the Congaree River (MACTEC 2008). However, the VCSNS-Varnville line would cross other river habitats that may have shortnose sturgeon present in the proposed transmission-line corridor sited through Orangeburg, Dorchester, Colleton, and Hampton Counties. This line would cross the North Fork Edisto River at two locations: the Edisto River and the Salkehatchie River just north of where it flows into the Combahee River. However, these waterbodies would be spanned by transmission lines and in-water installation activities are not expected. By following State and Federal BMPs associated with water quality, the review team concludes that the impacts of the preparation for and installation of new transmission-line corridors would be minimal for the VCSNS-Varnville corridor.

SCE&G has proposed to install, expand, or upgrade three transmission-line corridors: VCSNS-Killian, VCSNS-Lake Murray, and VCSNS-St. George. The VCSNS-Killian corridor crosses only Fairfield and Richland Counties, and does not cross waterbodies in either county that are known habitat for shortnose sturgeon. The VCSNS-Lake Murray corridor crosses Fairfield, Richland, and Lexington Counties. This corridor runs to the north of Lake Murray in Richland and Lexington Counties, with the closest habitat for shortnose sturgeon being the Congaree River to the southeast. Because this corridor does not occur near the Congaree River, it would not impact habitat for the shortnose sturgeon. The VCSNS-St. George corridor crosses Fairfield, Newberry, Saluda, Lexington, Aiken, Calhoun, Orangeburg, and Dorchester Counties. This

corridor would cross the North Fork Edisto River along the Lexington and Aiken County line to the southwest of Woodford, South Carolina, and in Orangeburg County just southwest of the city of Orangeburg (FP&S 2008), both in the Upper Edisto River basin. Shortnose sturgeon were reported to occupy the South Fork Edisto River in 1997 (Collins and Smith 1997); however, there have been no specific reports of this species in the North Fork Edisto River. Because there are no physical barriers to migration from the ACE river basin to the North Fork Edisto River, shortnose sturgeon may inhabit this reach with the basin in two locations where the transmission-line corridor crosses. SCE&G plans to implement BMPs to minimize adverse conditions for aquatic biota and habitats during transmission-line installation activities such as installation and replacement of transmission structures on the banks at river and stream crossings in such a way that runoff would be diverted, resulting in minimal impacts on these waterbodies (FP&S 2008). By following State and Federal BMPs associated with water quality, the review team concludes that the impacts of the preparation for and installation of new transmission-line corridors would be minimal for the VCSNS-St. George corridor.

5.2 Impacts of Operations

Maintenance activities along the six new 230-kV transmission lines could lead to periodic temporary impacts on the waterways being crossed. Both the VCSNS-Varnville and VCSNS-St. George transmission-line corridors cross aquatic habitat that may be used by shortnose sturgeon. However, it is assumed that the same vegetation-management practices currently used by SCE&G and Santee Cooper for the existing facility transmission-line corridors would be applied to the proposed VCSNS-Varnville and VCSNS-St. George transmission-line corridors, respectively. SCE&G and Santee Cooper practices and procedures were developed to prevent impacts on aquatic habitats so that impacts on aquatic ecosystems from operation and maintenance of transmission lines would be minimal. Methods used by SCE&G and Santee Cooper would include not disturbing root mats in stream buffer zones; leaving low-growing vegetation intact, to the maximum extent practicable, in stream buffer zones; not changing wetland contours; not building access roads in wetlands; minimizing soil disturbance and rutting in wet areas; and using erosion-control measures and BMPs to comply with the S.C. Stormwater Management and Sediment Reduction Act (FP&S 2008; MACTEC 2008). Only EPA-approved herbicides registered for use in wetlands or aquatic sites would be used and their application would be limited to selective low-volume treatments aimed at controlling undesirable woody vegetation while still promoting low-growing native vegetation (MACTEC 2008). Both SCE&G and Santee Cooper restrict the use of heavy equipment around stream crossings to prevent erosion and sedimentation (SCE&G 2009). The review team concludes that based upon the right-of-way management and maintenance plans followed by SCE&G and Santee Cooper, the impacts of transmission-line corridor maintenance activities on aquatic resources would not adversely affect aquatic ecosystems, and additional mitigation beyond that described above would not be warranted.

6.0 Cumulative Effects on Shortnose Sturgeon

The NRC and the USACE review team considered potential cumulative effects on shortnose sturgeon that could occur because of building and operating new nuclear units at the VCSNS site proposed by SCE&G in its Combined License Application and Environmental Report. For this analysis, cumulative effects include the effects of future State, Tribal, local, and private actions that are reasonably certain to occur in the action area considered in this biological assessment. Future Federal actions that are not related to the proposed action are not considered because they require separate consultation pursuant to Section 7 of the ESA (16 USC 1531, et seq.). The future is defined as the period from the start of construction of the proposed VCSNS Units 2 and 3 until the conclusion of decommissioning. The action area for this evaluation includes the ACE river basin.

Anthropogenic activities such as residential or industrial development near the vicinity of the proposed transmission-line corridors may introduce additional constraints on aquatic resources. Future activities may include shoreline development (i.e., removal of habitat), increased water needs, and increased discharge of effluents into the ACE river basin. Water quality in the ACE river basin is monitored through compliance with NPDES permits, which have been issued for 13 municipal and industrial facilities within the basin (SCDNR 2009).

Climate change is expected to affect the southeastern United States by decreasing rainfall, increasing water temperature, and increasing shoreline erosion (Karl et al. 2009). VCSNS transmission-line corridor construction and maintenance would not add to these potential impacts and there would be no cumulative adverse effect on protected species.

7.0 Conclusions

The potential impacts of the construction and operation of proposed VCSNS Units 2 and 3 on shortnose sturgeon in the proposed transmission-line corridors, while not entailed by the proposed NRC action, have been evaluated. The known distributions and records of the species, the potential ecological impacts of the construction and operation on the species, its habitat, and its prey have been considered in this biological assessment.

Based on this review and SCE&G's and Santee Cooper's commitment to proper siting of associated transmission lines in accordance with Federal, State, and local regulations and permit requirements; minimizing interactions with waterbodies and watercourses along the transmission-line corridors; and using appropriate State and Federal BMPs during corridor preparation, tower placement, and corridor maintenance to protect water quality, the NRC and the USACE conclude that the overall effects of the construction and operation of the proposed new units at the VCSNS site would not be likely to adversely affect or jeopardize the continued existence of the shortnose sturgeon in Aiken, Calhoun, Colleton, Dorchester, Hampton, Lexington, Orangeburg, or Richland Counties of South Carolina.

8.0 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

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

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

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Appendix G

Supporting Documentation for Radiological Dose Assessment

Appendix G

Supporting Documentation for Radiological Dose Assessment

The U.S. Nuclear Regulatory Commission (NRC) staff performed an independent dose assessment of the radiological impacts resulting from normal operation of the existing and proposed new nuclear units at and near the Virgil C. Summer Nuclear Station (VCSNS). The results of this assessment are presented in this appendix and are compared to the results from South Carolina Gas & Electric (SCE&G) found in Section 5.9, Radiological Impacts of Normal Operations. The appendix is divided into four sections: (1) dose estimates to the public from liquid effluents, (2) dose estimates to the public from gaseous effluents, (3) cumulative dose estimates, and (4) dose estimates to the biota from liquid and gaseous effluents.

G.1 Dose Estimates to the Public from Liquid Effluents

The staff used the dose-assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the LADTAP II computer code (Strenge et al. 1986) to estimate doses to the maximally exposed individual (MEI) and population from the liquid effluent pathway of the proposed VCSNS Units 2 and 3. The staff used the annual radioactive-effluent-release reports for the years 2005 and 2006 to estimate doses to the MEI and population from liquid effluent releases from the existing Unit 1 (SCE&G 2006, 2007).

G.1.1 Scope

Doses from the proposed new units to the MEI were calculated and compared with regulatory criteria for the following:

- Total Body – Dose was the total for all pathways (i.e., drinking water, fish consumption, irrigated crops, milk and meat produced on irrigated land, shoreline usage, swimming exposure, boating) with the highest value for either the adult, teen, child, or infant, compared to the 3 mrem/yr per reactor dose design objective in Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix I.

- Organ – Dose was the total for each organ for all pathways (i.e., drinking water, fish consumption, irrigated crops, milk and meat produced on irrigated land, shoreline usage, swimming exposure, boating) with the highest value for either the adult, teen, child, or infant, compared to the 10 mrem/yr per reactor dose design objective specified in 10 CFR Part 50, Appendix I.

The staff reviewed the assumed exposure pathways and the input parameters and values used by SCE&G (2009a) for appropriateness, including references made to the Westinghouse Advanced Passive 1000 (AP1000) Design Control Document (DCD) (Westinghouse 2008). Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The staff concluded that the assumed exposure pathways were reasonable, and that the input parameters and values used by SCE&G were appropriate.

G.1.2 Resources Used

To calculate doses to the public from liquid effluents, the staff used a personal-computer (PC) version of the LADTAP II code entitled NRCDOSE, Version 2.3.8 (Chesapeake Nuclear Services, Inc. 2006) obtained through the Oak Ridge Radiation Safety Information Computational Center (RSICC).

G.1.3 Input Parameters

Table G-1 lists the major parameters used in calculating dose to the public from liquid effluent releases during normal operation.

The Section 5.4.1 of the *Environmental Standard Review Plan* (ESRP) (NRC 2000) requires use of "...projected population for 5 years from the time of the licensing action" (Table G-2), resulting in collective doses that are overestimates of the collective dose that would be received by the significantly smaller population projected for about the year 2020 (5 years from the time of the licensing action under consideration). Because using the larger population results in a larger collective dose, the staff concludes this assumption is conservative.

SCE&G chose to use the discharge flow rate of 1.78×10^3 ft^3/s in its LADTAP II calculations, that is, the minimum historical flow rate of the Broad River (SCE&G (2009b). This assumption will generally lead to an overestimation of doses from the liquid pathway to the MEI, the population, and to biota. The staff concludes that the low-flow assumption is conservative.

G.1.4 Comparison of Results

Table G-3 presents a comparison of SCE&G's results for a single new unit with those determined by the staff. Doses calculated for the MEI and population were similar.

Table G-1. Parameters Used in Calculating Dose to the Public from Liquid Effluent Releases (1 Unit)

Parameter	Staff Value		Comments
New unit liquid effluent source term (Ci/yr)[(a)]	H-3	1.01×10^{3}	Values from Westinghouse AP1000 Design Control Document Table 11.2-7 for a single unit (Westinghouse 2008). Except for rounding differences, these values are the same as those reported in ER Table 3.5-1 (SCE&G 2009a).
	Na-24	1.63×10^{-3}	
	Cr-51	1.85×10^{-3}	
	Mn-54	1.30×10^{-3}	
	Fe-55	1.00×10^{-3}	
	Fe-59	2.00×10^{-4}	
	Co-58	3.36×10^{-3}	
	Co-60	4.40×10^{-4}	
	Zn-65	4.10×10^{-4}	
	Br-84	2.00×10^{-5}	
	Rb-88	2.70×10^{-4}	
	Sr-89	1.00×10^{-4}	
	Sr-90	1.00×10^{-5}	
	Sr-91	2.00×10^{-5}	
	Y-91m	1.00×10^{-5}	
	Y-93	9.00×10^{-5}	
	Zr-95	2.30×10^{-4}	
	Nb-95	2.10×10^{-4}	
	Mo-99	5.70×10^{-4}	
	Tc-99m	5.50×10^{-4}	
	Ru-103	4.93×10^{-3}	
	Ru-106	7.352×10^{-2}	
	Rh-106	7.352×10^{-2}	
	Ag-110m	1.05×10^{-3}	
	Ag-110	1.40×10^{-4}	
	Te-129m	1.20×10^{-4}	
	Te-129	1.50×10^{-4}	
	Te-131m	9.00×10^{-5}	
	Te-131	3.00×10^{-5}	
	Te-132	2.40×10^{-4}	
	I-131	1.413×10^{-2}	
	I-132	1.64×10^{-3}	
	I-133	6.70×10^{-3}	
	I-134	8.10×10^{-4}	
	I-135	4.97×10^{-3}	
	Cs-134	9.93×10^{-3}	
	Cs-136	6.30×10^{-4}	
	Cs-137	1.332×10^{-2}	
	Ba-137m	1.245×10^{-2}	
	Ba-140	5.52×10^{-3}	
	La-140	7.43×10^{-3}	
	Ce-141	9.00×10^{-5}	
	Ce-143	1.90×10^{-4}	
	Ce-144	3.16×10^{-3}	
	Pr-143	1.30×10^{-4}	
	Pr-144	3.16×10^{-3}	
	W-187	1.30×10^{-4}	
	Np-239	2.40×10^{-4}	
	All others	2.00×10^{-5}	

Table G-1. (contd)

Parameter	Staff Value	Comments
Freshwater site	Selected	Discharge is to the freshwater Parr Reservoir (Broad River).
Discharge flow rate (ft^3/s)	1782	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009b).
Source-term multiplier	1	For one unit.
Reconcentration model	No impoundment	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Effluent discharge rate from impoundment system to receiving water body (ft^3/s)	1782	Matches discharge flow rate for "no impoundment" model (Strenge et al. 1986).
Impoundment total volume (ft^3)	0	Set to zero for "no impoundment" model (Strenge et al. 1986).
Shore-width factor	0.2	Suggested value for river shoreline (NRC 1977; Strenge et al. 1986)
Dilution factors for aquatic food and boating, shoreline and swimming, and drinking water	1	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a). The value of "1" indicates no dilution.
Transit time (hr)	0.1	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a). A transit time of 96 hr is used for 50-mi population dose.
Consumption and usage factors for adults, teens, children, and infants	Shoreline usage (hr/yr) 12 (adult) 67 (teen) 14 (child) 0 (infant) Water usage (L/yr) 730 (adult) 510 (teen) 510 (child) 330 (infant) Fish consumption (kg/yr) 21 (adult) 16 (teen) 6.9 (child) 0 (infant)	LADTAP II code default values (NRC 1977; Strenge et al. 1986).
Total 50-mi population	2,131,000	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a). Population distribution used by SCE&G and the staff was for year 2060.
50-mi drinking water population	299,930	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total 50-mi sport fishing (kg/yr)	377,000	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).

Table G-1. (contd)

Parameter	Staff Value	Comments
Total 50-mi shoreline usage (person-hr/yr)	3.59×10^6	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total 50-mi swimming usage (person-hr/yr)	3.59×10^5	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total 50-mi boating usage (person-hr/yr)	3.59×10^6	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Fraction of SC crops irrigated	0.0696	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Fraction of population using contaminated water for drinking and food production	0.141	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Fraction of SC agricultural products within 50 mi radius	0.258	
Irrigation rate for food products (liters per square meter per month)	110	The same as 1 in. per week. Site-specific value used by applicant in LADTAP II Input. Value in Table 5.4-1 of the ER (SCE&G 2009a) was 102.
Fraction of contaminated water not used for feed or drinking water	0	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total production of vegetables within 50 mi radius (kg per year)	6.86×10^7	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Production rate for irrigated vegetables (kg per year)	6.71×10^5	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total production of leafy vegetables within 50 mi radius (kg per year)	1.80×10^7	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Production rate for irrigated leafy vegetables (kg per year)	1.76×10^5	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total production of milk within 50 mi radius (liters per year)	6.78×10^7	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Production rate for irrigated milk (liters per year)	6.63×10^5	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Total production of meat within 50 mi radius (kg per year)	9.15×10^8	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).
Production rate for irrigated meat (kg per year)	8.96×10^6	Site-specific value from Table 5.4-1 of the ER (SCE&G 2009a).

(a) Only radionuclides included in Regulatory Guide 1.109 are considered (NRC 1977).

Table G-2. Population by Sector and Radial Distance Around the VCSNS Site with Projections to the Year 2060

		Radii/Distances (mi)											
Sectors	Year	0-1	1-2	2-3	3-4	4-5	5-10	0-10[a]	10-20	20-30	30-40	40-50	0-50
North	2000	0	0	0	0	7	237	244	602	4005	5172	17,385	27,408
	2010	0	0	0	0	7	254	261	643	4165	5657	21,191	31,917
	2020	0	0	0	0	8	268	276	679	4325	6203	25,690	37,173
	2030	0	0	0	0	8	287	295	726	4526	6879	31,223	43,649
	2040	0	0	0	0	9	306	315	773	4686	7626	37,963	51,363
	2050	0	0	0	0	10	325	335	820	4886	8533	46,085	60,659
	2060	0	0	0	0	10	346	356	873	5086	9609	56,103	72,027
North-Northeast	2000	0	0	0	7	50	336	393	446	7416	10,583	71,500	90,338
	2010	0	0	0	7	54	360	421	436	7726	11,147	85,629	105,359
	2020	0	0	0	8	57	380	445	472	8032	11,741	102,277	122,967
	2030	0	0	0	8	61	407	476	513	8416	12,481	122,730	144,616
	2040	0	0	0	9	65	433	507	553	8731	13,177	147,505	170,473
	2050	0	0	0	10	69	460	539	598	9115	14,034	177,331	201,617
	2060	0	0	0	10	73	491	574	651	9504	14,976	214,038	239,743
Northeast	2000	0	0	79	17	57	106	259	1411	2529	9318	37,953	51,470
	2010	0	0	85	18	61	113	277	1510	2673	9775	40,927	55,162
	2020	0	0	89	19	64	120	292	1594	2803	10,272	44,777	59,738
	2030	0	0	96	21	69	128	314	1707	2973	10,822	49,501	65,317
	2040	0	0	102	22	74	137	335	1820	3131	11,362	55,934	72,582
	2050	0	0	108	23	78	145	354	1933	3301	11,953	64,663	82,204
	2060	0	0	115	25	83	155	378	2060	3485	12,585	77,448	95,956
East-Northeast	2000	0	35	0	13	0	543	591	8373	982	1397	11,472	22,815
	2010	0	37	0	14	0	581	632	8959	1054	1547	12,517	24,709
	2020	0	40	0	15	0	614	669	9461	1120	1718	13,721	26,689
	2030	0	42	0	16	0	657	715	10,131	1204	1907	15,015	28,972
	2040	0	45	0	17	0	700	762	10,801	1290	2125	16,512	31,490
	2050	0	48	0	18	0	744	810	11,471	1378	2360	18,099	34,118
	2060	0	51	0	19	0	793	863	12,225	1,477	2,634	19,934	37,133

Table G-2. (contd)

		Radii/Distances (mi)											
East	2000	0	13	101	0	0	627	741	3159	5291	14,719	20,208	44,118
	2010	0	14	108	0	0	671	793	3382	5735	16,752	23,004	49,666
	2020	0	15	114	0	0	709	838	3576	6182	19,069	26,195	55,860
	2030	0	16	122	0	0	759	897	3832	6713	21,679	29,784	62,905
	2040	0	17	130	0	0	809	956	4088	7276	24,720	33,972	71,012
	2050	0	18	138	0	0	859	1015	4347	7877	28,047	38,553	79,839
	2060	0	19	147	0	0	915	1081	4637	8552	31,951	43,930	90,151
East-Southeast	2000	80	3	8	91	15	219	416	4102	60,471	10,288	6268	81,545
	2010	86	3	9	97	16	234	445	4453	66,161	11,440	6847	89,346
	2020	90	3	9	103	17	248	470	4859	73,060	12,798	7516	98,703
	2030	97	4	10	110	18	266	505	5283	80,059	14,247	8207	108,301
	2040	103	4	10	117	19	283	536	5739	87,761	15,889	8979	118,904
	2050	110	4	11	125	21	301	572	6259	96,672	17,736	9843	131,082
	2060	117	4	12	133	22	321	609	6820	106,337	19,823	10,765	144,354
Southeast	2000	0	20	39	0	107	256	422	28,191	187,392	34,059	8212	258,276
	2010	0	21	42	0	114	276	453	30,754	206,115	37,137	8950	283,409
	2020	0	23	44	0	121	295	483	33,869	228,958	40,898	9851	314,059
	2030	0	24	47	0	129	318	518	37,016	252,729	44,666	10,752	345,681
	2040	0	26	50	0	138	341	555	40,450	278,932	48,777	11,735	380,449
	2050	0	27	53	0	147	367	594	44,458	309,998	53,570	12,859	421,479
	2060	0	29	57	0	156	394	636	48,768	343,866	58,718	14,087	466,075
South-Southeast	2000	0	0	0	0	0	1886	1886	47,835	73,130	23,297	8921	155,069
	2010	0	0	0	0	0	2056	2056	55,280	87,025	27,103	9817	181,281
	2020	0	0	0	0	0	2263	2263	64,310	103,845	31,717	10,871	213,006
	2030	0	0	0	0	0	2470	2470	74,911	124,321	37,185	12,036	250,923
	2040	0	0	0	0	0	2696	2696	86,931	147,723	43,399	13,325	294,074
	2050	0	0	0	0	0	2960	2960	101,793	176,975	51,049	14,859	347,636
	2060	0	0	0	0	0	3242	3242	118,703	210,614	59,842	16,596	408,997
South	2000	0	4	0	73	60	1294	1431	12,382	19,982	10,399	7142	51,336
	2010	0	4	0	79	65	1479	1627	14,687	23,779	12,331	8,081	60,505
	2020	0	5	0	85	72	1703	1865	17,478	28,374	14,670	9,208	71,595
	2030	0	5	0	92	78	1962	2137	20,864	33,969	17,503	10,478	84,951
	2040	0	5	0	100	85	2254	2444	24,731	40,364	20,734	11,885	100,158
	2050	0	5	0	108	93	2613	2819	29,560	48,356	24,763	13,573	119,071

Table G-2. (contd)

		Radii/Distances (mi)											
	2060	0	6	0	117	102	3020	3245	35,109	57,548	29,388	15,465	140,755
South-Southwest	2000	0	0	8	29	61	1737	1835	7236	12,835	6375	6849	35,130
	2010	0	0	9	31	65	1971	2076	8391	14,912	7262	7808	40,449
	2020	0	0	9	33	70	2251	2363	9778	17,390	8322	8969	46,822
	2030	0	0	10	36	75	2577	2698	11,437	20,371	9537	10,268	54,311
	2030	0	0	0	0	0	2470	2470	74,911	124,321	37,185	12,036	250,923
	2040	0	0	11	38	81	2949	3079	13,332	23,782	10,900	11,703	62,796
	2050	0	0	11	41	86	3396	3534	15,662	27,997	12,539	13,412	73,144
	2060	0	0	12	44	92	3907	4055	18,332	32,814	14,385	15,326	84,912
Southwest	2000	0	0	31	6	38	1044	1119	3577	3379	7498	12,580	28,153
	2010	0	0	33	6	41	1117	1197	3822	3582	7968	14,290	30,859
	2020	0	0	36	7	44	1201	1288	4097	3784	8441	16,121	33,731
	2030	0	0	38	7	47	1284	1376	4372	3987	8921	18,309	36,965
	2040	0	0	41	8	50	1378	1477	4682	4224	9477	20,625	40,485
	2050	0	0	44	8	54	1472	1578	4993	4460	10,042	23,417	44,490
	2060	0	0	47	9	57	1576	1689	5334	4697	10,615	26,568	48,903
West-Southwest	2000	0	24	11	0	111	662	808	4151	2518	3479	5366	16,322
	2010	0	26	12	0	119	708	865	4442	2677	3712	5861	17,557
	2020	0	27	13	0	128	761	929	4774	2845	3947	6369	18,864
	2030	0	29	14	0	137	814	994	5106	3013	4193	6949	20,255
	2040	0	31	15	0	147	874	1067	5479	3206	4473	7588	21,813
	2050	0	33	16	0	157	933	1139	5853	3399	4754	8270	23,415
	2060	0	36	17	0	168	1000	1221	6268	3601	5059	9065	25,214
West	2000	0	0	6	16	41	464	527	15,595	1658	4512	46,446	68,738
	2010	0	0	6	17	44	496	563	16,687	1776	4973	50,918	74,917
	2020	0	0	7	18	47	534	606	17,934	1911	5446	55,391	81,288
	2030	0	0	7	20	50	571	648	19,182	2047	6008	60,706	88,591
	2040	0	0	8	21	54	612	695	20,585	2199	6615	66,486	96,580
	2050	0	0	8	23	58	654	743	21,989	2352	7250	72,455	104,789
	2060	0	0	9	24	62	701	796	23,548	2522	7991	79,542	114,399
West-Northwest	2000	0	12	0	4	36	573	625	1854	2942	17,480	23,226	46,127
	2010	0	13	0	4	39	613	669	1984	3216	19,577	26,013	51,459
	2020	0	14	0	5	41	659	719	2132	3505	21,675	28,800	56,831
	2030	0	15	0	5	44	705	769	2280	3835	24,296	32,284	63,464

Table G-2. (contd)

		Radii/Distances (mi)											
	2040	0	16	0	5	48	756	825	2447	4195	27,093	36,000	70,560
	2050	0	17	0	6	51	808	882	2614	4568	30,065	39,948	78,077
	2060	0	18	0	6	54	865	943	2800	4997	33,560	44,593	86,893
Northwest	2000	0	0	0	6	0	423	429	495	3295	4127	11,816	20,162
	2010	0	0	0	6	0	453	459	526	3500	4351	12,994	21,830
	2020	0	0	0	7	0	486	493	561	3711	4578	14,268	23,611
	2030	0	0	0	7	0	520	527	598	3962	4856	15,668	25,611
	2040	0	0	0	8	0	558	566	637	4206	5111	17,247	27,767
	2050	0	0	0	8	0	596	604	677	4476	5410	19,040	30,207
	2060	0	0	0	9	0	639	648	721	4774	5727	20,941	32,811
North-Northwest	2000	24	0	6	154	16	283	483	307	2212	18,657	9409	31,068
	2010	26	0	6	165	17	303	517	326	2301	19,426	10,144	32,714
	2020	27	0	7	174	18	321	547	344	2390	20,200	10,974	34,455
	2030	29	0	7	186	19	343	584	365	2501	21,167	11,902	36,519
	2040	31	0	8	199	21	366	625	387	2590	21,956	12,849	38,407
	2050	33	0	8	211	22	389	663	409	2701	22,940	13,986	40,699
	2060	35	0	9	225	23	415	707	434	2812	23,936	15,182	43,071
TOTAL	2000	104	111	289	416	599	10,690	12,209	139,716	390,037	181,360	304,753	1,028,075
	2010	112	118	310	444	642	11,685	13,311	156,323	436,397	200,158	344,991	1,151,180
	2020	117	127	328	474	687	12,813	14,546	175,950	492,235	221,695	390,998	1,295,424
	2030	126	135	351	508	735	14,068	15,923	198,349	554,626	246,347	445,812	1,461,057
	2040	134	144	375	544	791	15,452	17,440	223,457	624,296	273,434	510,308	1,648,935
	2050	143	152	397	581	846	17,022	19,141	253,449	708,511	305,045	586,393	1,872,539
	2060	152	163	425	621	902	18,780	21,043	287,283	802,686	340,799	679,583	2,131,394

Source: SCE&G 2009a, Table 2.5-1
(a) Transient populations are included in population estimates and projected within 0-10 mi only.

Table G-3. Comparison of Doses to the Public from Liquid Effluent Releases for a New Unit

Type of Dose	SCE&G ER (2009b)[(a)]	Staff Calculation	Percent Difference
Total body (mrem/yr)	0.14 (adult)	0.14 (adult)	0
Organ dose (mrem/yr)	0.50 (adult GI tract)	0.50 (adult GI tract)	0
Thyroid (mrem/yr)	0.19 (child)	0.19 (child)	0
Population dose from liquid pathway (person-rem/yr)	14.6	14.6	0

(a) Results from SCE&G revised Tables 5.4-2 and 5.4-9 (SCE&G 2009b).

G.2 Dose Estimates to the Public from Gaseous Effluents

The staff used the dose-assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the GASPAR II computer code (Strenge et al. 1987) to estimate doses to the MEI from the gaseous effluent pathway for both the proposed and existing units, and to the population within the 50-mi radius of the VCSNS site from the gaseous effluent pathway for proposed Units 2 and 3.

G.2.1 Scope

The staff and SCE&G calculated the maximum gamma air dose, beta air dose, total body dose, and skin dose to receptors located at two points on the exclusion area boundary 0.5 mi from the VCSNS Units 2 and 3 powerblock area circle as shown in Figure 2.7-17 in the ER (SCE&G 2009a). The maximum atmospheric dispersion factor occurs in the southeast direction, and the maximum ground deposition occurs in the east-northeast direction, so SCE&G used whichever dose value was higher in its analysis. Dose to the MEI was calculated at 1.68 mi southeast of the VCSNS site for the following exposure pathways: plume immersion, direct shine from deposited radionuclides, inhalation, ingestion of local farm or garden vegetables, and ingestion of locally produced beef and milk.

The staff reviewed the input parameters and values used by SCE&G (2009a) for appropriateness, including references made to the AP1000 DCD (Westinghouse 2008). Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The staff concluded that the assumed exposure pathways, input parameters, and values used by SCE&G were appropriate. These pathways and parameters were used by the staff in its independent calculations using GASPAR II.

Joint frequency-distribution data of wind speed and wind direction by atmospheric-stability class for the VCSNS site (SCE&G 2009a) were used as input to the XOQDOQ code (Sagendorf et al. 1982) to calculate long-term average atmospheric dispersion factor (χ/Q) and atmospheric

deposition factor (D/Q) values for routine releases. The staff's independent results, based on 2 years of meteorological data (SCE&G 2009f), are similar to those reported by SCE&G in Tables 2.7-16 and 2.7-26 of the ER (SCE&G 2009a).

Population doses were calculated for all types of releases (i.e., noble gases, iodines and particulates, and ^{3}H and ^{14}C) using the GASPAR II code for the following exposure pathways: plume immersion, direct shine from deposited radionuclides, ingestion of vegetables, and ingestion of milk and meat.

G.2.2 Resources Used

To calculate doses to the public from gaseous effluents, the staff used a PC version of the XOQDOQ and GASPAR II codes entitled NRCDOSE Version 2.3.8 (Chesapeake Nuclear Services, Inc. 2006) obtained through the Oak Ridge Radiation Safety Information Computational Center.

G.2.3 Input Parameters

Table G-4 lists the major parameters used in calculating dose to the public from gaseous effluent releases during normal operation.

G.2.4 Comparison of Doses to the Public from Gaseous Effluent Releases

Table G-5 compares results documented in the ER (SCE&G 2009a) for doses from noble gases at the exclusion area boundary with the results calculated by the NRC staff. The ER doses are based on 1 year of meteorological data, while the staff doses are based on 2 years of meteorological data (SCE&G 2009f). The doses provided by SCE&G and those calculated by NRC were similar; the differences were due to differences in the meteorological data.

Table G-6 compares doses to the MEI calculated by SCE&G and the staff. Doses to the MEI were calculated for a child at the nearest residence, 1.68 mi southeast of the VCSNS site, because it provided the highest doses. The doses provided by SCE&G and those calculated by the NRC staff were similar, except for ground deposition.

Table G-4. Parameters Used in Calculating Dose to Public from Gaseous Effluent Releases

Parameter	Staff Value		Comments
New unit gaseous effluent source term (Ci/yr)	Ar-41	3.4×10^{1}	Values from Westinghouse AP1000 Design Control Document Table 11.3-3 for a single unit (Westinghouse 2008). Except for rounding differences, these values are the same as those reported in ER Table 3.5-2 (SCE&G 2009a).
	Kr-85m	3.6×10^{1}	
	Kr-85	4.093×10^{3}	
	Kr-87	1.5×10^{1}	
	Kr-88	4.6×10^{1}	
	Xe-131m	1.776×10^{3}	
	Xe-133m	8.7×10^{1}	
	Xe-133	4.642×10^{3}	
	Xe-135m	7.0×10^{0}	
	Xe-135	3.34×10^{2}	
	Xe-138	6.0×10^{0}	
	I-131	1.168×10^{-1}	
	I-133	4.017×10^{-1}	
	H-3	3.5×10^{2}	
	C-14	7.3×10^{0}	
	Cr-51	6.06×10^{-4}	
	Mn-54	4.331×10^{-4}	
	Co-57	8.2×10^{-6}	
	Co-58	2.316×10^{-2}	
	Co-60	8.75×10^{-3}	
	Fe-59	7.88×10^{-5}	
	Sr-89	3.024×10^{-3}	
	Sr-90	1.159×10^{-3}	
	Zr-95	1.008×10^{-3}	
	Nb-95	2.452×10^{-3}	
	Ru-103	8.02×10^{-5}	
	Ru-106	7.77×10^{-5}	
	Sb-125	6.09×10^{-5}	
	Cs-134	2.298×10^{-3}	
	Cs-136	8.53×10^{-5}	
	Cs-137	3.552×10^{-3}	
	Ba-140	4.23×10^{-4}	
	Ce-141	4.164×10^{-4}	
	Tritium	3.50×10^{4}	

Table G-4. (contd)

Parameter	Staff Value		Comments
Existing-unit gaseous effluent source term (Ci/yr)	Kr-85	3.32×10^{-1}	Values are averages from annual radioactive-effluent-release reports for 2006, 2007, and 2008 Table 2 (SCE&G 2007a, 2008a, 2009d).
	Xe-133	2.45×10^{0}	
	Xe-133m	1.48×10^{-3}	
	Xe-135	8.16×10^{-1}	
	Ar-41	6.99×10^{-2}	
	I-131	4.07×10^{-5}	
	I-132	1.81×10^{-4}	
	I-133	8.07×10^{-7}	
	Br-82	4.20×10^{-9}	
	Mn-54	1.76×10^{-7}	
	Co-58	2.32×10^{-7}	
	Co-60	4.43×10^{-7}	
	Sr-89	9.97×10^{-7}	
	Be-7	1.90×10^{-5}	
Population distribution	Table 2.5.1-1 of the ER (SCE&G 2009a)		Population distribution used by SCE&G and the NRC staff is for year 2060.
Wind speed and direction distribution	Tables 2.7-10 and 2.7-11 (SCE&G 2009e)		Site-specific data provided by SCE&G for 2-year period from Jan. 1 2007 - Dec. 31 2008.
Atmospheric dispersion factors (sec/m^3)	Tables 2.7-19 to 2.7-24 (SCE&G 2009e)|		Site-specific data provided by SCE&G for 2-year period from Jan. 1 2007 - Dec. 31 2008.
Ground deposition factors (m^{-2})	Tables 2.7-25 and 2.7-26 (SCE&G 2009e)		Site-specific data provided by SCE&G for 2-year period from Jan. 1 2007 - Dec. 31 2008.
Milk production rate within an 50-mi radius of the VCSNS site (L/yr)	6.78×10^{7}		Site-specific data provided by SCE&G (2009a).
Vegetable/fruit production rate within a 50-mi radius of the VCSNS site (kg/yr)	$6.8.66 \times 10^{7}$		Site-specific data provided by SCE&G (2009a).
Meat production rate within an 50-mi radius of the VCSNS site (kg/yr)	9.15×10^{8}		Site-specific data provided by SCE&G (2009a).

Table G-4. (contd)

Parameter	Staff Value	Comments
Pathway receptor locations (direction, distance, and atmospheric dispersion factors) - nearest site boundary, vegetable garden, residence, meat animal	Table 5.4-5 and 2.7-16 of the ER (SCE&G 2009a)	Site-specific data provided by SCE&G (2007a).
Consumption factors for milk, meat, leafy vegetables, and vegetables	Milk (L/yr) 310 (adult) 400 (teen) 330 (child) 330 (infant) Meat (kg/yr) 110 (adult) 65 (teen) 41 (child) 0 (infant) Leafy vegetables (kg/yr) 64 (adult) 42 (teen) 26 (child) 0 (infant) Vegetables (kg/yr) 520 (adult) 630 (teen) 520 (child) 0 (infant)	Table 5.4-4 of the ER (SCE&G 2009a) and Regulatory Guide 1.109 (NRC 1977).
Fraction of year during which leafy vegetables are grown	0.58	Site-specific value from Table 5.4-4 of the ER (SCE&G 2009a).
Fraction of year that milk cows are on pasture	1	Default value of GASPAR II code (Strenge et al. 1987).
Fraction of MEI vegetable intake from own garden	0.76	Default value of GASPAR II code (Strenge et al. 1987).
Fraction of milk-cow plant intake that is from pasture while on pasture	1	Default value of GASPAR II code (Strenge et al. 1987).
Average absolute humidity over the growing season (g/m^3)	8.0	Default value of GASPAR II code (Strenge et al. 1987).

Table G-4. (contd)

Parameter	Staff Value	Comments
Average temperature over the growing season (°F)	None	Default value of GASPAR II code (Strenge et al. 1987).
Fraction of year beef cattle are on pasture	1	Default value of GASPAR II code (Strenge et al. 1987).
Fraction of year beef cattle plant intake that is from pasture while on pasture	1	Default value of GASPAR II code (Strenge et al. 1987).

Table G-5. Comparison of Doses to the Public from Noble-Gas Releases for a New Unit

Type of Dose	SCE&G ER (2009a)[(a)]	Staff Calculation[(b)]	Percent Difference
Gamma air dose at exclusion area boundary – noble gases only (mrad/yr)	0.74	0.71	3.9%
Beta air dose at exclusion area boundary – noble gases only (mrad/yr)	3.1	3.0	3.5%
Total body dose at exclusion area boundary – noble gases only (mrem/yr)	0.60	0.44	27%
Skin dose at exclusion area boundary – noble gases only (mrem/yr)	2.4	2.2	8.8%

(a) Results from SCE&G ER Table 5.4-7 (SCE&G 2009a).
(b) Results based on 2 years' meteorological data provided by SCE&G (2009f)

Table G-6. Comparison of Doses to the MEI from Gaseous Effluent Releases for a New Unit

Meteorological data:		1 year[a]	2 years[b]		1 year[a]	2 years[b]		1 year[a]	2 years[b]		1 year[a]	2 years[b]	
Pathway	Age Group	SCE&G Total Body Dose (mrem/yr)	NRC Total Body Dose (mrem/yr)	% difference	SCE&G Max Organ Dose (mrem/yr)	NRC Max Organ Dose (mrem/yr)	% difference	SCE&G Skin Dose (mrem/yr)	NRC Skin Dose (mrem/yr)	% difference	SGE&G Thyroid Dose (mrem/yr)	NRC Thyroid Dose (mrem/yr)	% difference
Plume (1.68 mi. SE)	All	0.060	0.058	-3.3	0.065 (lung)	0.0624 (lung)	-4.2	0.33	0.314	-5.1	0.06	0.0581	-3.3
Ground (1.68 mi. SE)	All	0.030	0.058	48.4	0.03 (lung)	0.0624 (lung)	51.9	0.035	0.314	88.9	0.03	0.0581	48.4
Inhalation (1.68 mi. SE)	Adult	0.0074	0.0071	-3.6	0.0094 (lung)	0.00913 (lung)	-3.0	0.0072	0.00693	-3.9	0.066	0.0644	-2.5
	Teen	0.0075	0.0072	-3.9	0.011 (lung)	0.0103 (lung)	-6.8	0.0072	0.007	-2.9	0.083	0.0803	-3.4
	Child	0.0066	0.0064	-3.3	0.0092 (lung)	0.00893 (lung)	-3.0	0.0064	0.00618	-3.6	0.096	0.0935	-2.7
	Infant	0.0038	0.0037	-3.0	0.0056 (lung)	0.00546 (lung)	-2.6	0.0037	0.00355	-4.2	0.086	0.0837	-2.7
Vegetable (1.68 mi. SE)	Adult	0.056	0.054	-3.7	0.29 (bone)	0.276 (bone)	-5.1	0.048	0.0461	-4.1	0.66	0.643	-2.6
	Teen	0.083	0.080	-4.1	0.44 (bone)	0.43 (bone)	-2.3	0.073	0.071	-2.8	0.89	0.864	-3.0
	Child	0.18	0.17	-4.0	1.00 (bone)	0.995 (bone)	-0.5	0.17	0.16	-6.3	1.7	1.67	-1.8
Meat (1.68 mi. SE)	Adult	0.017	0.016	-6.3	0.072 (bone)	0.0694 (bone)	-3.7	0.016	0.0153	-4.6	0.04	0.0385	-3.9
	Teen	0.013	0.013	-0.8	0.061 (bone)	0.0585 (bone)	-4.3	0.013	0.0125	-4.0	0.03	0.0293	-2.4
	Child	0.024	0.023	-3.4	0.11 (bone)	0.11 (bone)	0.0	0.024	0.0228	-5.3	0.05	0.0482	-3.7
Cow milk (1.68 mi. SE)	Adult	0.025	0.024	-5.0	0.086 (bone)	0.0834 (bone)	-3.1	0.02	0.019	-5.3	0.7	0.674	-3.9
	Teen	0.040	0.038	-4.4	0.16 (bone)	0.152 (bone)	-5.3	0.034	0.0327	-4.0	1.1	1.07	-2.8
	Child	0.085	0.082	-3.4	0.38 (bone)	0.37 (bone)	-2.7	0.078	0.0757	-3.0	2.2	2.13	-3.3
	Infant	0.17	0.16	-4.3	0.73 (bone)	0.708 (bone)	-3.1	0.16	0.153	-4.6	5.3	5.16	-2.7
Goat milk (1.68 mi. SE)	Adult	0.038	0.036	-4.7	0.1 (bone)	0.0964 (bone)	-3.7	0.024	0.0234	-2.6	0.92	0.893	-3.0
	Teen	0.054	0.052	-3.6	0.18 (bone)	0.174 (bone)	-3.4	0.04	0.0385	-3.9	1.5	1.42	-5.6
	Child	0.10	0.098	-1.9	0.43 (bone)	0.419 (bone)	-2.6	0.088	0.0848	-3.8	2.9	2.82	-2.8
	Infant	0.19	0.18	-3.3	0.81 (bone)	0.778 (bone)	-4.1	0.17	0.167	-1.8	7	6.81	-2.8

(a) The SCE&G values from Table 5.4-6 of SCE&G (2009a) are based on 1 year of meteorological data. The MEI is a child living 1.68 mi southeast of the VCSNS site; values for adults, teenagers, and infants shown for reference.
(b) The staff values are based on 2 years of meteorological data provided by SCE&G (2009f)

G.2.5 Comparison of Results – Population Doses

Table G-7 compares the SCE&G population dose estimates taken from Table 5.4-9 of the ER (SCE&G 2009a) with the NRC staff estimates for the new units. The staff's independent calculation for population dose based on 2 years of meteorological data yields results that are similar to, but lower than, the SCE&G ER estimates for two new units based on a single year of meteorological data. SCE&G computed a collective dose to the population within a 50-mi radius projected for the year 2060 using an annual background dose of 0.36 rem, a number which includes both background and medical doses estimated in the early 1980s (NCRP 1987). The staff used an annual-dose value to U.S. residents of 0.311 rem (NCRP 2009), which includes background radiation but not medical radiation.

Table G-7. Comparison of Population Total Body Doses from Gaseous Effluent Releases for Two New Units

Pathway	SCE&G ER (2009a) (person-rem/yr)[(a)]	Staff Estimate (person-rem/yr)[(b)]	Percent Difference
Noble gases	2.5	1.71	32
Iodines and particulates	0.49	0.323	35
Tritium and ^{14}C	2.8	2.04	26
Total	5.8	4.06	30
Natural Background	770,000	663,000	14

(a) Results from SCE&G ER Table 5.4-9 (SCE&G 2009a).
(b) The staff values are based on 2 years' meteorological data provided by SCE&G (2009f).

G.3 Cumulative-Dose Estimates

Table G-8 compares SCE&G's results for estimates of cumulative dose to the MEI with those calculated by the NRC staff. Estimates of cumulative dose include doses from all pathways (i.e., external, liquid effluent, and gaseous effluent) for both the proposed Units 2 and 3 and the existing Unit 1 at the VCSNS site. Cumulative-dose estimates calculated by SCE&G (2009a) were larger than those calculated by the NRC staff.

Staff estimates of the dose from releases from existing Unit 1 and proposed Units 2 and 3 are shown in Table G-8. The staff did not attempt to reproduce SCE&G's calculation of the dose from releases from Unit 1 to the MEI (located 1.68 mi southeast of the point halfway between the containment buildings of proposed Units 2 and 3). Instead, the staff examined gaseous effluent release data and dose calculations from the annual effluent and waste-disposal reports for Unit 1 from SCE&G for the years 2005 through 2008 (SCE&G 2006a, 2007a, 2008a, 2009d). In these reports, SCE&G calculated the whole body and skin doses to an MEI at the Unit 1 site

boundary from both gaseous and liquid effluents. The staff averaged SCE&G's whole body and skin doses over the years 2005–2008. The average total body dose is 0.0072 mrem/yr, far below the SCE&G value of 1.2 mrem/yr from Unit 1 in Table 5.4-8 of the ER. Similarly, the dose to the maximally exposed organ (liver or gastrointestinal tract-lower large intestine [GI-LLI]) is 0.0171 mrem/yr, well below the SCE&G value of 0.043 mrem/yr in Table 5.4-8 of the ER. To address the thyroid dose, the staff calculated the average ratio of 4-year-average measured releases from Unit 1 to the design-basis releases from an AP1000 unit. The average ratio was 0.00049 (0.049 percent), with a maximum ratio of 0.0063 (0.63 percent) for ^{133}Xe. This ratio for ^{131}I was 0.0041 (0.41 percent). The staff concludes that thyroid doses to the MEI at the residence nearest to the VCSNS site (1.68 mi southeast) due to ^{131}I released from Unit 1, which is farther away from the MEI than Units 2 and 3, would be 100 or more times smaller than the thyroid dose due to predicted releases of radioiodines from proposed Units 2 and 3.

Table G-8. Comparison of Cumulative Doses to the Maximally Exposed Individual

Dose	SCE&G ER (2009c)[(a)(b)]	Staff Estimate[(c)]	Percent Difference
Whole body (mrem/yr)	2.3	1.26	82
Thyroid dose (mrem/yr)	15	14.1	5
Dose to other organ – bone (mrem/yr)	3.6	4.30	–16

(a) Doses from direct radiation were determined to be negligible (SCE&G 2009a)
(b) Sum of doses from liquid and gaseous effluent releases for the existing Unit 1 and the proposed Units 2 and 3 are from revised Table 5.4-8 (SCE&G 2009c, revised Table 5.4-8 for ER Rev. 2).
(c) The staff calculation included the sum of doses from liquid and gaseous effluent releases from the existing unit and the two proposed units. Doses due to liquid effluent and gaseous effluents from the existing Unit 1 were taken from the 2005, 2006, 2007, and 2008 Annual Radiological Effluent Reports (SCE&G 2006a, 2007a, 2008a, 2009d). Doses from radioiodines for the existing unit were negligible due to the small emissions of these gases.

G.4 Dose Estimates to the Biota from Liquid and Gaseous Effluents

To estimate doses to the biota from the liquid and gaseous effluent pathways, the staff used the LADTAP II code (Strenge et al. 1986), the GASPAR II code (Strenge et al. 1987), and input parameters supplied by SCE&G in its ER (SCE&G 2009a).

G.4.1 Scope

Doses to both terrestrial and aquatic biota were calculated using the LADTAP II code. Aquatic biota include fish, invertebrates, and algae. Terrestrial biota include muskrats, raccoons, herons, and ducks. The LADTAP II code calculates an internal-dose component and an external-dose component and sums them for a total body dose. The staff reviewed the input parameters used by SCE&G for appropriateness. Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The staff

concluded that all of the input parameters used by SCE&G were appropriate. These parameters were used by the staff in its independent calculations using LADTAP II.

The LADTAP II code calculates biota dose only from the liquid effluent pathway. Terrestrial biota could also be exposed via the gaseous effluent pathway. These values would be the same as those for the MEI calculated using the GASPAR II code. SCE&G assumed that biota could be inside the exclusion area boundary, at a distance of 0.25 mi southeast of the powerblock area circle to estimate these doses (SCE&G 2009a). To account for the closer proximity of the main body mass of animals to the ground compared to humans, the MEI calculation for the biota assumed a ground deposition factor twice that used in the MEI calculation for a member of the public. Also, no vegetation-intake pathway was estimated for muskrat and heron because they are not known to consume vegetation (SCE&G 2009a).

G.4.2 Resources Used

To calculate doses to the biota, the staff used a PC version of the LADTAP II and GASPAR II computer codes entitled NRCDOSE Version 2.3.8 (Chesapeake Nuclear Services, Inc. 2006). NRCDOSE was obtained through the Oak Ridge RSICC.

G.4.3 Input Parameters

Most of the LADTAP II input parameters are specified in Section G.1.3 to include the source term, the discharge flow rate to the receiving fresh water system, and the shore-width factor. The values of these parameters are appropriate for use in calculating biota dose.

For GASPAR II input, SCE&G assumed that biota could be inside the exclusion area boundary, and assumed biota to be at an average distance of 0.25 mi from the powerblock area circle.

G.4.4 Comparison of Results

Table G-9 compares SCE&G's biota dose estimates from liquid and gaseous (based on 1 year of meteorological data) effluents taken from Table 5.4-10 of the ER (SCE&G 2009a) with the NRC staff's estimates, whose gaseous component was based on 2 years of meteorological data. Dose estimates were similar.

Table G-9. Comparison of Dose Estimates to Biota from Liquid and Gaseous Effluents for Two Units

Biota	Pathway	SCE&G (2009c) (mrad/yr)[(a)]	Staff Calculation (mrad/yr)[(a)]	Percent Difference
Fish	Liquid	0.82	0.82	0.0
	Gaseous[(b)]	0	0	0
Invertebrate	Liquid	2.3	2.30	0.0
	Gaseous[(b)]	0	0	0
Algae	Liquid	6.7	6.66	0.6
	Gaseous[(b)]	0	0	0
Muskrat	Liquid	2.4	2.44	–1.7
	Gaseous	5	4.63	7.4
Raccoon	Liquid	0.96	0.956	0.4
	Gaseous	7.4	6.89	6.9
Heron	Liquid	11	11.14	–1.3
	Gaseous	5	4.63	7.4
Duck	Liquid	2.3	2.34	–1.7
	Gaseous	7.4	6.89	6.9

(a) For terrestrial biota, dose equals the sum of the plume immersion, vegetable ingestion (except herons and muskrats), inhalation, and two times the ground deposition doses 0.25 mi southeast of the site.
(b) Fish, invertebrates, and algae would not be exposed to gaseous effluents.

G.5 References

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Appendix H

Authorizations, Permits, and Certifications

Appendix H

Authorizations, Permits, and Certifications

This appendix contains a list of the environmental-related authorizations, permits, and certifications potentially required by Federal, State, regional, local, and affected Native American Tribal agencies related to the combined license for the proposed new nuclear units, at the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3. Tables H-1 through H-4 are based on Tables 1.2-1 through 1.2-4 of the Environmental Report submitted to the U.S. Nuclear Regulatory Commission by the South Carolina Electric and Gas (SCE&G 2009)

Table H-1. Authorizations Required for a Combined License

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
FWS	Endangered Species Act	Consultation regarding potential to adversely impact protected species (non-marine species)	Concurrence with no adverse impact or consultation on appropriate mitigation measures	No permits have been issued.
SCDNR	Endangered Species Act	Consultation regarding potential to adversely impact protected species (non-marine species)	Concurrence with no adverse impact or consultation on appropriate mitigation measures	No permits have been issued.
NMFS	Endangered Species Act	Consultation regarding potential to adversely impact protected species (marine species)	Concurrence with no adverse impact or consultation on appropriate mitigation measures	No permits have been issued.
South Carolina Department of Archives and History	National Historic Preservation Act (36 CFR Part 800)	Consultation regarding potential to adversely affect historic resources	Confirm site construction or operation would not affect protected historic resources	No permits have been issued.
SCDHEC	Clean Water Act (33 USC 1251 et seq.), SC R.61-101 Water Quality Certification	Section 401 Certification	Compliance with water quality standards	No permits have been issued.

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
DOE	Nuclear Waste Policy Act (42 USC 10101 et seq.) and 10 CFR Part 961	Spent fuel contract	Contract for DOE disposal services for spent nuclear fuel	Unit 2 – DE-CR01-09RW09014 Unit 3 – DE-CR01-09RW09015

Source: SCE&G 2009, Table 1.2-1
CFR = Code of Federal Regulations
FWS = U.S. Fish and Wildlife Service
NMFS = National Marine Fisheries Service
SCDNR = South Carolina Department of Natural Resources
DOE = U.S. Department of Energy

Table H-2. Authorizations Required for Preconstruction Activities

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
USACE	CWA (33 USC 1251 et seq.)	Section 404 Permit	Disturbance or crossing wetland areas or navigable waters	No permits have been issued.
USDOT	49 FR 107, Subpart G	Certificate of Registration	Transportation of hazardous materials	No permits have been issued.
FWS	Migratory Bird Treaty Act (16 USC 703 et seq.), 50 CFR Part 21	Federal Depredation permit	Adverse impacts on protected species and/or their nests	Permit# MB040209-0. Expires March 31, 2009.

Table H-2. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
FAA	49 USC 1501, 14 CFR Part 77	Construction Notice	Notice of erection of structures (>200 feet high) potentially affecting air navigation	No permits have been issued.
FERC	Federal Power Act (16 USC 791a-825r) 18 CFR 4.200	License/order revision	Use of Monticello Reservoir as water source for Units 2 and 3 and discharge of blowdown to Parr Reservoir	Project 1894. Expires June 30, 2020.
PSC	SC Utility Facility Siting and Environmental Protection Act, SC Code of Laws Title 58, Ch. 33	Certificate of Environmental Compatibility and Public Convenience and Necessity	Present and future public convenience and necessity require the operation of such equipment or facility	Application filed May 30, 2008.
SCDNR	Nongame and Endangered Species and Conservation Act (SC Code of Laws, Title 50, Ch. 15), SC R.123-50	State Depredation permit	Adverse impacts on protected species and/or their nests	Permit# MD-08-01. Expires December 31, 2008.

Table H-2. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
SCDHEC	Federal Clean Air Act (CAA), SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC Air Pollution Control Regulations and Standards (SC R. 61-62)	Bureau of Air Quality Construction Permit	Construction air emission sources (*e.g.,* concrete batch plant, portable generators)	No permits have been issued.
SCDHEC	Federal Clean Air Act Amendments Title V, SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC R. 61-62.70 "Title V Operating Permit Program"	Revision of existing conditional major operating permit	Operation of air emission sources	Permit# CM-1000-0012. Expires March 31, 2010.
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC R.61-9 "Water Pollution Control Permits"	Revision of existing National Pollutant Discharge Elimination System (NPDES) permit	Regulates limits of pollutants in liquid discharge to surface water	Permit# SC0030856. Expires July 31, 2012.

Table H-2. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC R.61-9	Authorization to discharge under the general NPDES permit for stormwater discharges associated with construction activity	Discharge of stormwater associated with large construction activities (>5 acres)	Permit# SCR100000. Expires August 31, 2011.
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC R.61-9	Stormwater Pollution Prevention Plan (SWPPP)	Discharge of stormwater associated with large construction activities (>5 acres)	Permit# SCR100000. Expires August 31, 2011.
SCDHEC	SC Safe Drinking Water Act (SC Code of Laws, Title 44, Ch. 55), SC R.61-58	Permit to construct/operate a public water system	Construct and operate a public, nontransient, noncommunity water system	No permits have been issued.
SCDHEC	Clean Water Act (33 USC 1251 et seq.), SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC R.61-67	Wastewater facility construction permit	Construction of wastewater transportation and treatment facilities	No permits have been issued.

Table H-2. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
SCDHEC	SC R.61-71	Certification of monitoring well approval and/or abandonment	Abandonment (fill, plug, and seal) of test wells	Certification# 2624.
SCDOT	SC R.63-370 "Private Driveway entrances to Highways"	Permit for encroachment on state highway right-of-way	Construction of access road within the right-of-way of public roadways; improvements to Parr Road	Permit# 61919. Expires September 11, 2009.
Fairfield County	Local ordinance	Construction permit	Construction of facilities	No permits have been issued.

Source: SCE&G 2009, Table 1.2-2
CAA = Clean Air Act
CWA = Clean Water Act
FAA = Federal Aviation Administration
FERC = Federal Energy Regulatory Commission
FWS = U.S. Fish and Wildlife Service
PSC = Public Service Commission
SCDHEC = South Carolina Department of Health and Environmental Control
SCDOT = South Carolina Department of Transportation
USACE = U.S. Army Corps of Engineers

Table H-3. Authorizations Required for Construction Activities[a]

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
NRC	10 CFR Part 52, Subpart C	COL	Safety-related construction for a nuclear power facility.	No permits have been issued.
NRC	10 CFR 50.10(d)(1)	LWA	Safety-related construction activities (driving of piles, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation, installation of the foundation, including placement of concrete). The LWA is at the applicant's discretion.	No permits have been issued.
FAA	49 USC 1501, 14 CFR Part 77	Construction Notice	Notice of erection of structures (>200 ft high) potentially impacting air navigation.	No permits have been issued.
USACE	CWA	Section 404 Permit	Disturbance or crossing wetland areas or navigable waters associated with transmission line corridors.	No permits have been issued.

Table H-3. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
FWS	Migratory Bird Treaty Act (16 USC 703 et seq.), 50 CFR Part 21	Federal Depredation Permit	Adverse impacts on protected species and/or their nests associated with transmission line corridors.	Permit# MB040209-0. Expires March 31, 2009.
SCDNR	Nongame and Endangered Species and Conservation Act, (SC Code of Laws, Title 50, Ch. 15), SC R.123-50	Depredation permit	Adverse impacts on state-designated protected species and/or their habitat associated with transmission line corridors.	Permit# MD-08-01. Exp December 31, 2008.ires
SCDHEC	CAA, SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC Air Pollution Control Regulations and Standards (SC R. 61-62)	Bureau of Air Quality Construction Permit	Construction air emission sources.	No permits have been issued.
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Code of Laws, Title 48, Ch. 1), SC R.61-9	Authorization to discharge under the general NPDES permit for stormwater discharges associated with construction activity	Discharge stormwater from linear construction sites (e.g., transmission lines) during construction.	Permit# SCR100000. Expires August 31, 2011.

Table H-3. (contd)

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
Fairfield County	Local ordinance	Construction permit	Construction of facilities.	No permits have been issued.
Various county offices responsible for land disturbing activities	Bamberg, Calhoun, Charleston, Chester, Colleton, Dorchester, Fairfield, Hampton, Lancaster, Lexington, Orangeburg, and Richland County ordinances	Land-Disturbing Activity Permit	Land-disturbing activities within county boundaries for transmission line corridors.	No permits have been issued.
SCDOT	23 CFR 1.23	Permit	Utility right-of-way easement.	No permits have been issued.

(Source: SCE&G 2009, Table 1.2-3a)
Assumes that SCE&G obtained the authorizations that Table H-2 identifies.
CAA = Clean Air Act
CFR = Code of Federal Regulations
COL = combined operating license
CWA = Clean Water Act
FAA = Federal Aviation Administration
FWS = U.S. Fish and Wildlife Service
LWA = Limited Work Authorization
NPDES = National Pollutant Discharge Elimination System
NRC = U.S. Nuclear Regulatory Commission
SCDHEC = South Carolina Department of Health and Environmental Control
SCDNR = South Carolina Department of Natural Resources
SCDOT = South Carolina Department of Transportation
USACE = U.S. Army Corps of Engineers

Table H-4. Authorizations Required for Operation[a]

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
NRC	10 CFR Part 70	Special nuclear materials license	Possession of fuel.	No permits have been issued.
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Laws 1976, Title 48, Ch. 1), SC R.61-9 "Water Pollution Control Permits"	Revision of existing NPDES permit	Regulates limits of pollutants in liquid discharge to surface water.	Permit# SC0030856. Expires July 31, 2012.
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Laws 1976, Title 48, Ch. 1), SC R.61-62.70 "Title V Operating Permit Program"	Revision of existing Conditional Major Operating Permit	Operation of air emission sources.	Permit# CM-1000-0012. Expires March 31, 2010.
SCDHEC	South Carolina Surface Water Withdrawal and Reporting Act (SC Code of Laws, Title 49, Ch. 4)	Registration and reporting of surface water withdrawal	Withdrawal of water from the Monticello Reservoir for cooling makeup and in-plant use.	No permits have been issued.
SCDHEC	CWA (33 USC 1251 et seq.), SC Pollution Control Act (SC Laws 1976, Title 48, Ch. 1), SC R.61-9	Authorization to discharge under the general NPDES permit for stormwater discharges associated with industrial activity	General permit to discharge storm-water from site during operations.	No permits have been issued.

Table H-4. (contd)

Agency	Authority	Requirement	Activity Covered	
SCDHEC	Atomic Energy and Radiation Control Act (SC Code of Laws, Title 13, Ch. 7), SC R.61-63	Radioactive materials license	Receipt and use of radioactive materials.	No permits have been issued.
SCDHEC	South Carolina Radioactive Waste Transportation and Disposal Act (Act No. 429 of 1980), SC R. 61-83 "Transportation of Radioactive Waste Into or Within South Carolina"	Revision of existing South Carolina Radioactive Waste Transport Permit	Transportation of radioactive waste within the state of South Carolina.	Permit# 0163-39-07. Expires December 31 of each year (renewable).
TDEC	TDEC Division of Radiological Health Rule 1200-2-10.32 "Licensing of Shippers of Radioactive material into or within Tennessee"	Revision of existing Tennessee Radioactive Waste License-for-Delivery	Transportation of radioactive waste into the state of Tennessee.	Permit# T-SC001-L07. Expires December 31 of each year (renewable).

(a) Assumes that SCE&G obtained the authorizations that Tables H-2 and H-3 identify.
CFR = Code of Federal Regulations
CWA = Clean Water Act
NPDES = National Pollutant Discharge Elimination System
NRC = U.S. Nuclear Regulatory Commission
SCDHEC = South Carolina Department of Health and Environmental Control
TDEC = Tennessee Department of Environment and Conservation

H.1 Reference

South Carolina Electric and Gas (SCE&G). 2009. V.C. Summer Nuclear Station, Units 2 and 3 COL Application, Part 3, Applicant's Environmental Report – Combined License Stage. Revision 1, Jenkinsville, South Carolina. Accession No. ML090510261.

Appendix I

U.S. Army Corps of Engineers Public Interest Review Factors

Appendix I

U.S. Army Corps of Engineers Public Interest Review Factors

A public interest review must be completed prior to any U.S. Army Corps of Engineers (USACE) permit decision for this project. The specific weight of each factor is determined by its importance and relevance to this proposed project. Some Public Interest Review Factors (PIRFs) may be given greater weight, while other PIRFs may not be present or as important based on their relevance. However, full consideration and appropriate weight will be given to all comments, including those of Federal, State, and local agencies, and other experts on matters within their expertise. A permit will generally be issued for Federal and Federally authorized activities; another Federal agency's determination to proceed is entitled to substantial consideration in the USACE's public interest review. Mitigation should be developed and incorporated within the public interest review process to the extent that the mitigation is found by the USACE to be reasonable and justified. However, only the measures required to confirm that the project is not contrary to the public interest may be required in this specific context.

I.1 Wetlands

Most wetlands constitute a productive and valuable public resource, the unnecessary alteration or destruction of which should be discouraged as contrary to the public interest. Wetlands considered to perform functions important to the public interest include the following:

- wetlands that serve significant natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species
- wetlands set aside for study of the aquatic environment or as sanctuaries or refuges
- wetlands, the destruction or alteration of which would negatively affect natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics
- wetlands that are significant in shielding other areas from wave action, erosion, or storm damage. Such wetlands are often associated with barrier beaches, islands, reefs and bars.
- wetlands that serve as valuable storage areas for storm and flood waters
- wetlands that are groundwater discharge areas that maintain minimum baseflows important to aquatic resources and those that are prime natural recharge areas

- wetlands that serve significant water purification functions
- wetlands that are unique in nature or scarce in quantity to the region or local area.

I.2 Fish and Wildlife Values

In accordance with the Fish and Wildlife Coordination Act, the USACE will consult with the Regional Director of the U.S. Fish and Wildlife Service, the Regional Director of the National Marine Fisheries Service, and the Director of the South Carolina Department of Natural Resources when considering how to conserve wildlife resources by preventing their direct and indirect loss and damage due to the proposed project. The USACE will give full consideration to the views of those agencies on fish and wildlife matters in deciding on the issuance, denial, or conditioning of individual or general permits.

I.3 Water Quality

Project activities that may adversely affect the quality of waters of the United States will be evaluated for compliance with applicable effluent limitations and water-quality standards, during the construction and subsequent operation of the proposed activity, and will include the consideration of both point and non-point sources of pollution. It should be noted, however, that the Clean Water Act assigns responsibility for control of non-point sources of pollution to the State. Certification of compliance with applicable effluent limitations and water-quality standards required under provisions of Section 401 of the Clean Water Act will be considered conclusive with respect to water-quality considerations unless the Regional Administrator of the Environmental Protection Agency (EPA) advises that other water-quality aspects be taken into consideration.

I.4 Historic, Cultural, Scenic, and Recreational Values

When applications for Department of the Army (DA) permits involve areas that possess recognized historic, cultural, scenic, conservation, recreational or similar values, full evaluation of the general public interest requires that due consideration be given to the effect that the proposed structure or activity may have on historic, cultural, scenic, and recreational values. Such values include those associated with wild and scenic rivers, historic properties and National Landmarks, National Rivers, National Wilderness Areas, National Seashores, National Recreation Areas, National Lakeshores, National Parks, National Monuments, estuarine and marine sanctuaries, archaeological resources, including Indian religious or cultural sites, and such other areas as may be established under Federal or State law for similar and related purposes. Recognition of these values is often reflected by State, regional, or local land-use classifications, or by similar Federal controls or policies. To the extent possible, action on

permit applications should be consistent with and avoid significant adverse effects on the values or purposes for which the classifications, controls, or policies were established.

I.5 Consideration of Property Ownership

Authorization of work or structures by the USACE does not convey a property right, nor authorize any injury to property or invasion of other rights. An inherent aspect of property ownership is a right to reasonable private use. However, this right is subject to the rights and interests of the public in the navigable and other waters of the United States, including the Federal navigation servitude and Federal regulation for environmental protection. Because a landowner has the general right to protect property from erosion, applications to erect protective structures will usually receive favorable consideration. However, if the protective structure may cause damage to the property of others, adversely affect public health and safety, adversely affect floodplain or wetland values, or otherwise appears contrary to the public interest, the USACE will advise the applicant and inform it of possible alternative methods of protecting his property.

I.6 Safety

As a PIRF, safety is most closely reviewed in association with impoundment structures. To ascertain that all impoundment structures are designed for safety, non-Federal applicants may be required to demonstrate that the structures comply with established State dam safety criteria or have been designed by qualified persons and, in appropriate cases, that the design has been independently reviewed (and modified as the review would indicate) by similarly qualified persons.

I.7 Floodplains and Flood Hazards

Floodplains possess significant natural values and carry out numerous functions important to the public interest. These include (1) water resources values (natural moderation of flooding, water quality maintenance, and groundwater recharge); (2) living resource values (fish, wildlife, and plant resources); (3) cultural resource values (open space, natural beauty, scientific study, outdoor education, and recreation); and (4) cultivated resource values (agriculture, aquaculture, and forestry). Although a particular alteration to a floodplain may constitute a minor change, the cumulative impact of such changes may result in a significant degradation of floodplain values and functions and in increased potential for harm to upstream and downstream activities. In accordance with the requirements of Executive Order 11988, the USACE, as part of its public interest review, should avoid to the extent practicable, long- and short-term significant adverse impacts associated with the occupancy and modification of floodplains, as well as the direct and indirect support of floodplain development whenever there is a practicable alternative. For those activities that in the public interest must occur in or impact upon floodplains, the USACE

will verify, to the maximum extent practicable, that the impacts of potential flooding on human health, safety, and welfare are minimized, the risks of flood losses are minimized, and, whenever practicable, the natural and beneficial values served by floodplains are restored and preserved. In accordance with Executive Order 11988, the USACE avoids authorizing floodplain developments whenever practicable alternatives exist outside the floodplain. If there are no such practicable alternatives, the USACE considers, as a means of mitigation, alternatives within the floodplain that will lessen any significant adverse impact on the floodplain.

I.8 Water Supply and Conservation

Water is an essential resource, basic to human survival, economic growth, and the natural environment. Water conservation requires the efficient use of water resources in all actions that involve the significant use of water or that significantly affect the availability of water for alternative uses, including opportunities to reduce demand and improve efficiency to minimize new supply requirements. Actions affecting water quantities are subject to Congressional policy as stated in Section 101(g) of the Clean Water Act, which provides that the authority of States to allocate water quantities shall not be superseded, abrogated, or otherwise impaired.

I.9 Energy Conservation and Development

Energy conservation and development are major national objectives. The USACE will give high priority to the processing of permit actions involving energy projects.

I.10 Navigation

Section 11 of the Rivers and Harbors and Appropriations Act of 1899 authorized establishment of harbor lines shoreward of which no individual permits were required. Because harbor lines were established on the basis of navigation impacts only, the USACE published a regulation on May 27, 1970 (33 CFR 209.150), which declared that permits would thereafter be required for activities shoreward of the harbor lines. Review of applications is based on a full public interest evaluation, and harbor lines would serve as guidance for assessing navigation impacts. Accordingly, activities constructed shoreward of harbor lines prior to May 27, 1970, do not require specific authorization. Protection of navigation in all navigable waters of the United States continues to be a primary concern of the Federal government.

I.11 Economics

When private enterprise applies for a permit, it will generally be assumed that appropriate economic evaluations have been completed, the proposal is economically viable, and is needed in the market place. However, in appropriate cases, the USACE may conduct an independent review of the need for the project from the perspective of the overall public interest. The

economic benefits of many projects are important to the local community and contribute to needed improvements in the local economic base, affecting such factors as employment, tax revenues, community cohesion, community services, and property values. Many projects also contribute to the national economic development (i.e., the increase in the net value of the national output of goods and services).

I.12 References

33 CFR Part 209. Code of Federal Regulations. Title 33, *Navigation and Navigable Waters*, Part 209, "Administrative Procedure." Clean Water Act. 33 USC 1251, et seq. (also referred to as the Federal Water Pollution Control Act [FWPCA]).

EO 11988. (1977). Executive Order. "Floodplain Management." *Federal Register* 42: 26951. (May 24, 1977).

Fish and Wildlife Coordination Act. 16 USC 661-667e, et seq.

Rivers and Harbors Appropriation Act of 1899, 33 USC 403, as amended (also referred to as the Rivers and Harbors Act of 1899).

Appendix J

Carbon Dioxide Footprint Estimates for a 1000 MW(e) Reference Reactor

Appendix J

Carbon Dioxide Footprint Estimates for a 1000 MW(e) Reference Reactor

The review team has estimated the carbon dioxide (CO_2) footprint of various activities associated with nuclear power plants. These activities include building, operating, and decommissioning a plant. The estimates include direct emissions from the nuclear facility and indirect emissions from workforce transportation and the uranium fuel cycle.

Construction equipment estimates listed in Table J-1 are based on hours of equipment use estimated for a single nuclear power plant at a site requiring a moderate amount of terrain modification. Equipment usage for a multiple unit facility would be larger, but it is likely that it would not be a factor of 2 larger. A reasonable set of emissions factors used to convert the hours of equipment use to CO_2 emissions are based on carbon monoxide emissions (UniStar 2007) scaled to CO_2 using a scaling factor of 165 tons of CO_2 per ton of carbon monoxide (CO). This factor is based on emissions factors in Table 3.3-1 of AP-42 (EPA 1995). Equipment emissions estimates for decommissioning are one half of those for construction.

Table J-1. Construction Equipment CO_2 Emission (metric tons equivalent)

Equipment	Construction Total[(a)]	Decommissioning Total[(b)]
Earthwork and Dewatering	1.1×10^4	5.4×10^3
Batch Plant Operations	3.3×10^3	1.6×10^3
Concrete	4.0×10^3	2.0×10^3
Lifting and Rigging	5.4×10^3	2.7×10^3
Shop Fabrication	9.2×10^2	4.6×10^3
Warehouse Operations	1.4×10^3	6.9×10^2
Equipment Maintenance	9.6×10^3	4.8×10^3
Total[(c)]	3.5×10^4	1.8×10^4

(a) based on hours of equipment usage over 7-year period.
(b) based on equipment usage over 10-year period.
(c) total not equal to the sum due to rounding.

Workforce estimates are typical workforce numbers for new plant construction and operation based on estimates in various combined construction permit and operating license (COL) applications, and decommissioning workforce emissions estimates are based on decommissioning workforce estimates in NUREG-0586 S1, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1 Regarding the*

Decommissioning of Nuclear Power Reactors (NRC 2002). A typical construction workforce averages about 2500 for a 7-year period with a peak workforce of about 4000. A typical operations workforce for the 40-year life of the plant is assumed to be about 400, and the decommissioning workforce during a decontamination and dismantling period of 10 years is assumed to be 200 to 400. In all cases, the daily commute is assumed to involve a 100-mi roundtrip with two individuals per vehicle. Considering shifts, holidays, and vacations, 1250 roundtrips per day are assumed each day of the year during construction; 200 roundtrips per day are assumed each day during operations; and 150 roundtrips per day are assumed 250 days per year for the decontamination and dismantling portion of decommissioning. If the SAFSTOR decommissioning option is included in decommissioning, 20 roundtrips each day of the year are assumed for the caretaker workforce.

Table J-2 lists the review team's estimates of the carbon dioxide equivalent emissions associated with workforce transport. The table lists the assumptions used to estimate total miles traveled by each workforce and the factors used to convert total miles to metric tons CO_2 equivalent. CO_2 equivalent accounts for other greenhouse gases, such as methane and nitrous oxide, that are emitted by internal combustion engines. The workers are assumed to travel in gasoline powered passenger vehicles (cars, trucks, vans, and SUVs) that get an average of 19.7 miles per gallon of gas (FHWA 2006). Conversion from gallons of gasoline burned to CO_2 equivalent is based on Environmental Protection Agency (EPA) emissions factors (EPA 2007a, b).

Table J-2. Workforce CO_2 Footprint Estimates

	Construction Workforce	Operational Workforce	Decommissioning Workforce	SAFSTOR Workforce
Roundtrips per day	1250	200	150	20
Miles per roundtrip	100	100	100	100
Days per year	365	365	250	365
Years	7	40	10	40
Miles traveled	3.2×10^8	2.9×10^8	3.8×10^7	2.92×10^7
Miles per gallon[(a)]	19.7	19.7	19.7	19.7
Gallons fuel burned	1.6×10^7	1.5×10^7	1.9×10^6	1.58×10^6
Metric tons CO_2 per gallon[(b)]	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}
Metric tons CO_2	1.4×10^5	1.3×10^5	1.7×10^4	1.3×10^4
CO_2 equivalent factor[(c)]	0.971	0.971	0.971	0.971
Metric tons CO_2 equivalent	1.5×10^5	1.3×10^5	1.7×10^4	1.3×10^4

(a) FHWA 2006
(b) EPA 2007b
(c) EPA 2007a

Published estimates of uranium fuel cycle CO_2 emissions required to support a nuclear power plant range from about 1 percent to about 5 percent of the CO_2 emissions from a comparably sized coal-fired plant, e.g., Sovacool (2008). A coal-fired power plant emits about 1 metric ton of CO_2 for each megawatt hour generated (Miller and Van Atten 2004). Therefore, for consistency with Table S-3 of Title 10 of the Code of Federal Regulations (CFR) 51.51 (10 CFR 51), the NRC staff has estimated the uranium fuel cycle CO_2 emissions as 0.05 metric tons of CO_2 per MWh generated as assumed an 80-percent capacity factor. Finally, the review team estimated the CO_2 emissions directly related to plant operations from the typical usage of various diesel generators on site using EPA emissions factors (EPA 1995). The review team assumed an average of 600 hours of emergency diesel generator operation per year (total for four generators) and 200 hours of station blackout diesel generator operation (per year total for two generators).

Given the various sources of CO_2 emissions discussed above, the review team estimates the total life CO_2 footprint for a reference 1000 MW(e) nuclear power plant to be about 18 million metric tons. The components of the footprint are summarized in Table J-3. The uranium fuel cycle component of the footprint dominates all other components. It is directly related to power generated. As a result, it is reasonable to use reactor power to scale the footprint to larger reactors.

Table J-3. Nuclear Power Plant Lifetime Carbon Dioxide Footprint

Source	Activity Duration (yr)	Total Emissions (MT)
Construction Equipment	7	3.5×10^4
Construction Workforce	7	1.5×10^5
Plant Operations	40	1.9×10^5
Operations Workforce	40	1.3×10^5
Uranium Fuel Cycle	40	1.4×10^7
Decommissioning Equipment	10	1.8×10^4
Decommissioning Workforce	10	1.7×10^4
SAFSTOR Workforce	40	1.3×10^4
Total		1.5×10^7

In closing, the review team considers the footprint estimated in Table J-3 to be appropriately conservative. The CO_2 emissions estimates for the dominant component uranium fuel cycle are based on 30-year-old enrichment technology assuming that the energy required for enrichment is provided by coal-fired generation. Different assumptions related to the source of energy used for enrichment or the enrichment technology that would be just as reasonable could lead to a significantly reduced footprint.

Emissions estimates presented in the body of this environmental impact statement have been scaled to values that are appropriate for the proposed project. The uranium fuel cycle emissions have been scaled by reactor power using the scaling factor determined in Chapter 6 and by the number of reactors to be built. Plant operations emissions have been adjusted to represent the number of large CO_2 emissions sources (diesel generators, boilers, etc.) associated with the project. The workforce emissions estimates have been scaled to account for differences in workforce numbers and commuting distance. Finally, equipment emissions estimates have been scaled by estimated equipment usage. As can be seen in Table J-3, only the scaling of the uranium fuel cycle emissions estimates makes a significant difference in the total carbon footprint of the project.

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Docket Nos. 52-027, 52-028

11. ABSTRACT *(200 words or less)*

This environmental impact statement (EIS) has been prepared in response to an application submitted by South Carolina Electric & Gas (SCE&G) to the U.S. Nuclear Regulatory Commission (NRC) for combined licenses (COLs) for Units 2 and 3 at the Virgil C. Summer Nuclear Station (VCSNS) site in Fairfield County, South Carolina. This EIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action and mitigation measures for reducing and avoiding adverse impacts.

The NRC staff's preliminary recommendation to the Commission, considering the environmental aspects of the proposed action, is that the COLs be issued. This recommenation is based on (1) the COL application, including the Environmental Report submitted By SCE&G; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public scoping comments; and (5) the assessments summarized in this EIS, including the potential mitgation measures identified in the ER and this EIS.

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