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Date: 12/11/2006 6:14:02 PM
Subject: Part 1 - NRC Submittal
cc: "Tom C. Moorer" <TCMOORER@southernco.com>

PDF version of the NRC submittal provided for your information at the request of Tom Moorer. Part 2 to follow in separate email.

<<Final_Part_1.pdf>>

Merry Christmas!

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SOUTHERN COMPANY
Energy to Serve Your World℠

DEC 11 2006

Docket No.: 52-011

AR-06-2684

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Southern Nuclear Operating Company
Vogtle Early Site Permit Application
Environmental Site Audit Information Needs

Ladies and Gentlemen:

On October 17-19, 2006, the U.S. Nuclear Regulatory Commission (NRC) performed an onsite audit of the Environmental Report (ER) that was submitted with the Early Site Permit (ESP) Application for the Vogtle site. Approximately one week prior to the audit, the NRC provided Southern Nuclear Operating Company (SNC) with a list of questions to discuss during the audit. SNC dispositioned many of these questions during the audit, and the NRC added some additional questions to the list.

The NRC requested that many of the questions receive formal answers by the second week in December to support the development of their Environmental Impact Statement (EIS). The enclosure to this letter provides the SNC response to all but 35 questions. SNC will continue developing the responses to these remaining questions with the expectation that these answers will be provided to the NRC in the near future. It is SNC's understanding that the NRC will restructure and reissue these open questions as formal Requests for Additional Information (RAIs).

If you have any questions, please contact T. C. Moorer at 205-992-5807 or J. T. Davis at 205-992-7692.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Joseph A. (Buzz) Miller

Sworn to and subscripted before me this 11th *day of* December, *2006*

Gloria H. Bui
Notary Public

JAM/BJS/dmw

Enclosure: Response to NRC Information Needs from October 2006 Environmental Site Audit for Vogtle ESP Application

cc: Southern Nuclear Operating Company
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Document Services RTYPE: AR01
File AR.01.01.06

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Tetra Tech NUS, Inc.
Ms. K. K. Patterson, Project Manager

Southern Nuclear Operating Company

AR-06-2684

Enclosure

Response to NRC Information Needs

from

October 2006 Environmental Site Audit

for

Vogtle ESP Application

NOTE: This enclosure makes reference to attachments which follow the enclosure. The referenced attachments are identified below. The enclosure alone, without referenced attachments or this coversheet, consists of 73 pages.

Attachment A-1 (2 pages)
Attachment A-2 (3 pages)
Attachment A-3 (3 pages)
Attachment A-4 (6 pages)
Attachment A-5 (6 pages)
Attachment A-6 (8 pages)
Attachment A-7 (12 pages)
Attachment A-8 (7 pages)

Attachment B-1 (9 pages)
Attachment B-2 (3 pages)
Attachment B-3 (2 pages)

Attachment C-1 (8 pages)
Attachment C-2 (2 pages)
Attachment C-3 (14 pages)
Attachment C-4 (71 pages)

AR-06-2684
Enclosure
Information Needs Question Response

#	Information Need	Discipline Name	Reviewer Name
1	Provide more detailed information on location, purpose, withdrawal rate for known surface water intakes within 50 mi of the VEGP site, not just those intakes within the Savannah River Basin (potential impacts of severe accidents are not limited to the Savannah River Basin). The information should include bearing and distance from the site. Tables 2.3.2.2 and 2.3.2.3 and Figures 2.3.2-3 and 2.3.2.4 provide relevant, but incomplete information.	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed**.**			
2	Complete bibliographic information should be included in the reference lists for NRC documents referenced in the text. (Through out ER)	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
3	Why does the ER reference more than one version of the AP1000 Design Control Document? (e.g. Section 2.7 references Revision 14; Section 3.0 references Revision 15)	Accidents	Van Ramsdell
Response: Reference to Revision 14 is incorrect and will be corrected in the next revision of the ESP.; No further action needed.			
4	Please provide input to and output from the PAVAN code.	Accidents	Van Ramsdell
Response: Input files and Executive Summary of methodology were provided during the audit. Copies will be provided separately by December 31, 2006.			
5	Section 2.7.7 does not provide a basis for the statements related to predicted noise levels. How were the noise levels estimated? Please provide references?	Accidents	Van Ramsdell

#	Information Need	Discipline Name	Reviewer Name
Response: Noise levels at full power conditions were predicted for seven locations along the property line using ambient measurements and a model developed by Argonne Labs. Predictions were also made using Edison Electric Institute's Electric Power Plant Environmental Noise Guide and reported in the Operating License Stage Environmental Report for the Unit 1 & 2 FES. ***References:*** Georgia Power Company, 1985, Applicants Operating License Stage Environmental Report, Vogtle Electric Generating Plant Unit 1 and Unit 2, March, 29 Edison Electric Institute, Electric Power Plant Environmental Noise Guide			
6	The last line of Section 5.3.3.1 states that 1999 meteorological data were used in the SACTI code runs because they were the most complete. Was 1999 a representative year meteorologically? If not, why not and what is the impact of the departure on the results of the SACTI analysis.	Accidents	Van Ramsdell
Response: 1999 is a representative year meteorologically. There is generally not great variation in meteorogical data from year to year at the Vogtle site. A complete data set is an important discriminator when selecting meteorological data. SNC provided five years of met data. Of those five years, two years of data were considered complete – 1998 and 1999. The year 1999 was selected for the representative year from the two complete years of data since, in the judgment of the analyst, it would provide slightly more conservative results for the severe accident analysis. The year 1999 was not judged to be more conservative for SACTI, but the data sets were consistent for the two analyses. There was no sensitivity study on the year of met data for the SACTI runs.			
7	Section 5.3.3.1.3 cites a salt deposition value in NUREG-1555 as a basis for determining significance. This is an improper use of NUREG-1555. NUREG-1555 is a review plan, not a technical basis document. Use of NUREG-1555 in this manner decreases the validity of the environmental review.	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
8	Page 5.6-7 Section 5.6.3.4 refers to "A 1974 study on radio noise..." Please provide a reference for the statement and include the reference in the reference list.	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
9	Page 7.1-1... Last paragraph... What EAB is considered here? It isn't likely to be the EAB for the current site, which is the EAB described in Chapter 3.	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
10	Please explain how the noise levels predicted for the cooling towers (Table 2.7-26) are combined with ambient noise levels to arrive at the conclusion in Section 2.7.7.	Accidents	Van Ramsdell
Response: The noise levels estimates made by Georgia Power Company were made using Edison Electric Institute's Electric Power Plant Environmental Noise Guide. The significant sound-producing plant components were identified, and the effects of directional sources, distance, and other attenuation factors were considered. Table 2.7-26 is Table 5.6-1 from GPC 1985. ***Reference:*** Georgia Power Company, 1985, Applicants Operating License Stage Environmental Report, Vogtle Electric Generating Plant Unit 1 and Unit 2, March, 29			
11	The EAB defined in Table 3.0-1 near the bottom of page 3.0-2 is not the EAB described or used for X/Q calculation in Section 2.7.5.1, or for the X/Q presented in Table 3.0-1 near the center of page 3.0-2.	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
12	Section 3.6.3.1 states that there will be no sources of gaseous emissions for the new plants other than from the diesel generators and auxiliary boilers. Will there be activities using paint,solvents, or other volatile substances?	Accidents	Van Ramsdell

#	Information Need	Discipline Name	Reviewer Name
Response: The current Vogtle Unit 1 and 2 site is subject to a full Title V permit issued by the Georgia Environmental Protection Division (EPD). The proposed new units will be subject to the same requirements either as part of the Vogtle 1 and 2 Title V permit or a separate Title V permit. In either case, emissions from painting, use of solvents, or other volatile substances fall well below the threshold (deminimus) activities under the permit requirements. Best management practices will be used to minimize emissions of volatile substances.			
13	Please clarify the last sentence in Section 3.7.1. How do the 12 and 30 ft numbers in this sentence relate to the 45 ft phase-to-ground clearance listed in Section 3.7.2 on page 3.7-2?	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
14	Page 4.4-3, last line of Section 4.4.1.1.3. Does this sentence mean that the " "minor road repairs and improvements" said to be necessary in the last paragraph on page 4.4-2 will not be made? Or that damage to public roads, etc. listed in the first paragraph of pate 4.4-3 will not be made as promised. The words "... and will not require mitigation." are unacceptable in places where mitigation measures are discussed or promised!	Accidents	Van Ramsdell
Response: SNC does not consider minor repair and/or improvements of roadways to be mitigation. Burke County and the Georgia Highway Department coordinate these type activities as part of their ongoing road maintenance program.			
15	Same comment line of page 4.4-3; last line of Section 4.4.1 on page 4.4-5; last line on page 5.1-3;	Accidents	Van Ramsdell
Response: Correct wording should be that "mitigation beyond that discussed above will not be warranted." This correction will be reflected in the next revision to the ESP application.			
16	The statistics in Section 4.7.2 seem to indicate that VEGP is a more dangerous place to work than the US or Georgia in general. Why is that? The nuclear industry is generally regarded as having a good safety record.	Accidents	Van Ramsdell
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
17	On page 4.4-19 and again on page 5.8-15, you estimate the number of school-aged (under 18 years old) children in a manner that is incorrect. The methodology creates an estimated percentage of under 18 people based on the general GA population which includes children, retired people, and possibly other demographic groups that do not have children. Please provide a more appropriate estimate of the number of school-aged children.	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name

Response: During the NRC site audit at SNC, NRC requested that SNC use a different methodology for estimating the number of school-aged children that would migrate into the VEGP socioeconomic region for construction of the new units. NRC requested that SNC use the same methodology used by TVA in their environmental report to renew the licenses for their Browns Ferry Nuclear Plant Units 1, 2, and 3 (TVA 2003, Section E.3.4, page E-110).

The TVA document analyzed the refurbishment of Unit 1 based on recent TVA experiences on other large construction projects. In its analysis, TVA made the following assumptions:

a. 830 refurbishment workers would relocate to the area
b. 65 to 85 percent of them would bring families (or a maximum of 706 workers would bring families (830 X 0.85 = 706))
c. "the estimated number of dependents would be 1,244, consisting of 622 spouses and 622 children". 1,244 dependents is approximately 1.762 times the number of workers bringing families (706 X 1.762 = 1,244)
d. the estimated number of school-aged children was estimated to be 460, which is approximately 74 percent of the total number of children.

Therefore, applying the same methodology to the VEGP construction project, SNC estimates the following:

a. 2,700 construction workers would relocate to the area
b. 65 to 85 percent of them would bring families (or a maximum of 2,295 workers would bring families (2,700 X 0.85 = 2,295)
c. the estimated number of dependents would be 4,044, consisting of 2,022 spouses and 2,022 children. 4,044 dependents is approximately 1.762 times the number of workers bringing families (2,295 X 1.762 = 4,044)
d. the estimated number of school-aged children is estimated to be 1,496, which is approximately 74 percent of the total number of children.

The original analysis estimated that 1,900 school-aged children would accompany the construction workforce.
This confirmatory analysis was performed at the NRC's request. No revision to the evaluation in the ESP application is planned.

Reference:
Tennessee Valley Authority (TVA). 2003 Applicant's Environmental Report. Operating License Renewal Stage. Browns Ferry Nuclear Plant, Units 1, 2, and 3. December.

#	Information Need	Discipline Name	Reviewer Name
18	Provide a complete listing of the county-by-county residence for Vogtle employees.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action is necessary**.**			
19	Population data in different parts of the analysis come from different sources (SECPOP, US Census, State of Georgia). Provide a short discussion of the different data sources and explain how the use of multiple sources does not compromise the conclusions you derive from them.	Socioeconomics and Environmental Justice	Katie Cort
Response: See response to Question 20 below.			
20	On page 2.5-2 you say future populations were calculated from SECPOP data, extrapolated by applying the change in population between 1980 and 2000 in SECPOP. On page 2.5-3 you say future populations were calculated from State of Georgia Data, extrapolated by using ". . . the most recent census data and the actual birth and death data for 1990 through 2003." Reconcile this conflict and explain why you can use an extrapolation from a recent 20-year change in population to more than eighty years in the future. (See page 2.5-2.) Provide a complete list of the underlying assumptions behind your population projections, any possible bias each assumption could introduce to the analysis, and the potential magnitude of that bias.	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name
Response: NUREG-1555 directs the analyst to include a table with population data and projections by sector, not by political jurisdiction. Population data presented in sector format is most useful to analysts performing accident analyses, not those performing socioeconomic analyses. In general, socioeconomic impacts are not experienced by sectors, but are experienced by political jurisdiction (i.e. town, county, state, etc.). Though not required by NUREG-1555, SNC added a table with population data and projections provided by the State of Georgia to aid in the analyses of socioeconomic impacts. \ There is a difference in methodologies used for the projections in the two tables in Section 2.5. In the sector population table, the (20-year) annualized growth rate is calculated from 1980 to 2000 for each sector. The growth rate is used to project decennial populations for each sector to 2090. In the political jurisdiction table, the projection data is provided by the State of Georgia, which used the cohort-component model to project decennial populations to 2015. When the growth rates are compared side-by-side, the growth rates provided by the state are larger than the 20-year annualized rates (1.0 % vs. 0.7%, in 2010) in Burke County and smaller than the 20-year rates in Richmond (-0.3% vs. 0.48%, in 2010) and Columbia (2.7% vs. 4.1%, in 2010) Counties. Such differences may overstate or understate accident impacts, depending on the county. However, over the 50-mile radius, these differences will offset one another to a degree. Additionally, for accident analyses, a sensitivity analysis is performed wherein population projections were increased 30 percent. This increase would also serve to narrow the margin between the two growth rates. While differences are noted, each method is considered a valid approach. With respect to projections to 2090, most demographers and economists agree that, beyond 20 years, the uncertainty (or degree of error) of any projection method is large and projections become increasingly speculative. In effect, the validity of any methodology used for dates beyond 20 or so years from the present could be seriously debated. However, in effort to provide some rough estimate of projected populations to 2090 (assuming units go on-line about 2020 and a sixty-year operating life, or to 2080), these methods (SECPOP) were selected.		
21	Provide the raw Arcview data and the "calculation package" used to determine minority and low-income population sizes.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action is necessary.			
22	The ESP characterization of affected Native American communities on page 2.5-25 does not include South Carolina populations. Provide this analysis.	Socioeconomics and Environmental Justice	Katie Cort
Response: The location and distribution of South Carolina Native American populations are provided in Attachment A-1. <u>This information will be added to the ESP at the next revision.</u>			

#	Information Need	Discipline Name	Reviewer Name
23	Page 4.4-13, states (and page 5.8-11 reiterates): "Use of the WMA/boat landing is seasonal and it will be unlikely that hunters and fishermen will be on River Road at the same time as the construction shifts. . ." Provide citations for the assumption that sports and recreational users of the boat landing will not be on the roads at the same time as construction or operations-related vehicles.	Socioeconomics and Environmental Justice	Katie Cort
Response: Based on interviews with plant personnel and individuals with personal knowledge of local hunters/fishermen habits, deer/turkey hunters are in place before daylight, and leave mid-day or after dark. Fishermen are more likely to use River Road at same time as commuters; however since they are also recreational users, they will likely start later in the day than commuter traffic. Both will use the roads more on weekends than weekdays. Also, there are additional roads to Yucci Wildlife Management Area and the boat landing other than those to VEGP.			
24	On page 2.5-20 the ESP says: "All three school districts have *some* capacity for additional students. . . " [Emphasis added] Please provide concrete values for this statement. What is the capacity of each affected school? What was the student population at each school last year? What are the projected population and capacity factor for each school during the construction phase of the Vogtle project?	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
25	Page 4.4-7 states "The creation of such a large pool of jobs [5,800] would inject *millions of dollars* into the regional economy." Provide an actual value for your estimate.	Socioeconomics and Environmental Justice	Katie Cort
Response: Please see Attachment A-2.			
26	Page 4.4-8 states "While the exact amount of income taxes the project will generate for Georgia cannot be known, it could be *fairly large* over a 7-year pre-construction and construction period. . ." Provide a quantity for your estimation of the tax revenues that will be collected.	Socioeconomics and Environmental Justice	Katie Cort
Response: Please see Attachment A-3. This analysis is provided for confirmatory purposes; no revision to the ESP is planned.			
27	Clarify your statements on page 4.4-16, within two sentences, that the in-migration of workers in Burke County is "significant" and "MODERATE."	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
28	Page 5.8-6 of the report states: "Therefore, SNC used generic assumptions. SNC based costs on reasonable assumptions supported by several independent studies . . ." Provide a comprehensive list of those studies and the generic and reasonable assumptions used in this report. For each assumption, discuss the consequences of that bias in terms of its direction and magnitude on the results of the analysis.	Socioeconomics and Environmental Justice	Katie Cort
Response: The following simplifying assumptions were used to generate the tax revenue analysis. Supporting information is provided in Attachment A-4.: • Cost range [for a single unit] was based on GPC analyses-generated estimates and generic estimates in MIT 2003. • Joint ownership was disregarded. • Tax benefits to other Georgia counties from GPC ownership in the new units was disregarded, and all tax benefits were assumed to accrue to Burke County. • The Allowance for Funds Used During Construction (AFUDC) was estimated assuming a 5-year schedule from ground breaking to on-line, but the AFUDC was not based on an actual construction schedule / percent complete. • Millage rate was held constant for the approximate 40-year analysis period at the current rate. • 40 years of operation for each unit was assumed to estimate depreciation and rate base returns Rates of return based on market costs of capital will be received for property placed in the rate base. • Rates of return on property not subject to rate regulation is assumed to be comparable to rates of return for property that is subject to rate regulation. • Value of property placed in the rate basis is approximately equal to the amount added to the rate base as a result of the project. • The value of nontaxable property on the project was estimated to be 19% of the total value, but this was based on fossil-fueled plants. The portion of nuclear units not subject to the ad valorem tax is not known. • Tax payments to Alabama were calculated as a ratio of payments to Georgia and were not based on the Alabama tax structure.			

#	Information Need	Discipline Name	Reviewer Name
29	List all of your underlying assumptions with regard to the working conditions at the Vogtle site. How many days a week will the construction workforce work? How many hours a day? Will the work be done with labor agreements with local unions or through nonunion companies? Provide references and/or anecdotal evidence in support of each assumption. On page 4.4-11, the ESP states; ". . . SNC has assumed that there will be four construction shifts and each shift will include 25 percent of the total construction workforce. . ." Provide evidence this manpower strategy has been successfully employed on a project of this magnitude.	Socioeconomics and Environmental Justice	Katie Cort
Response: The information contained in Chapter 4 of the ER provides a description of the strategy planned for the construction of new units at Vogtle and provides a brief discussion of the workforce structure and work schedule. The construction of the new units will be managed by a contractor. Decisions regarding the detailed work schedule have not been made and will likely not be made for some time to come. Southern Company has a long history of constructing and operating power plants in the southeast including three nuclear facilities. SNC has relied extensively on previous experience with the construction of the existing Vogtle units in evaluating the socioeconomic impacts of this new construction project. SNC and their contractors will comply fully with applicable laws and regulations and will manage working conditions in a way to maximize efficiency, ensure a quality work product, and ensure fair and equitable treatment of the construction workforce.			
30	Page 5.8-11 discusses the impact of outages, but there is no description of what is meant when an outage occurs. Explain your number of outages per year, how it was derived, and what takes place at an outage.	Socioeconomics and Environmental Justice	Katie Cort
Response: There are currently two units located at the Vogtle site. Each unit undergoes a scheduled refueling outage every 18 months. As such, there are two years with one outage and one year with two outages for every three year period. Typical outage length is 20 - 25 days. The proposed Vogtle Unit 3 and Unit 4 are currently estimated to undergo scheduled refueling outages approximately every 18 - 24 months. Outage length should be in the 18 - 24 day range. Although an outage schedule for all four Vogtle units has not yet been designed, it is reasonable to assume that outages will be carefully planned in advance to optimize the process and minimize the impact on Southern Company system reliability and SNC manpower resources. The typical outage consists of the required fuel reload activities, scheduled equipment maintenance, and frequently special projects such as major equipment replacements and refurbishment, chemical cleanings, etc. The onsite work force increases significantly as contractors come onsite to support outage activities. Plant shifts are modified to ensure outage coverage and coverage for the operating units and overtime is common. Outages are carefully managed to minimize downtime.			

#	Information Need	Discipline Name	Reviewer Name
31	On page 2.5-1, you assume the construction workforce will locate in the 50-mile region in approximately the "same proportion as the existing workforce." There is not enough detail presented to support your assumption. Table 4.4.2-1, footnote #1 suggests this assumption may be coming from a report; however the report is not cited. Revise your assumptions for worker housing to reflect a defensible distribution of workers. List your assumptions, any potential bias that each assumption may impose, and the potential magnitude of that bias. Provide citations.	Socioeconomics and Environmental Justice	Katie Cort
Response: Information in Table 4.4.2-1 is based on similar sized projects and knowledge of the local skilled craft labor force. This information is based on the following: 1. A manpower curve and project schedule for a two-unit (1500 MW each unit) project. 2. A derivation of the number of local skilled craft labor force (1,000) based on the following: a. The known skilled craft workforce currently with jobs working in the area. b. The assumption that the ESP project could draw 20 to 25 percent of the known skilled craft workforce in the area c c. The assumption that field non-manual workers would come from outside of the area 3. It is expected that approximately 70 to 80 percent of the entire construction workforce would be employed for two years or more. SNC conservatively assumed that construction workers expecting to stay 2 or more years would consider the area their permanent residence and move their families there. SNC determined that the distribution of a permanent construction workforce would be best represented by the distribution of an operations workforce. The majority of the current operations workforce employed at VEGP lives in one of the three counties of interest (Burke, Richmond, and Columbia).		
32	On page 2.5-1 you state “the residential distribution of the new units’ construction and operational workforces would resemble the residential distribution of VEGP’s current workforce.” You also state that since 80% current workforce lives in only three counties, that those three counties are sufficient for your socioeconomic analysis. Provide an analysis for all construction and operational workers and all of the counties within the 50 mile radius around the Vogtle site.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
33	Almost half the study area is in South Carolina, yet all of the socioeconomic and environmental health effects are limited to only three counties in Georgia. Explain county-by-county why that simplifying assumption can be made.	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name
Response: Please see Attachment A-5			
34	The ER claims 1,000 of the 4,400 construction workers will come from local labor sources. Provide citations for the reports and studies from which this assertion was derived. Farther in the analysis, you claim that, to be conservative, you assume all of the 660 workers needed for operating the new Vogtle units after construction will immigrate from outside the area. Explain why some proportion of the 660 operations workers cannot come from the local labor pool. Provide anecdotal evidence or other support for such an assertion.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed**.**			
35	Page 4.4-6 uses a multiplier to estimate the number of new jobs that will be created by the influx of 3,400 new construction workers for the life of the construction project. The value assigned to the construction labor multiplier appears to be too high for it to be correct. Specific issues and questions that arise related to the use of the multiplier include the following: Is it appropriate for this multiplier to be applied directly to the labor component of the economy? What were the baseline and specific changes to that baseline that went into the RIMS II analysis? Please provide the letter you cited from the BEA representative that gave you the RIMS II multiplier value and the contact's instructions on how to it. When construction is complete, the area will experience a loss of about 2,300 jobs (based on the maximum construction employment, net of the new operations work force). In terms of multiplier effects, can you adequately capture and discuss the net loss in employment from this change? Construction employment is not constant. It will begin with a small work force and then expand to its maximum size, then decline to a low level again (similar to a bell curve with the peak at 4,400), not a constant plateau at 4,400 from beginning to end. This would suggest that the ER overstates the full employment effect by as much as 100% (assuming a normal distribution on the bell curve). Can you adjust your analysis based upon this distribution?	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
36	Chapter 4 claims “the assessed value of plant during construction is discussed as likely being greater than $0 and less than "actual cost."” Provide an estimated value, using the estimated overnight capital costs used in Table 10.4-2.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
37	Provide the list of local "government officials, the staff of social welfare agencies, and local businesses" that were contacted concerning environmental justice issues? Provide copies of all interview notes, as well.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
38	Provide the GIS layer data that includes population data as well as minority and low-income block groups.	Socioeconomics and Environmental Justice	Katie Cort
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
39	Provide estimates of the potentially disproportionate health and environmental effects among populations of interest. Quantify each health and environmental effect identified. Discuss and quantify the applicant’s planned mitigation strategies for these anticipated effects, using monetary measures whenever possible. Quantify and discuss the possible exposure doses to affected populations of interest. (This especially applies to all four subsections of chapter 7)	Socioeconomics and Environmental Justice	Katie Cort
Response: SNC plans to provide the response to this question by January 31, 2007.			

#	Information Need	Discipline Name	Reviewer Name
40	The ER identifies a serious public services problem that may arise due to the in-migration of workers: "Fire protection infrastructure, already inadequate could not be able to meet the needs of [Burke] county. . ." Chapter 4 identifies under staffing of the fire department and the county police, road congestion problems, and overcrowding of its schools. Chapters 4 and 10 let local tax increases fund the new personnel and equipment necessary to address these problems. However, there is a lag between the collection of the new taxes and the actual use of the new assets. Furthermore, mitigation strategies need to be actions to be taken by the applicant, not outside entities. What forms of mitigation does the applicant plan to mitigate social problems created by the construction and/or operation of the Vogtle units 3 and 4? Provide cost estimates of the before- and after-mitigation levels for all social problems that require mitigation.	Socioeconomics and Environmental Justice	Katie Cort
Response: SNC has not proposed a mitigation measure for the impact described. NEPA does not require mitigation for every impact. The increased tax revenues identified in the ER that will result from the proposed action will offset impacts on county services and should be considered by NRC in conjunction with any such impacts. While the conservative assumption underlying the analysis is that the entire construction workforce will arrive en masse, that scenario is not realistic. (why did we assume it for the purpose of the analysis). The increases in population that will result from the construction of the new units will ramp up gradually over several years. It is reasonable to conclude that the impacted counties will respond to these increases in population as they would other population growth, regardless of cause. The counties' response can be financed through tax revenues generated through the construction and operation of the units. Mitigation measures by SNC, therefore, should not be required. As part of the planning process, SNC will keep local officials apprised of the expected arrival of workers far enough in advance to allow them to respond appropriately. SNC will include such notification measures as mitigation measures in the next revision to the ESP application.		
41	Provide a table that displays all of the benefit categories attributable to the proposed site and all alternative sites and the expected magnitude of those benefits in monetary terms whenever possible.	Socioeconomics and Environmental Justice	Katie Cort
Response: SNC plans to provide the response to this question by January 31, 2007.			

#	Information Need	Discipline Name	Reviewer Name
42	Expand the analysis on page 10.1.2 which discusses the unavoidable and adverse impacts of operation (currently in eleven lines). Include a discussion of each impact, mitigation strategies to reduce their impact, and cost estimates for before- and after-mitigation levels for each impact.	Socioeconomics and Environmental Justice	Katie Cort
Response: Please see Attachment A-6.			
43	Provide a discussion of the procedures and practices that the applicant will undertake to minimize the size of the commitment, the cost of those efforts, and some quantification of those commitments that remain after all mitigation attempts have been made.	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name

Response:
Groundwater
SNC estimates that the new units will use 752 gallons per minute (gpm) of groundwater (during off-normal operations the new units could draw 3,140 gpm for a short period of time). Using this estimate and historic data from existing site wells and Units 1 and 2, SNC estimates that drawdown at the site boundary could range from less than 2 feet to less than 13 feet (note that groundwater analyses are still being prepared and will be provided in response to an RAI). Some AP1000 water systems are recycled to minimize consumption. No other activities near the VEGP site require large amounts of groundwater. SNC concludes that impacts to groundwater will be small and short-term (i.e., withdrawals and drawdown would cease when operations ceased) and therefore does not require additional mitigation.

Surface Water
SNC will use surface water drawn from the Savannah River turbine plant cooling. The Best Available Technology for power plant cooling systems is cooling towers. SNC plans to construct natural draft cooling towers for the new units. Consumptive losses from the cooling towers are estimated to be 1.55 percent of the river flow under worst case conditions. This water loss would lower the river level at VEGP less than 1 inch. No large water withdrawals exist between VEGP (at River Mile 151) and approximately River Mile 25. SNC concludes that impacts to the water quantity from consumptive water losses will be small and will not require mitigation beyond cooling towers.

A small thermal plume will be discharged into the river just downstream of the existing plume. The new plume will affect less that 800 ft^3 of the river. Small amounts of regulated chemicals will be discharged with the plume. The chemicals will disperse quickly and concentrations outside the Georgia-approved mixing zone will be at ambient river concentrations. SNC concludes that impacts to the water quality from discharges will be small and will not require mitigation beyond cooling towers.

The intake canal/ intake structure will be designed to Best Available Technology and recessed from the river flow which will reduce the approach velocity significantly. This will minimize impingement and entrainment losses of aquatic organisms.

By constructing cooling towers and an intake using Best Available Technology, SNC has mitigated impacts to the Savannah River and its aquatic organisms. The estimated cost of cooling towers and associated infrastructure is $175,000,000. All impacts will be small and short-term, ending with the cessation of operations. No additional mitigation is warranted.

#	Information Need	Discipline Name	Reviewer Name

Land Use
Two new units will require a commitment of approximately 300 acres of land for the duration of plant operations. The land will be unsuitable habitat for many terrestrial plant and animal species that are found in the natural habitats in the area. However, there is sufficient undeveloped land adjacent to the VEGP site, and such that any impacts from the loss of 300 acres will be small and mitigation will not be necessary.
The AP1000 is designed to minimize waste generation, thus minimizing the disposal space required. For example, the liquid radioactive waste system is designed to minimize the generation of solid wastes. In this way, SNC minimizes not only the amount of land needed to dispose of wastes but also the costs incurred through waste disposal.
In addition, SNC has practices in place to further minimize solid waste generation. Vogtle currently has active waste minimization programs for solid waste (including paper, cardboard, used oil, and scrap metal recycle), hazardous and mixed waste, low-level radwaste, and a Pollution Prevention Program. These programs have been in place for a number of years and have produced significant results. Similar programs would be put in place for the new units.

Radiation Releases to Air and Surface Water
Nuclear plants are designed to ensure very low radiation exposure to employees and the public and that only very low concentrations of radiation are released to the environment. The plant systems are designed to prevent or minimize leakage, equipment failures, corrosion, and other factors that would stress system components and increase the likelihood of system failures. For example, radiation equipment and piping are shielded to minimize radiation exposure by plant personnel. Direct connections between inside and outside the containment are minimized. Exhaust air ductwork is designed to minimize the spread of any airborne contamination. Air exhausted to the outside passes through filters to minimize particulate releases. The design of the AP1000 minimizes the potential for large fission product releases in the event of a severe accident: for example, water would drain on the outside of the containment to increase heat transfer, improved containment isolation reduces the probability of containment bypass, steam generator tube rupture core melt frequency is reduced with multiple levels of redundant and diverse defensive systems. It is not possible to determine the costs of these design features at this time
SNC concludes that the design of the reactor and auxiliary systems will limit the potential for releases to the environment and exposure to workers and the public and that further mitigation is not warranted.

Construction Material
The AP1000 utilizes building configurations and structural designs that minimize building volumes and quantities of materials such as concrete, wiring, steel, etc.

#	Information Need	Discipline Name	Reviewer Name
44	Establish a $2005 US standard for all dollar values in the report.	Socioeconomics and Environmental Justice	Katie Cort
Response: The data used by SNC to conduct the economic analysis includes data from many sources and many years. It would be extremely difficult, if possible at all, to express all of this data in terms of Standard Dollars for 2005 or for any reference year. SNC believes that the purpose of this data does not warrant this action.			
45	The section on unavoidable adverse environmental impacts discusses social issues without specificity and never identifies any particular environmental concern. Clarify this discussion to include specific environmental adverse impacts for construction and operations, including an assessment of the before- and after-mitigation value of those impacts? Include the EJ effects of both construction and operations for each alternative site. Provide a table that displays all of the adverse environmental impacts of construction and operations (including human health effects); a description of each impact; all mitigation strategies to be undertaken by the applicant for that impact, the cost of mitigation, and the expected value of the unavoidable portion of that impact.	Socioeconomics and Environmental Justice	Katie Cort
Response: Please see Attachment A-7.			
46	Provide a discussion of the unavoidable and adverse effects of construction and operation at alternative sites (including human health effects), including the pre- and post-mitigation levels of those impact categories. Provide a table that displays all of the adverse environmental impacts of construction and operations at alternative sites; a description of each impact; all mitigation strategies to be undertaken by the applicant for that impact, the cost of mitigation, and the expected value of the unavoidable portion of that impact.	Socioeconomics and Environmental Justice	Katie Cort
Response: SNC is currently working on this information. It will be sent to the NRC by January 31, 2007.			

#	Information Need	Discipline Name	Reviewer Name
47	Provide a copy of the documentation for your assessment of the real estate markets in the affected area. In particular, explain your statement on page 5.8-12 that states: "the average income of the new workforce will be expected to be higher than the median or average income in the county, therefore, the new workforce could exhaust the high-end housing market . . ." What is the correlation between wages and home value (corrected for boom economy immigration) in the Savannah River basin?	Socioeconomics and Environmental Justice	Katie Cort

Response: The 2000 real estate inventory, by price, in Burke, Richmond, and Columbia Counties is provided in Attachment A-8 (USCB 2000). In Burke County, the largest housing inventories fall within the $40,000 to $79,999 price ranges and the median housing price is $59,800. In Richmond County, the largest housing inventories fall within the $40,000 to $174,999 price ranges and the median housing price is $76,800. In Columbia County, the largest housing inventories fall within the $60,000 to $249,999 price ranges and the median housing price is $118,000. The inventory of higher-priced housing ($100,000 or more) is the lowest in Burke County at 0.1 percent of total housing. Richmond County has 15.4 percent and Columbia County has 21.6 percent. The average wage in the Augusta-Richmond County, GA-SC metropolitan statistical area in 2005 was $33,560 (BLS 2005). The average annual salary of an SNC operations worker at the VEGP site will be $75,400 (Woodruff and Pittman 2005).
Based on the housing inventories and wage information presented here and the fact that workers with larger disposable incomes tend to purchase more expensive housing, it would be reasonable to assume that this workforce would purchase housing in the upper price ranges (over $100,000) of the housing markets.

References: U.S. Department of Labor Bureau of Labor Statistics (BLS). 2005. "May 2005 Metropolitan Area Occupational Employment and Wage Estimates. Augusta-Richmond County, GA-SC." Available online at http://stats.bls.gov/bls/blswage.htm. Accessed October 16, 2006.U.S. Census Bureau (USCB). 2000. "QT-H14. Value, Mortgage Status, and Selected Conditions: 2000." Data Set: Census 2000 Summary File 3 (SF 3) – Sample Data. Available online at http://factfinder.census.gov. Accessed November 16, 2006.Woodruff, J. and Pittman, J. 2005. "Staffing and Cost Study for a New Unit at Plant Vogtle." August 12. ATTENTION -- Business Confidential.

48	Provide a table that displays all of the benefit categories (including human health benefits) attributable to the proposed site (including health benefits) for the proposed site and all alternative sites; a description of each benefit; and the expected value of the benefit.	Socioeconomics and Environmental Justice	Katie Cort

Response: SNC is currently working on a response to this question. It be sent to the NRC by January 31, 2007.

#	Information Need	Discipline Name	Reviewer Name
49	Wetlands meet the definition of "important habitats" in NUREG-1555. Impacts to wetlands associated with building the new units at Vogtle will be quantified as part of the NEPA review process.	Terrestrial Ecology	Amanda Stegen
Response: In order to evaluate the impacts of construction on wetland habitat, the final location of the intake and discharge structures, barge slip, and other construction activities with potential to impact wetlands must be known. This information has only recently become available. SNC will conduct wetlands delineation in early December 2006 and will use the information to evaluate the impacts of construction on wetlands. Thus, SNC plans to provide the response to this question by January 31, 2007**.**			
50	Please identify and provide a figure with all wetlands that may be impacted during the pre-construction and construction activities including the wetlands found on the floodplain adjacent to the Savannah River.	Terrestrial Ecology	Amanda Stegen
Response: As described in the response to Question 49, information on the final location of key structures only recently became available. SNC will conduct wetlands delineation in early December 2006 and will utilize the information to evaluate the impacts of construction activities on wetlands. SNC plans to provide the response to this question by January 31, 2007**.**			
51	How were the wetlands determined - aerial photos, wetlands delineation. If delineated, was the 1987 Wetlands Delineation Manual used? If not, what method was used?	Terrestrial Ecology	Amanda Stegen
Response: A survey of wetland areas on the Vogtle site was conducted in support of the original Unit 1 and 2 Licensing in the early 1980's. This work was also used in the Wildlife Habitat Council program development. It consists primarily of maps developed from topos, aerial photos, and site walkdowns of wetland areas. The wetlands were mapped and the aerial extent was defined. No formal delineation was conducted and the 1987 Wetland Delineation Manual was used for reference only. SNC will conduct wetlands delineation in early December 2006. SNC plans to provide the response to this question by January 31, 2007**.**			
52	Identify the specific activities associated with wetlands impacts - including both preconstruction and construction activities (example - building the access/haul roads, new water intake structure) Specifically, provide information on the activity, the potential impact, number of acres to be impacted, type of wetland impacted (jurisdictional/non jurisdictional), and any planned mitigation associated with the wetlands. We have provided Table X-1 to facilitate compiling this information.	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
Response: SNC now has adequate information available about the final design, location, and process for the construction activities that have potential to impact wetlands. SNC will conduct wetlands delineation in early December 2006 and the resulting information will be utilized to determine the impact to wetland areas associated with the Unit 3 and 4 construction. SNC plans to provide the response to this question by January 31, 2007**.**			
53	It is understood that the specifics associated with the construction of the new 500 kV transmission line and the borrow areas is still in the planning phase. Provide as much information as possible on wetlands, sensitive areas, and Carolina Bays that may be impacted with the construction of the new 500 kV transmission line as well as the borrow areas.	Terrestrial Ecology	Amanda Stegen
Response: SNC is working with Georgia Power Company (GPC) to develop a macro-corridor for new 500 KV line and an assessment of the environmental impacts associated with construction and operation of this line. The assessment will build on the county level assessment provided in the ER for this line. Information should be available by January 31, 2007. SNC plans to provide the response to this question by January 31, 2007**.**			
54	In regards to wetlands, has SNC provided maps or delineations to the ACOE for jurisdictional determinations, and if not, how much interaction regarding wetlands has SNC had with the Corps?	Terrestrial Ecology	Amanda Stegen
Response: Information about the final design and location of structures and construction activities has only recently become available. SNC has engaged the U.S. Army Corps of Engineers (USACE) – Savannah District and has met with them on two occasions to discuss wetland issues. SNC will conduct wetlands delineation in early December 2006 and this information will be provided to the USACE for the purpose of obtaining jurisdictional determinations. These determinations will be utilized in evaluating the environmental impact of construction activities on wetlands. SNC plans to provide the response to this question by January 31, 2007**.**			
55	What is the proposed schedule for obtaining the required permits from Georgia DNR and COE? What is the status of the 401, 404 and Section 10 applications? These permits include the 401, 404 and Section 10 permits.	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
Response: SNC has engaged the Georgia Department of Natural Resources – Environmental Protection Division (EPD) regarding state issued permits and the US Army Corps of Engineers (USACE) regarding federal permits. A number of meetings have been held and Georgia EPD personnel were present at the site audit. There are four permits that are the focus of current efforts; the Section 10/Section 404 permits for the intake structure, discharge structure, and barge slip and the NPDES Stormwater permit for construction activities. The first three permits are issues by the USACE, but require Section 401 water Quality Certifications from Georgia EPD. The stormwater permit is issued by Georgia EPD. In addition to these permits, SNC is evaluating the need for coverage under a Title V air permit for construction activities, including control of dust and storage and use of volatile substances such as gasoline and diesel fuel. The ER discusses permits in Chapter 6. The current schedule for permit applications is under development. Applications for the four permits discussed above will be submitted as follows: Intake Structure Section 10 and Section 404 permit - Fall 2007 Discharge Structure Section 10 and Section 404 permit - Fall 2007 Barge Slip Section 10 and Section 404 permit - Fall 2007 NPDES Stormwater permit for construction activities - Summer 2007 **Dependent on schedule of pre-construction activities and outcome of LWA rulemaking SNC has already had discussions with the relevant agency personnel about these permits and will continue dialogue as additional schedule information becomes available.		
56	Provide acreage associated with the man-made ponds.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
57	What species are associated with Debris Basins 1 and 2 and associated wetland areas?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
58	What species are associated with the large basin between Debris Basin 1 and 2?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
59	There is currently insufficient detail to determine if there will be any dredge and fill activities associated with the preconstruction/construction activities including building access roads to and from riverfront structures, the new cooling water intake structure, the new discharge structure; modification of existing barge slip; and installation of proposed 500 kV transmission line. Provide information regarding the preconstruction/construction activities that may have dredge and fill component. What are the quantities of material to be dredged/ used for fill? And have these sediments been characterized? Table X-1 has been provided to facilitate compiling this data.	Terrestrial Ecology	Amanda Stegen
Response: As part of site preparation activities and prior to any construction activities, any wetlands associated with the intake/discharge structure and barge facility or within the upland construction site will be delineated to determine wetland impacts and all appropriate state and federal permits would be obtained. SNC will conduct wetland delineation in early December 2006 and utilize this information in determining the impacts of construction activities on wetlands. SNC plans to provide the response to this question by January 31, 2007. .			
60	pg 2.4-4, 4th para. The first sentence states that "No streams or wetlands are located within the proposed footprint (see Figure 2.1-1)." The legend for Figure 2.1-1 does not include wetlands. Provide a map with wetlands in legend and on figure.	Terrestrial Ecology	Amanda Stegen
Response: There are no streams or wetland areas in the proposed footprint. The power block, cooling towers, and switchyard are located in upland areas and construction in these areas will not impact wetlands. SNC will begin wetland delineation in early December 2006 beyond the proposed footprint and the subsequent report will clearly define and delineate wetland areas and SNC will utilize that information to determine wetland impacts.			
61	What survey methods were used for the 2005 threatened and endangered surveys? Were separate plant, reptile, amphibian and bird surveys conducted? If not, how were these organisms surveyed? What methods were used to complete these surveys (e.g., did trained biologists conduct the surveys, number of people on each survey, type of survey?).	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC. No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
62	Specifically what sections of the VEGP Site and transmission line corridors were surveyed for threatened and endangered species? Please provide a map(s) with this information.	Terrestrial Ecology	Amanda Stegen
Response: SNC is developing this information in December 2006, but it will not be available with this response. SNC plans to provide the response to this question by January 31, 2007**.**			
63	Were the all the areas that will be impacted during pre-construction/construction activities surveyed for threatened and endangered species? If not, what areas that will be impacted were NOT surveyed? Please identify what activities are associated with areas that have been surveyed/haven't been surveyed. Table X-1 is provided to facilitate compiling this information.	Terrestrial Ecology	Amanda Stegen
Response: All areas that will be impacted during pre-construction/construction activities were surveyed for threatened and endangered species. Regarding areas that have been surveyed, SNC is developing this information in December 2006, but it will not be available with this response. SNC plans to provide the response to this question by January 31, 2007**.**			
64	If areas that will be impacted were not surveyed, please provide justification for not completing any surveys/monitoring.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed			
65	Are there historical records of "important" species using the site? If so, when and where?	Terrestrial Ecology	Amanda Stegen
Response: There are no historical records of "important species" utilizing the Vogtle site.			
66	Provide information on any historic programs that documented wildlife onsite or in the transmission line corridors.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
67	pg 5.6-1, 4th para, last sentence, Transmission System Impacts provide additional details (procedures/training qualifications) concerning reporting unusual occurrences (or mortality) of federally threatened or endangered (T&E) species to the GPC Environmental Affairs Department within 24 hours of discovery. Do the maintenance crews actively look for T&E species or are the reports just by chance? Do they have T and E training?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
68	Has suitable habitat for T&E species been identified in the transmission corridors or onsite? If not, have any efforts been made to identify suitable habitat?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
69	pg 2.4-4, 2nd para The last sentence states that "SNC biologists at VEGP are familiar with special-status species in eastern Georgia." Does this imply that there is on-going program to document special-status species if they are encountered on site? Do the SNC biologists work with state and federal biologists to document/protect species that may occur onsite or in the transmission corridors? Please describe the SNC terrestrial threatened and endangered species program.	Terrestrial Ecology	Amanda Stegen
Response: SNC utilizes biologists from the Georgia Power Company (GPC) Environmental Lab to provide support for the current Plant Vogtle needs and for support of the ESP process. A consultant (Third Rock) was used to develop the Threatened and Endangered (T & E) Species report for the Vogtle ESP. They worked closely with GPC biologists during all phases of the work and the GPC biologists provided review of the T & E species report and the ESP ER sections dealing with T & E species. GPC maintains an outstanding working relationship with state and federal biologists and participate in the Georgia Heritage program. SNC also maintains a focus on T & E species issues through the Wildlife Habitat Council (WHC) certification program. Vogtle is a Certified Wildlife Habitat site. The WHC program includes an outreach program to local schools and employees actively participate in wildlife education projects. Any activity conducted at Vogtle with potential for environmental impact is reviewed by environmental personnel and experts are brought in when needed. T & E species is one of the many items that are considered during these reviews. The GPC biologists met with NRC, PNNL, and Georgia Department of Natural Resources (DNR) personnel during the site audit and provided copies of many of the guidelines and procedures used on transmission line siting and other environmental assessment work. The GPC biologists will be working with the SNC consultant during the upcoming wetlands delineation work.		

#	Information Need	Discipline Name	Reviewer Name
70	The longleaf, loblolly and slash pine forests that occur on the VEGP Site are described as being "diverse ages" (pg 2.4.1). Provide a map that shows the distribution of the forest age classes on the VEGP site in relation to the areas that will be impacted by pre-construction and construction activities.	Terrestrial Ecology	Amanda Stegen
Response: SNC plans to provide the response to this question by January 31, 2007**.**			
71	Provide information on the construction/pre construction activities associated with removal of forested/hardwood areas. Specifically provide the activity, type of impact, acres impacted, type of forest, and planned mitigation. Table X-1 has been provided to facilitate compiling this information.	Terrestrial Ecology	Amanda Stegen
Response: SNC plans to provide the response to this question by January 31, 2007**.**			
72	Page 2.4.-4 mentions the "bottomland hardwoods" near the new intake structure. Please describe these hardwoods including acreage.	Terrestrial Ecology	Amanda Stegen
Response: The hardwoods in question are described on page 2.4-2: "Canopy species in the lower, wetter areas along the Savannah River are primarily bald cypress and tupelo gum, while sycamore, box elder, sugarberry, and swamp chestnut oak occupy the slightly higher ground in the bottomland hardwoods. American holly, ironwood, water locust, cane, and buttonbush form the understory. Ground cover is sparse and limited to those species that can survive inundation and dense shade; these include richweed, lizard tail, sensitive fern, and Virginia dayflower." The layout plan is for 12 acres to be impacted.			
73	Provide the data sources (e.g., on-going investigations by licensee, existing GIS database, federal/state/local records, etc.) used to describe the existing environmental conditions, the site habitats and communities, and the wildlife populations. These general descriptions are found in section 2.0 and 2.4.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed**.**			
74	Provide documentation regarding any fieldwork that was conducted as part of the review including extent/duration of the field work, and whether or not any federal or state agencies participated in the field work or data analysis/review.	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
Response: The threatened and endangered species surveys were conducted during spring, summer, and fall of 2005; each survey lasted 10 days, and began on April 12, August 22, and October 24. Additional details regarding these surveys are documented in the Threatened and Endangered Species Survey Final Report, copies of which were distributed to the Georgia Department of Natural Resources Natural Heritage Program. Personnel from federal or state agencies did not participate in the field work, but the Threatened and Endangered Species Survey Final Report was distributed to the Georgia Department of Natural Resources Natural Heritage Program.			
75	Provide information on the existing species composition, spatial and temporal distribution, abundance of terrestrial natural resources onsite and in the transmission line corridors.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
76	Has the species composition, spatial and temporal distribution, abundance of terrestrial natural resources changed since the 1985 FES for operation was written? In so, please explain how these communities have changed. If the communities have not changed, please explain how "no change" has been verified.	Terrestrial Ecology	Amanda Stegen
Response: Vegetation communities continuously change over time, and SNC actively manages the natural habitats at VEGP for wildlife enhancement. Major emphasis has been placed on reestablishing native longleaf pine at VEGP. Prescribed burning, timber thinning, and other methods are used for habitat management at VEGP; details are documented in Wildlife Habitat Council 2003 Recertification Application for Vogtle Electric Generating Plant. The VEGP site has been designated as a Certified Wildlife Habitat by the Wildlife Habitat Council. However, no studies have quantified the change over time, and so no information is available. A copy of the WHC certification application was provided during the site audit.			
77	Are the dominant species present native or non-native?	Terrestrial Ecology	Amanda Stegen
Response: Dominant species are native; see Section 2.4.1 of the ESP Application Environmental Report and the Threatened and Endangered Species Survey Final Report for species.			
78	Are there any issues concerning invasive plant species?	Terrestrial Ecology	Amanda Stegen
Response: No invasive species have been noted in the terrestrial or aquatic environments at Vogtle.			
79	Are there any species present that serve as biological indicators?	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
Response: The question presumably uses the term "biological indicators" as does NUREG-1555: "Species that may serve as biological indicators to monitor the effects of the facilities on the terrestrial environment". In this regard, SNC is not aware of any species at VEGP that serve as biological indicators. However, the natural community as a whole could be thought of as a biological indicator.			
80	pg 2.4-4, 5th para continued Are there any species present that are critical to the function and structure of the local terrestrial ecosystem?	Terrestrial Ecology	Amanda Stegen
Response: SNC is not aware of any species critical to the function and structure of the local terrestrial ecosystem**.**			
81	What activities are included in the 500 acre footprint?	Terrestrial Ecology	Amanda Stegen
Response: The area of the footprint and associated uses are shown on Figure 3.1-3 "ESP Site Utilization Plan." In addition, SNC is conducting additional onsite work in December 2006 to map the habitat types and presence of species onsite which will be provided by January 31, 2007**.**			
82	Provide a complete map with locations for all the planned activities/buildings including any new debris basins, the solid waste storage areas, fabrication and shop areas (pg 3.9-3). Provide information on the acreage breakdown associated with each pre-construction activity. For example, provide the number of acres associated with expanding the barge slip, building the new intake, etc. Table X-1 is provided to facilitate compiling this information.	Terrestrial Ecology	Amanda Stegen
Response: The majority of this information is available in Figure 3.1-3. SNC is developing detailed construction information that will include the requested information. SNC plans to provide the response to this question by January 31, 2007**.** .			
83	What upgrades will be required on "the rail line that runs from its connection with Norfolk and Southern line to the termination at VEGP" (pg 3.9-3)?	Terrestrial Ecology	Amanda Stegen
Response: No upgrades are anticipated at this time**.**			

#	Information Need	Discipline Name	Reviewer Name
84	It is difficult to discern what activities are covered under the current license and thus out of scope of our review and which pre construction activities are associated with the ESP application. For example, are the transmission line re-routes part of the pre-construction activities or are these covered under the current license for Units 1 and 2? Please clarify which activities are covered under the current license and which activities are associated with the ESP application.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved (See 3.9-1 and 4.1-1) through audit interaction between SNC and the NRC; No further action needed.			
85	Are any upgrades/changes to the existing corridors needed to support additional power that will be generated by Units 3 and 4?	Terrestrial Ecology	Amanda Stegen
Response: There are no upgrades/ changes to the offsite portions of the existing SNC transmission lines. Changes will be made onsite to relocate lines and expand the switchyards. These changes are discussed in the ER.			
86	Does SNC cooperate with the Georgia Natural Heritage Program or other state/federal agencies in conducting transmission corridor rare plant survey program on a periodic basis?	Terrestrial Ecology	Amanda Stegen
Response: Transmission corridor rare plant surveys are not conducted on a periodic basis. However, Georgia Power provides the locations of any rare plants and animals discovered on the transmission corridors to the Georgia Natural Heritage Program. In turn, the Georgia Natural Heritage Program periodically provides updates of their rare species GIS data base to Georgia Power so that Georgia Power can avoid negative impacts during corridor maintenance activities. Georgia has a state transmission line siting program (Georgia Code Title 22) that provides guidance.			
87	Provide information regarding the location/description of any sensitive/protected areas in the transmission corridors.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
88	Provide the transmission line maintenance procedures.	Terrestrial Ecology	Amanda Stegen
Response: GPC Transmission Maintenance Procedures were provided at the Site Audit.			

#	Information Need	Discipline Name	Reviewer Name
89	Provide the GPC procedures for implementing Georgia Code Title 22, Section 22-3-161 (pg 4.1-3).	Terrestrial Ecology	Amanda Stegen
Response: A copy was provided initially at Site Audit in draft form. A final copy is included as Attachment C-4.			
90	Provide the GPC Avian Protection Plan.	Terrestrial Ecology	Amanda Stegen
Response: A copy of the Avian Protection Plan was provided during the Site Audit.			
91	Provide the VEGP Environmental Protection Plan.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
92	Provide documentation on how SNC will comply with the Migratory Bird Treaty Act during pre-construction and construction activities?	Terrestrial Ecology	Amanda Stegen
Response: This information is contained in the Avian Protection Plan provided during the site audit.			
93	Pg 4.3-1 - how many acres of forested area will be impacted by construction? There are conflicting total acres on this page (500, 250, 249 acres). How many acres of hardwood forest will be impacted - this page states that "25 acres" will be impacted and page 4.1.-1 states that 50 acres of hardwood will be impacted. Please clarify.	Terrestrial Ecology	Amanda Stegen
Response: The reference to 249 acres in the first paragraph of page 4.3-1 is in error. Otherwise, that paragraph is correct (250 acres pine forest + 25 acres hardwood forest + 125 acres developed areas = 500 total acres). The sentence on page 4.1-1 stating "…less than 50 acres of…hardwoods" should have stated "25 acres". This typo will be corrected in the next revision of the ESP application.			
94	What are the impacts to the shoreline associated with the new intake and barge slip as well as increased water withdrawals?	Terrestrial Ecology	Amanda Stegen
Response: SNC has begun detailed evaluation of the impacts of construction. Results are expected in early January 2007. In addition, wetland delineation will be conducted in early December 2006. SNC plans to provide the response to this question by January 31, 2007.			

#	Information Need	Discipline Name	Reviewer Name
95	Are there any ecological or biological studies of the site or its environs that are recent or currently in progress (either by licensee or others)?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
96	pg 2.4-4, 5th para What is the status of the primary game species (e.g., relative health of deer herd, number of deer harvested)?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
97	The fourth sentence states that "No 'travel corridors' for game species cross the VEGP site." Provide documentation/reference for this conclusion. Was actual field reconnaissance conducted?	Terrestrial Ecology	Amanda Stegen
Response: NUREG 1555 states that data should be obtained for "locations of travel corridors for "important" terrestrial species and alternate routes for those corridors that could potentially be blocked by use of the site". Deer and small mammals use "game trails" at VEGP; such game trails are ubiquitous in forested areas of Georgia. The statement on page 2.4-4 that "travel corridors" do not exist at VEGP refers to the absence of seasonal routes of large migratory mammals such as caribou, elk, etc. and to seasonal flyways of migratory birds. The absence of large migratory mammals such as caribou and elk is obvious. Migratory birds do pass through the vicinity of VEGP and throughout the entire southeastern U.S., but VEGP is not located on a major flyway. Numerous references exist describing avian migration flyways in North America, see http://www.birdnature.com/flyways.html for an example.			
98	pg 4.3-2, 3rd para, last sentence. It is not clear if the "few avian collisions with existing structures at VEGP" is based on a formal cooling tower bird collision survey. Please clarify.	Terrestrial Ecology	Amanda Stegen
Response: No formal cooling tower bird collision surveys have been conducted at VEGP. The relatively few bird collision events have been investigated and determined to be of no significance.			

#	Information Need	Discipline Name	Reviewer Name
99	6.5-2 Construction, Pre-Operational, and Operational Monitoring In Section 5.3.3.2.5 Avian Collisions, the following statement is made: "Because collisions with existing VEGP cooling towers are rare, it is likely that bird collision with the new towers will be minimal." NUREG-1555, Section 6.5.1, states that "Monitoring programs should cover elements of the ecosystem for which a causal relationship between station construction and/or operation and adverse change is established or strongly suspected." Provide documentation on the cooling tower monitoring that was conducted to confirm that no changes in composition, abundance, or distribution of avian species are occurring as a result of operating the two additional units at VEGP. If no monitoring was conducted, provide documentation on how SNC reached the conclusion that collisions with the existing towers are rare.	Terrestrial Ecology	Amanda Stegen
Response: See response to comment # 98; no formal monitoring has been conducted. Collisions with the existing towers have been infrequent and the bird carcasses were examined to confirm the cause of mortality. The towers are surrounded by a wide expanse of open, gravel-covered area in which carcasses are relatively easily seen.			
100	Chapter 1010.1 Unavoidable Adverse Environmental Impacts and 10.2 Irreversible and Irretrievable Commitments of Resources Provide a summary regarding the modification to wetlands or wetlands filled as part of the planned construction activities in the bottomland hardwood forest along the Savannah River or along the proposed 500 kV transmission corridor across approximately 60 linear miles of eastern Georgia.	Terrestrial Ecology	Amanda Stegen
Response: SNC will conduct wetland delineation in early December 2006. SNC plans to provide the response to this question by January 31, 2007**.**			
101	Provide information on the cumulative impacts on terrestrial resources.	Terrestrial Ecology	Amanda Stegen
Response: The approximately 500 acres of potentially affected habitat at the site represents a small portion of the available undeveloped land in the vicinity, and since the construction and support areas do not contain any old growth timber, unique or sensitive plants, or unique or sensitive plant communities and are largely planted slash pines and open areas, cumulative impacts to terrestrial resources will be small.			
102	pg 6.0-1, Chapter 6, Environmental Measurements and Monitoring Programs Provide a figure showing the monitoring locations.	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
103	pg 6.5.1, 6.5 Ecological Monitoring, 6.5.1 Existing Ecological Monitoring Explain how the criterion of pre-application monitoring for at least one annual cycle has been met.	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
104	pg 4.3-2, 4th paraNUREG-1555, Section 2.4.1, page 2.4.1-6, states that "Information should be based on an analysis of at least one full year of data, to reflect seasonal variations in terrestrial populations." Was any effort made to either review historical data or collect new data for wildlife at the site?	Terrestrial Ecology	Amanda Stegen
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
105	All of the input, output, and on-site meteorological (1998 - 2002 or more) files used for the PAVAN, XOQDOQ, and SACTI models.	Meteorology	Jeremy Rishel
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
106	Please provide a map showing the areas that will be directly or indirectly impacted by construction of the new plant and the locations of archaeological sites documented by New South.	Cultural and Historical Resources	Darby Stapp
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed. Figure 3.1-3 locates areas that will be directly or indirectly impacted by construction of the new plant. Figure 8 in the New South report locates previously identified and new cultural resource survey sites in relation to the areas affected by new unit construction.			

#	Information Need	Discipline Name	Reviewer Name
107	Determinations of Eligibility. In order for NRC to move forward with its determination of impact, SNOC needs to obtain concurrence from the Georgia SHPO on both the "recommended eligible for listing on the National Register" and "recommended not eligible for listing on the National Register" archaeological sites. Presently, we understand that New South has submitted site forms for the sites with these recommendations to the Georgia Archaeological Site files. No action will be taken, however, until SNOC requests the Georgia SHPO to review the site forms and agree or not agree. Once this is done, NRC will know for certain which sites are eligible for listing (i.e., "historic properties") and therefore which sites need to be addressed in the analysis. It is important that this concurrence be obtained before the site audit.	Cultural and Historical Resources	Darby Stapp
Response: SNC has received response from SHPO and a copy was provided during the Site Audit.			
108	Determination of Adverse Effect. SNOC needs to seek concurrence from SHPO on SNOC's determination that the water intake structure and associated infrastructure will have no impact on archaeological sites 9BK416 and 9BK423. It is important that this concurrence be obtained before the draft EIS is submitted.	Cultural and Historical Resources	Darby Stapp
Response: SNC has received letter from SHPO. A copy of the letter was provided at the Site Audit.			

#	Information Need	Discipline Name	Reviewer Name
109	In order for NRC to make its level of impact determination, several things need to be clarified: a. In comparing Figure 2.5.3-1 with Figure 3.1-3, it appears that the water intake structure and associate road will impact both sites. Please explain why SNOC does not believe it will. b. We understand that no shovel testing was conducted on the river terrace where the water intake structure will be located. Please explain why no testing was done and why SNOC does not believe that there is any potential for archaeological sites in this area. c. Please explain any protective/mitigation measures that will be put in place during construction and operation. d. Please copies of the procedures that will be in place relative to cultural and historic resource protection.	Cultural and Historical Resources	Darby Stapp
Response: SNC will agree with conditions requested by SHPO. A copy will be provided to NRC for the docket upon transmittal. Additional shovel testing was done at the request of NRC in the floodplain area where the intake will be located. No positive tests were reported. The New South Addendum report is now complete and a copy will provided by separate transmittal letter to the NRC for the docket.			
110	Please provide the revised New South report.	Cultural and Historical Resources	Darby Stapp
Response: The New South Addendum Report is complete. SNC will provide by letter for the docket by January 31, 2007**.**			
111	Please provide any responses from the SHPO office, tribes, or interested parties.	Cultural and Historical Resources	Darby Stapp
Response: A copy of the letter from the SHPO was provided during the Site Audit**.**			
112	Section 2.3 Water Provide maximum, average maximum, average, average-minimum, and minimum monthly temperature of the Savannah River.	Hydrology	Chris Cook
Response: This information is contained in the SSAR portion of the ESP submittal. Please see SSAR 2.4.7.			

#	Information Need	Discipline Name	Reviewer Name
113	Provide a description (figure and coordinates) of all wetlands, and their respective seasonal characteristics, on the site. Describe how these wetlands will be affected during construction and operation of the facility.	Hydrology	Chris Cook
Response: SNC will conduct wetland delineation in early December 2006 and provide the response by January 31, 2007.			
114	Provide estimated erosion characteristics and sediment transport rates, including bed and suspended load fractions, for the Savannah River near the site.	Hydrology	Chris Cook
Response: This information is provided in Attachment B-1.			
115	Provide any water velocity data collected near the location of the proposed intake and outfall structures.	Hydrology	Chris Cook
Response: This information is contained in SSAR 2.4.11 of the ESP submittal. Water velocity data has been collected at USGS Station No. 021973269 Savannah River near Waynesboro and are presented in the SSAR Table 2.4.11-6. Other than these data, water velocity measurements have not been acquired at the locations proposed for the intake or outfall structures. Note that the SRP for ER 2.3.1 does show this requirement for fresh water streams. Bathymetric surveys were conducted at these locations. This data could be used to estimate the longitudinal velocity distributions at these locations for a given river stage.			
116	Provide the stage-discharge rating curves for the Savannah River gauges nearest the site.	Hydrology	Chris Cook
Response: The Stage-discharging rating curve is provided in the SSAR, Figure 2.4.11-7. The rating curve was developed using measured data at the USGS Station no. 021973269 Savannah River near Waynesboro for 1986, 1987, 1988 and 2005**.**			
117	Section 2.3.1 Hydrology, Describe the process used to develop the reasonably conservative Vogtle site conceptual model and nearby area. Also, describe any alternate conceptual models that were considered. Provide data (e.g., precipitation, surface water runoff, stream flow, groundwater levels, historical groundwater resource depletion [pumping) used to formulate the water budget for key hydrologic elements of the Vogtle site and the nearby area, (e.g., Mallard/Mathes pond, water table aquifer, Tertiary aquifer, Cretaceous aquifer). Include data and descriptions on the recharge rates, soil moisture characteristics and moisture content in the vadose zone.	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
Response: This question along with questions 118, 144, 145, 146, 147, 148 and 163 will be addressed comprehensively in a single response. This response will require more time to complete and will be submitted by January 31, 2007.			
118	Provide any information regarding what the anticipated impacts of excavation beneath the ESP facility site will have on the water levels within the pond. Also, provide any existing monthly water elevation and water quality data. Based upon the piezometric contour maps for the water table aquifer, much of this aquifer apparently recharges Mallard/Mathes Pond.	Hydrology	Chris Cook
Response: SNC has provided two (2) hard copies of LIDAR maps of the site including the Mallard pond area which may be used to determine the pond surface elevation and the relationship to site terrain and drainage. No elevation or water quality data exists for Mallard Pond. SNC concurs that based on the piezometric contour maps, there is recharge to the pond from the Water Table Aquifer. Significant recharge also occurs from surface runoff in the pond drainage area. SNC is investigating availability of dewatering data from the construction of Units 1 and 2. This information, if available, will be included by January 31, 2007 in response with Question 117**.**			
119	Section 2.3.1.2.3 Observation Well Data, Provide a table listing the observation and water well statistics (for example, well name, legal location, well depth, screened interval, and formation or water-bearing unit of the screened interval). Provide geologic logs and construction diagrams of the observation wells and discuss the procedures for installing these wells.	Hydrology	Chris Cook
Response: Please see Appendix 2.4-A of the SSAR. This reference provides all needed information. Although this data is not available in a single table, it is available collectively in Tables 2.3.1-18, 19, and 20. SSAR Appendix 2.4A – Observation Well Installation and Development Report (Report Table 5.1 and Appendices E and F) contains the geologic logs, construction information, and other pertinent installation documentation.			
120	Provide data that support why Wells OW-1006 and OW-1007 were at their highest elevations in June and lowest elevations in December (Table 2.3.1-18). Trends at other wells show relatively low elevations in July and high elevations in Feb/March. Well 808, with its respective high/low elevation for September and May, also seems to be an exception.	Hydrology	Chris Cook
Response: This response is provided as Attachment B-2.			

#	Information Need	Discipline Name	Reviewer Name
121	Section 2.3.1.2.4 Water Table Aquifer, Provide the data presented in Table 2.3.1-20. In the case of well OW-1001A, the depth interval tested for hydraulic conductivity appears to be above the water table, and hence not suitable for testing saturated zone hydraulic conductivity.	Hydrology	Chris Cook

Response: The data used to obtain the hydraulic conductivity values summarized in ER Table 2.3.1-20 is included in SSAR Appendix 2.5A – Geotechnical Investigation and Laboratory Testing Data Report (Report Appendix D). Hydraulic conductivity values were determined by in situ hydraulic testing using the slug test method. In the case of observation well OW-1001A, SSAR Appendix 2.5A, report Appendix D discusses the installation, development, and testing of OW-1001A. This well was installed as a replacement well for OW-1001, which was either impacted by grout during installation or installed in a confining unit. OW-1001A was installed, developed, and tested October 11-14, 2005. The screened interval for this well extends from 136.13 to 146.13 ft msl. The static water level in the well prior to testing was 3.2 ft above the bottom of the well sump at an elevation of 136.33 ft msl and only slightly above the bottom of the screen. Subsequent monthly water level measurements, summarized in ER Table 2.3.1-18, have varied from 135.91 to 135.99 ft msl, which fall below the screened interval. This data suggests that the screened interval for the well extends above the water table and that this well is not suitable for characterizing saturated hydraulic conductivity using the slug test method.

In the next revision of the ESP application, the hydraulic conductivity value for OW-1001A reported in Table 2.3.1-20 will be deleted, the Geometric Mean will be recalculated, and a footnote will be added to this table to explain that the value in SSAR Appendix 2.5A for this well is not considered reliable because of the thin saturated zone present within the screened interval during testing.

#	Information Need	Discipline Name	Reviewer Name
122	This section describes the basis for a groundwater travel time of 400 years from the center of the Power block to Mallard Pond. This travel time is based on Barnwell Formation data; geometric mean hydraulic conductivity of 0.41 ft/day, horizontal gradient of 0.012 ft/ft, effective porosity of 0.32, and distance of 2200 ft. If the north-south cross section reported in Figure 2.4.12-2A of the Vogtle Early Site Permit Application - Part 2 - SSAR is applicable to the groundwater path between Power block and pond, the water table aquifer between them is a combination of Utley Limestone and Barnwell Formation. Assuming a release from the vicinity of the Power block could move through the backfill underlying construction to the Utley Limestone, the travel time to Mallard Pond may be much shorter than the 400 years described. If one only examines the influence of the hydraulic conductivity cited for the Utley Limestone (range 340 to 4.2 ft/day), the travel times are 0.5 year and 40 years respectively. Describe the conceptual model supporting the groundwater travel time estimate more fully, and include a map showing where across the site the basal Utley Limestone of the water table aquifer is known to be absent, where it is present and its thickness. Include data on the Utley Limestone necessary to make a travel time calculation, e.g., effective porosity. Note that deMarsily (1986) suggests a much lower porosity for limestone than employed for the Barnwell Formation. Provide a table and map showing the 'geotechnical and hydrogeological borings' used to describe each of the geohydrologic units described in the conceptual model of the Vogtle site, (e.g., Barnwell Formation, Utley Limestone, Tertiary aquifer, Cretaceous aquifer).	Hydrology	Chris Cook

Response: The Utley Limestone is not continuous beneath the ESP site and cannot be described as what is commonly considered a limestone. At the ESP site the limestone is generally described as a “silty clayey sand with varying amounts of carbonate material and silicified zones” (ER Section 2.6). Pumping tests conducted in the Utley Limestone for Units 1 and 2 and described in the UFSAR indicated that the transmissivity of the Utley Limestone is relatively low and varies considerably from place to place. It was concluded it would not be an effective drain for dewatering the excavation for Units 1 and 2, which implies that it would also not be effective as a preferential pathway for radionuclide transport.

#	Information Need	Discipline Name	Reviewer Name
123	Section 2.3.1.2.4 Lisbon Formation (Blue Bluff Marl) Confining Unit, Provide data to support porosity values in this section. The deMarsily (1986) citation does not support the assumption of an effective porosity of 80% of total porosity for the Lisbon Formation confining unit. Rather, the cited table suggests a total porosity of ~0.44 which corresponds to an effective porosity of ~0.13. These values will impact time of travel calculations.	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name

Response: Total porosity values for the Lisbon Formation (Blue Bluff Marl) confining unit are summarized in ER Table 2.3.1-22. These values are included in the SSAR Appendix 2.5A – Geotechnical Investigation and Laboratory Testing Data Report (report Appendix E). Total porosity values were determined by laboratory testing of soil samples obtained from the Lisbon Formation (Blue Bluff Marl). Table 1 (Attachment B-3) of this response presents the total porosity values along with grain size distribution test data. Total porosity values range from 0.25 to 0.59 and have a median value of 0.44. Grain size distribution data indicate that most of the Lisbon Formation (Blue Bluff Marl) samples can be classified as silty sand (SM) or clayey sand (SC).

The effective porosity of the Lisbon Formation (Blue Bluff Marl) was estimated using Figure 2.17 of de Marsily (1986). This figure plots total and effective porosity as a function of grain size. To estimate the effective porosity for the Lisbon Formation (Blue Bluff Marl), the ratio of effective to total porosity determined from Figure 2.17 was applied to the site-specific total porosity value for the Vogtle Electric Generating Plant (VEGP) site. Using the median D50 value of 0.24 mm as a representative grain size (cited in Table 1 of this response), a ratio of effective to total porosity of about 0.8 was determined from de Marsily's Figure 2.17. Multiplying the median total porosity of 0.44 by this ratio yields an effective porosity of 0.35.

The effective porosity was also estimated as the difference between the total porosity and the residual water content, as given by Equation 4.4 of Yu et al. (1993). The residual water content for the SM or SC soils comprising the Lisbon Formation (Blue Bluff Marl), obtained from Carsel and Parrish (1988) using equivalent USDA-SCS soil textural classifications, ranges from 0.07 to 0.10. The effective porosity would then range from 0.34 to 0.37. This result indicates that the 0.35 value for effective porosity reported in the ESP application should be representative of the Lisbon Formation (Blue Bluff Marl).

Clarifying text will be added in the next revision of the ESP application. ER Table 2.3.1-22 will also be updated to include the additional information described in this response and the new references [(Carsel and Parrish 1988) and (Yu et al. 1993)] will be added.

References;

Carsel, R. F., and R. S. Parrish, Developing Joint Probability Distributions of Soil Water Retention Characteristics, Water Resources Research, 24:755-769, 1988.
de Marsily, G., Quantitative Hydrogeology, Groundwater Hydrology for Engineers, Academic Press Inc.; London, p. 36, 1986.
Yu, C., C. Loureiro*, J.-J. Cheng, L. G. Jones, Y. Y. Wang, Y. P. Chia, and E. Faillace, Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil, Argonne National Laboratory, Argonne, Illinois, April 1993.

#	Information Need	Discipline Name	Reviewer Name
124	Section 2.3.2.1.1 Local and Onsite Water Use and Section 5.2.4 Future Water Use, Provide current and projected water use at the SRS site. SRS is a major water consumer within 6 miles of the site.	Hydrology	Chris Cook
Response: Current SRS water use was provided during the audit in a copy of the Savannah River Site (SRS) Annual Environmental Operating Report. SNC was unable to find any source of information other than the report above that would provide SRS projected water use in the future. As a federal agency, NRC may be able to obtain projections from DOE.			
125	Describe any recent activity toward developing a current/updated comprehensive water resources management plan (e.g., an updated Rutherford 2000) that includes a revised drought management plan with the ESP facility in place. Describe how these developments could or could not impact SNC's ability to acquire the water rights necessary for the ESP facility.	Hydrology	Chris Cook
Response: SNC has not been involved in and is not aware of any activity to develop drought management information with the proposed new Vogtle units in place. Georgia EPD has a process in place requiring counties to develop water resources management plans (this process resulted in the original Rutherford 2000 report). The plan is updated on five year intervals, but the 2005 update is not available at this time. It is reasonable to think that water use associated with the proposed new Vogtle units would be factored into the next update cycle (2010). Based on discussions with Georgia EPD, SNC does not anticipate that this county planning process will have major impact in acquiring the necessary permits for Unit 3 and 4 water needs. The amount of water needed for the Vogtle expansion is relatively small and current permits have significant margin in them such that the impact from a planning perspective should be insignificant.		
126	Section 2.3.1.1.3.4 Historic Flooding, Since PMF is a statistical event that is not reasonably expected to occur, what is the surrounding environmental concern surrounding its discussion?	Hydrology	Chris Cook
Response: The Probable Mean Flood (PMF) is included in the ER for reference purposes only and has no significance from an environmental perspective.			
127	Section 2.3.2 Water Use, Provide maps and cross sections showing those portions of ground water aquifer systems that could be affected by plant withdrawals (i.e., water table aquifer, Tertiary aquifer).	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
128	Provide 2005 and any 2006 data for Tables 2.3.2-4 and 2.3.2-6.	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
129	Provide quantitative and qualitative descriptions of navigational, recreational, in stream and other non-consumptive present and known future water uses (see page 2.3.2-3, especially as it relates to the information requested for a 6 mile radius).	Hydrology	Chris Cook
Response: The U.S. Army Corps of Engineers draft Water Control Plan for the Savannah River contains significant information regarding non-consumptive water uses such as recreation, navigation, ecology, etc. see http://www.sas.usace.army.mil. The document is currently under revision.			
130	Provide the specifics (e.g., depth, aquifer, and known degree of hydraulic connection with the water table and Tertiary aquifer) on which wells reported tritium (page 2.3.3-5). Provide the tritium data obtained from those wells from 1991 through 2002 (or current, if available).	Hydrology	Chris Cook
Response: A number of studies have been conducted in the area of Plant Vogtle to evaluate the effects of tritium contamination known to exist at the Savannah River Site (SRS). None of these studies have identified tritium contamination in the Tertiary aquifer on the Georgia side of the Savannah River. SNC review of GA DNR tritium studies revealed the initial report of tritium in Tertiary aquifer wells may be incorrect. New information, contained in subsequent reports, indicates that the monitoring wells in question were actually in the water table aquifer. The studies generally conclude that the tritium does not produce significant environmental concern downstream. References:			
131	Section 2.3.3 Water Quality, Provide the mean, range, temporal and spatial variations of surface water quality characteristics such as water temperature, TSS, TDS, DO, BOC, COD, etc. Is this type of data available for surface waters and ground water at the site?	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
132	"Ground water from the water table aquifer contains 20 to 170 ppm TDS; ground water from the deeper confined aquifer contains 110 to 194 ppm" page 2.3.3-3. Which wells are these values derived from and what has been the variation over time?	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
133	Section 2.6 Geology, Page 2.6-2. Indicate how many borings were "drilled as part of the ESP subsurface investigation program encountered the top of the Blue Bluff member..."	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
134	Section 2.8. Related Federal Project Activities, Provide recent information on the ongoing USACE studies regarding decommissioning of the Savannah Bluff's Lock and dam. Describe the consultations which have been conducted between SNC and USACE regarding decommissioning.	Hydrology	Chris Cook
Response: A copy of the referenced study is available on the US Army Corps of Engineers – Savannah District website http://www.sas.usace.army.mil. SNC is participating as a member of the public along with the Corps in determining the impacts of removing this dam. At present, a decision has been made to leave the dam in place and refurbish it over the next 5 years.			
135	Section 3.3 Plant Water Use, Provide average plant water use by month.	Hydrology	Chris Cook
Response: Bi-annual Reports for Groundwater Use for the most recent one-year period (July 05 – June 06) are provided in Attachment C-1.			
136	Section 3.3.1. Water Use, For the water use diagram, provide the data and narrative description for water consumption during periods of minimum water availability, and average operation by month and by plant operating status.	Hydrology	Chris Cook
Response: The water use described in the water use diagram does not vary based on water availability. In the event of a protracted severe drought, SNC would examine water use needs and make reductions in normal flow provided the safe operation of the plant was not impacted.			
137	Table 3.3-1. Provide the atmospheric conditions applied when generating data shown in this table. Are the maximum case values bounding?	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
Response: For surface water, the Average values presented in the table represent average annual uses during a normal year. The maximum values represent extreme conditions and are considered bounding. For groundwater, the average values represent average use during a normal year and the maximum values represent operation at the installed pumping capacity with and assumption of extreme operating conditions for equipment. For the discharge values, the average values represent normal cooling tower operation at 4 cycles of concentration. The maximum values represent cooling tower operation at two cycles of concentration.			
138	Section 3.3.2 Water Treatment, Provide operating cycles for each water treatment system for normal modes of plant operation (i.e., full power operation, shutdown/refueling, and startup).	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
139	Provide a tabulation of chemicals to be added by quantity and frequency of addition.	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
140	Provide a list of all chemicals (identification and quantities) to be used or considered.	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
141	Section 3.4.1.3.2 Water Treatment, What is the environmental concern associated with the icing discussion in this section?	Hydrology	Chris Cook
Response: There is no environmental concern with icing at Vogtle since icing will not occur but includes for completeness only..			
142	Section 3.4.2.1 River Intake Structure, Provide the basis for stating that the minimum river level is 78 ft MSL. Describe consultations SNC has had with USACE regarding minimum water surface elevations at the site. Has a commitment from USACE been provided to maintain a minimum water surface elevation?	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
Response: SNC has worked closely with the Savannah District Corps of Engineers over the life of the plant and in recent years has participated in development of the revisions to the Corps Water Control Plan and Drought Plan for the Savannah River. The 78 ft MSL "minimum" river level is a level that is based on the period of record data maintained for the Savannah Basin. It is discussed in Corps reports and is characterized as the minimum level observed for the period of record. The Corps Water Control Plan is the plan by which the federal reservoirs are operated and is a guidance document. There is no commitment stated or implied by the Corps to maintain this minimum level beyond what is considered "good engineering practice". SNC does not depend on this level to support any safety related plant functions and does not view it as a commitment.			
143	Section 3.4.2.2 Final Plant Discharge, Provide details regarding how the ESP facility will comply with 40 CFR 423 and EPA's associated discharge regulations.	Hydrology	Chris Cook
Response: The proposed new units at Vogtle will utilize natural draft recirculating cooling towers to provide closed cycle cooling for plant components including the main condenser (which represents the main heat load). This technology is recognized by EPA as Best Technology Available (BTA) relative to compliance with 40 CFR 423 limits. Since heat is the only pollutant of significance, installation of BTA should more than satisfy EPA Part 423 requirements. SNC has already begun discussion with the Georgia EPD relative to the proposed new units at Vogtle. Vogtle has an outstanding compliance record and no major concerns are anticipated with the permitting of the new units. Chapters 5 and 6 of the ER provide information regarding the impact of operation on the environment and thermal monitoring. Chapter 10 provides discussion of the cumulative impacts of four unit operation.			
144	Section 4.2.2 Water Use Impacts, Provide inputs to the calculation package and the calculation package to assess the impacts of construction on the potentiometric surface at the property boundary.	Hydrology	Chris Cook
Response: This information will be included in a future response by January 31, 2007.			
145	Section 5.2.2 Hydrologic Alterations and Plant Water Supply, Provide the calculation package for the drawdown model.	Hydrology	Chris Cook
Response: This information will be included in a future response by January 31, 2007.			
146	Provide any impacts of drawdown to Mathes Pond.	Hydrology	Chris Cook
Response: This information will be included in a future response by January 31, 2007.			

#	Information Need	Discipline Name	Reviewer Name
147	Provide any impacts of drawdown to the closest offsite wells completed in the water table aquifer and the Tertiary aquifer as well as the Cretaceous aquifer.	Hydrology	Chris Cook
Response: This information will be included in a future response by January 31, 2007.			
148	Provide information on potential impacts resulting from site excavation to Mallard Pond.	Hydrology	Chris Cook
Response: This information will be included in a future response by January 31, 2007.			
149	Section 5.2.2.2 Water Related Impacts – Groundwater, Describe SNC's consultations with the appropriate state agencies to withdraw water for the ESP facility at rates up to VEGP's withdrawal limit. Also, discuss any restrictions that may be placed on the withdrawals. Finally, discuss any issues the state agencies raised with the stated potential to exceed withdrawal limits for short periods of time.	Hydrology	Chris Cook
Response: SNC has initiated discussions with Georgia EPD regarding water withdrawal to support the proposed new units at Vogtle. The existing Vogtle Permit for Groundwater Use has significant margin in it and EPD has indicated that this should provide support for permitting the water use for the new units. As discussed in Chapter 5 of the ER, the impact from normal use of groundwater for four unit operation is considered small. Based on initial discussion with EPD, SNC does not anticipate problems with obtaining modifications of the Groundwater Use permit to support the new units nor do we see any restrictions being placed on water withdrawal. The discussion in Chapter 5 regarding potential to exceed withdrawal limits for short period of time applies to extreme circumstances such as a major fire event or something similar that might require use of all pumps for a short period of time. Such an event is highly unlikely. SNC contacted EPD and discussed this question with the Groundwater Division personnel. GPD indicated that they were not concerned with the ability to permit additional groundwater withdrawal for Vogtle in the amounts associated with the proposed new units.		
150	Well MU-2A was chosen as the well from which to simulate drawdown resulting from the cumulative projected water usage. Was the drawdown calculation made using a model calibrated to MU-2A data? If so, describe the data and model calibration. If not, describe more fully the circumstances mentioned in footnote 1 on Table 6.3-2; "MU-2A has proved difficult to monitor."	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name

Response: This response was also presented by discussion between SNC, NRC and TtNUS during the VEGP site audit. There are three site wells installed into the Cretaceous aquifer at VEGP, Wells TW-1, MU-2A, and MU-1. Well MU-2A was chosen for the model because it is the closest well to off-site wells. Even though the off-site wells are in the Tertiary aquifer, Well MU-2A was used to estimate potential drawdown at the property boundary nearest the off-site well.

Because the updated FSAR (FSAR for current units [SNC 2005]) stated that the aquifer tests conducted in the Cretaceous indicated varying results, the data reported in the UFSAR generated from all of the tests performed in the Cretaceous aquifer were either averaged by the writer or the datum used was a stated mean value in the FSAR. To determine potential offsite impacts of groundwater drawdown, cumulative well yield was used to calculate drawdown as though it had been pumped from a single onsite well. The well MU-2A location was used, due to its close proximity to the VEGP property boundary (5,700 feet) and because the well has been one of the site's primary production wells.

Data used as input to an analytical distance-drawdown model was taken from VEGP's updated Final Safety Analysis Report. A Transmissivity value of 158,000 gpd/ft was used. The Storativity value (3.1×10^{-4}) is an average of the values listed in Table 2.4.12-8 of the FSAR calculated for the deeper production wells. Total groundwater use reported to the Georgia Department of Natural Resources by VEGP from 2001 through 2004 averaged 730 gpm. (SNC 2000a,b, 2001a,b, 2002a,b,c, 2003a,b, 2004a,b in Chapter 3 of the environmental report) This value is considered the total groundwater use for the existing units. A maximum construction pumping rate of 420 gpm was used (FSAR 2005). The total groundwater use rate for the proposed units is 752 gpm (ESP ER Table 3.3-1).Therefore, the pumping rate used in the analysis for most of the construction phase is 1,150 gpm (730 + 420 = 1,150 gpm). There will be a period, after completion of the first unit but before completion of the second unit, when the pumping rate will include the 730 gpm for the existing units, a construction rate for Unit 4, and an operational rate for Unit 3. For this construction/operational overlap period, the groundwater pumping rate will include the existing rate of 730 gpm, one-half the construction rate or 210 gpm, and one-half the proposed operational rate or 376 gpm. The total for this period will be 1,316 gpm. The pumping rate during the normal operation of all four units will be 1,482 gpm (730 gpm + 752 gpm).

#	Information Need	Discipline Name	Reviewer Name

A non-leaky aquifer scenario was used using the Theis equation to simulate site conditions. The equation assumes that the aquifer is homogeneous, isotopic, with negligible recharge and gradient, and that boundary impacts do not occur. The equation was run for each pumping rate scenario described above. The first simulation assessed the initial pumping rate for Units 1 and 2 plus construction water usage; the second included pumping for Units 1 and 2, the initial startup of one unit, plus construction; and the third assumed the total use for all four units. The drawdown values calculated are very conservative because the pumping times for each of the simulations was initiated as being the start of Unit 1 operations and not adjusted to accommodate when actual changes in pumping rates would occur. Therefore, the drawdowns at the property boundary modeled here are the result of a much longer pumping period for each scenario than will actually occur. The result is a larger drawdown value than would actually be observed, resulting in a very conservative analysis.

Off-normal operations (Table 2.9-1) for the existing units would require approximately 2,300 gpm of groundwater for both units and off-normal operations for both the proposed units would use approximately 3,140 gpm. Off-normal usage for all four units would be 5,540 gpm. However, off-normal operations would likely affect only one unit, therefore SNC believes that groundwater needs for any off-normal operations plus normal operations of the other units can be accomplished within the existing groundwater permit issued by the State of Georgia. Since off-normal operations would be short lived, this scenario has not been modeled. SNC believes that a scenario where all four operating units would be under off-normal operations would be extremely unlikely. Therefore, this scenario has not been modeled although it would greatly exceed the maximum groundwater pumping rates [6 million gallons per day monthly average (MGD) [4,167 gpm] and average 5.5 MGD annually (3,819 gpm)] established under SNC's existing permit.

In regard to the question about the Footnote 1 on Table 6.3-2; "MU-2A has proved difficult to monitor", the following information is provided. During the NRC site audit, a question was asked regarding the reason for the footnote. SNC stated that Well MU-2A was in good condition. The reason for the change in monitoring from Well MU-2A to another well, was that due to the down-well hoses, etc. the well proved difficult to introduce a water level probe into the casing in order to gather water level data. The GEPD allowed for a substitution for this reason. However, data retrieved from the well is still considered good data.

#	Information Need	Discipline Name	Reviewer Name
151	The transmissivity value of158,000 gpd/ft and the storativity value of 3.1x10-4 used in the simulation of drawdown at MU-2A need to be supported with the complete data sets from which they are drawn. Page 2.4.12-12 of the Vogtle Early Site Permit Application - Part 2 - SSAR describes the transmissivity range as 110,400 to 130,900 gpd/ft and the storativity as 1.07x10-4 based on earlier data (i.e., Unit 1 and 2 studies. Page 2.4.12-13 of the Vogtle Early Site Permit Application - Part 2 - SSAR describes the transmissivity average as 158,000 gpd/ft and a storativity range of 3.3x10-4 to 2.1x10-4 based on more recent data that included data from test well TW-1. The complete data sets are needed for both hydraulic conductivity and storativity. Based on the data presented, the average hydraulic conductivity lies outside the cited range.	Hydrology	Chris Cook
Response: The transmissivity data were from TW-1 and were taken from the analysis beginning on p. 2.4.12-21 of the FSAR for the existing units. Storage data was averaged from Table 2.4.12-8 of the FSAR.			
152	The simulated drawdown for both the two existing units and all four units are provided, however, the hydraulic head of the Cretaceous aquifer should be provided to complete the argument that the forecasted drawdown is not of consequence.	Hydrology	Chris Cook
Response: This information is contained in the Bi-Annual Groundwater Use Report provided in Attachment C-1.			
153	Section 5.2.3.1 Chemical Impacts, Provide the data and/or calculations to support the claim that no effect is expected from the Units 3 and 4 discharge plume on DO concentrations in the Savannah River near the site. Provide a figure and coordinates showing what sections of the Savannah River near the site are on the South Carolina and Georgia State 303(d) Lists.	Hydrology	Chris Cook
Response: There are no sections of the Savannah River proximate to the Vogtle site included on the Georgia or South Carolina 303 (d) List. The Savannah Harbor is currently on the 303 (d) List for Dissolved Oxygen (DO). As discussed with Georgia EPD at the Site Audit, this will be considered in future Vogtle NPDES permits but will not likely result in any significant impact. EPA recently published the DO TMDL for the Savannah Harbor. In the document, EPA indicates that thermal loads would only have an impact on the TMDL if the water was at the saturation point for oxygen. Since the Savannah River is well below the saturation point for oxygen, any thermal load associated with Vogtle would have no effect.			

#	Information Need	Discipline Name	Reviewer Name
154	Section 5.2.3.2 Thermal Impacts, Provide a map and the coordinates of Shell Bluff Landing.	Hydrology	Chris Cook
Response: USGS Quadrangle Map Shell Bluff Landing, GA. – SC. 33081-B7-TF-024 contains Shell Bluff and the surrounding area. Plant Vogtle is also shown on this map. The coordinates of Shell Bluff Landing and a copy of the referenced map may be found at: http://www.topozone.com/map.asp?lat=33.22664&lon=-81.82307&datum=nad27&layer=DRG			
155	Section 5.2.3.8 Bottom Scour, Expand on and quantify the statement "only minor scouring of the river bottom is expected."	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
156	Section 5.3.2 Discharge Systems, Expand on the statement "During infrequent periods more scouring could be expected."	Hydrology	Chris Cook
Response: An expanded discussion of this statement is contained in the Bottom Scour subsection of the "Temperature Distribution as a Result of Blowdown Discharge" section of Toblin, 2006. The "infrequent periods" refer to the infrequent operation at 2-cycles of concentration, when discharge velocities will exceed those of the normal 4-cycle operation.			
157	Provide data input, data output, graphics and schematization conditions used in the CORMIX model. Include the CORMIX data package.	Hydrology	Chris Cook
Response: The CORMIX input and output files for the proposed units are contained in the "PROPOSED" folder of the "Blowdown Thermal Analysis Calculation Package." The analogous files for the existing units are contained in the "EXISTING" folder. The schematization is described in detail in the Bathymetry sub-section of the "Temperature Distribution as a Result of Blowdown Discharge" section of Toblin, 2006. Revised Bathymetry Maps illustrating the intake and discharge locations are provided as Attachment C-3.			
158	Section 6.1 Thermal Monitoring, Provide descriptions of the monitoring equipment to be used. Also, identify the type and frequency of temperature measurements to be taken and the duration of each monitoring program (page 6.1-2).	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
Response: In 2005, Southern Nuclear and Georgia Power agreed to provide funding support for a study of Water Quality Impacts on 15 reaches of the Savannah River. A Datasonde instrument was installed near the Vogtle intake during the summer of 2006 to continuously monitor ambient river conditions. The data will be used to evaluate the condition of the river and will be available to those who participate. Since the study only began this summer, no useable data has yet been generated..			
159	Provide more information regarding why "it is unlikely that routine thermal monitoring will be a requirement of the new or amended permit" and why the pre-application and post operational monitoring activities (as specified in the ESRP) are not discussed.	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
160	Section 6.2.2 Existing Radiological Environmental Monitoring Program Contents, How would releases of radiological contaminants from DOE's Savannah River Site (SRS) be distinguished from releases from Vogtle Units 1, 2, 3, or 4? Is monitoring of the Vogtle site designed to distinguish Vogtle releases from SRS releases? Would Vogtle staff rely entirely on SRS reports / data / interpretations? Are agreements in place with DOE regarding radiological releases to the environment from these two adjacent facilities? Are the existing monitoring programs at the two sites cooperative programs? Or, has it been assumed that any and all incremental change in the environment from the pre-operational state in the 1980's is associated with operation of Vogtle Units 1 and 2? Is it now assumed that any and all incremental change from the current state will be associated with operation of Vogtle Units 3 and 4?	Hydrology	Chris Cook
Response: SNC recently committed to a tritium monitoring program as part of an Nuclear Energy Institute (NEI) agreement with NRC to address concerns over tritium in groundwater at U.S. nuclear plants. That program is in the design stage at this time. A discussion of the SNC program for monitoring tritium will be provided in a response by January 31, 2007. There are no agreements in place with Savannah River Site regarding tritium. SNC would not rely on Savannah River Site data alone to make decisions regarding tritium at Vogtle. The new tritium monitoring program will provide some ability to distinguish tritium releases and pinpoint the source. There has been no assumption based on incremental changes in the environment..		
161	Section 6.3 Hydrological Monitoring, Provide the datasets that support this section.	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
162	Section 6.3.1 and Table 6.3-1 Existing Hydrological Monitoring, What process was followed to define the frequency and adequacy of monitoring as reflected in Table 6.3-1? How does the process used and the conclusions reached regarding sampling frequency relate to the conceptual site model, especially as the conceptual site model attempts to describe seasonal aspects of the environment?	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
163	Section 6.3.2 Construction and Pre-Operational Monitoring, This section summarizes the construction and pre-operational monitoring that will occur, and concludes that no significant impacts to groundwater are anticipated during construction. The reasonably conservative conceptual site model employed to reach this conclusion and others should be verified, to the extent possible, during the construction and pre-operational period. Were data from the construction and pre-operational period for Units 1 and 2 used to calibrate the model used here to conclude the construction of Units 3 and 4 would not impact the aquifers? What process will be used during the construction and pre-operational period to conclude that changes in the aquifers are anticipated and not unanticipated? What are the anticipated hydraulic head levels in the water table, Tertiary, and Cretaceous aquifers during the dewatering phase of construction? What delta from the anticipated levels will signal unanticipated performance of the adopted conceptual site model? Would an unanticipated level lead to review / revision of the conceptual site model, and be reflected in revised estimates of future impact?	Hydrology	Chris Cook
Response: Information for this question will be provided in a response to be provided by January 31, 2007.			
164	Section 6.7.1 Pre-Application Monitoring, Describe the process that was followed to arrive at the conclusion "No thermal pre-application monitoring will be required." Provide SNC's consultations with the appropriate state and federal agencies that support this statement.	Hydrology	Chris Cook
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
165	10 CFR 51.52 states a condition that rad wastes are to be in solid form and packaged or the applicant has to do an impact analysis. ER page 5.11.3 states that all rad wastes will be solidified, but ER Section 3.5.3 indicates some liquid wastes may be shipped offsite. Please clarify this apparent discrepancy. Also, explain why SNC intends to ship liquid wastes.	Transportation	Philip Daling
Response: In a conference call held on November 29, 2006. SNC stated that it does not intend to ship liquid radioactive wastes offsite. Section 3.5.3 provides estimates for wet wastes (resins, activated carbon, and liquid chemical waste) that would be shipped offsite to a LLW disposal facility. Prior to shipment, it is anticipated that these wastes will undergo dewatering, concentration, or solidification using mobile processing systems to obtain a solid waste form suitable for disposal. A small volume of liquid mixed waste (estimated at less than three 55-gal drums or approximately 17 cubic ft per year) would be stored on containment pallets in the waste accumulation room of the radwaste building. Processing of mixed waste is not included in the AP1000's solid waste management system (see Figure 11.4-1 of the AP1000 DCD). This liquid mixed waste would be shipped offsite for processing in accordance with RCRA requirements applicable to the hazardous constituents. Solidification of liquid mixed wastes prior to shipment would likely be inconsistent with RCRA requirements and detrimental to the ultimate processing of this waste to comply with the RCRA Land Disposal Restriction treatment standards. Section 5.11.1 indicates that all radioactive waste (i.e., all low-level radioactive wastes) would be packaged and in a solid form to meet 10 CFR 51.52(a).		
166	Did SNC estimate the heat load in a spent fuel shipping cask and compare the result to 10 CFR 51.52 Table S-4 conditions (i.e., 225,000 Btu/hr (~66 kW))?	Transportation	Philip Daling
Response: In a conference call was held on November 29, 2006 SNC stated that the heat load was not determined for a spent fuel shipping cask. The industry will follow a recent DOE publication ("Civilian Radioactive Waste Management System – Preliminary Transportation, Aging, and Disposal Canister System Performance Specification, Revision A DOE/RW-0585, Document ID Number WMO-TADCS-0000001, dated November 2006) for guidance on spent fuel management. Based on this document, the maximum allowable heat load for shipping is 25 KW for the 125 ton loaded shipping container. This is significantly less than the value specified in table S-4 of 10 CFR 51.52.		
167	Did SNC estimate the non-radiological impacts of accidents and compare the results to Table S-4 condition (i.e., non-radiological accidents result in one fatal injury per 100 reactor years, 1 non-fatal injury in 10 reactor years, and $475 in property damage per year)?	Transportation	Phil Daling

#	Information Need	Discipline Name	Reviewer Name
Response: In a conference call on November 29, 2006, SNC stated that it did not estimate non-radiological impacts. As discussed in Section 7.4.1, accident risks are a combination of accident frequency and consequence. Accident frequencies for transportation of fuel from future reactors are expected to be lower than those used in the analysis in WASH-1238, which forms the basis for Table S-4. This reduction is due to improvements in highway safety and security and decreases in traffic accident, injury and fatality rates. Consequently, the non-radiological impacts of accidents would be expected to be within the limits listed in Table S-4.In NUREG-1437, Volume 1, Addendum 1, NRC estimated the non-radiological impacts of truck accidents. Section 2.3.2 of that document identifies the following average accident rates for the period from 1990 to 1995: Large truck accidents at 233 per 100 million truck miles. Injuries at 21 per 100 million truck miles Fatalities at 0.42 per 100 million truck miles. Using the TRAGIS code, SNC estimated a transportation distance for the VEGP-Yucca Mountain route of 2,556 miles one-way or 5,112 miles roundtrip per shipment. SNC assumed that an average of 39 spent fuel shipments per year would be required. Using the accident rates above, the spent fuel shipments from VEGP to a repository would result in approximately 0.42 injuries per 10 reactor years and 0.084 fatalities per 100 reactor years. Both are less than their respective Table S-4 conditions.			
168	Figure 2.1-1 shows a small onsite pond and a stream leading from it to Telfair Pond. However, no description of this stream or pond was found, unless it was considered one of the several detention ponds mentioned briefly in Section 2.4.2.1. More description of the stream and pond is needed	Aquatic Ecology	Rebekah Krieg
Response: Georgia Power has never conducted surveys of aquatic biota in this pond (Retention Basin No. 2) or the stream leading to it. This basin was built during the Vogtle Unit 1 and 2 construction to prevent sediment from moving into Telfair Pond and Beaverdam Creek.			
169	Sampling occurred in the Beaverdam Creek over a two year period in 1977-1978. Did sampling take place in Telfair pond or in the stream or small pond above Telfair Pond? If so, what were the results? If not, why was it considered not important to sample?	Aquatic Ecology	Rebekah Krieg
Response: The 1977-1978 studies of fish and benthic organisms involved sampling at 8 stations in the streams, including two in Daniels Branch upstream of Telfair Pond. These 1977-1978 studies were discussed in fairly general terms, because they are nearly 30 years old. Because of the study's age, discussion of sampling results at a particular sampling station would not likely be representative.			
170	The statement is made in 2.4.2.1 that "Little is known about the aquatic biota of this stream" (the unnamed stream that drains Mallard Pond. Is more known about the aquatic biota besides the statement that "probably supports limited communities of aquatic macro invertebrates and fish". Is there any information on the aquatic biota of Mallard Pond?	Aquatic Ecology	Rebekah Krieg

#	Information Need	Discipline Name	Reviewer Name
Response: Almost nothing is known about the aquatic communities of Mallard Pond and the stream that drains it. Anecdotal information suggests that construction workers fished the pond in the early 1980s when Plant Vogtle was being built. One can see yearling largemouth bass and sunfish in the shallows. The pond has not been utilized for many years even for fishing.			
171	Have any more recent surveys been conducted of the Beaverdam creek since 1977 and 1978? If so, provide the results.	Aquatic Ecology	Rebekah Krieg
Response: There have been no additional surveys since 1977-1978**.**			
172	Would any construction related activities impact the small pond and stream inside the site property line that drain into Telfair pond? Would there be impacts to Telfair pond as a result of impacts to the small pond and stream?	Aquatic Ecology	Rebekah Krieg
Response: No, not if best construction management practices are employed. The construction of the power block and cooling towers occurs in an upland area. Drainage from this construction activity is routed to a retention pond installed to protect Beaverdam Creek and Telfair Pond from sediment associated with construction run-off.			
173	Is it Beaverdam creek? Or Beaver Dam creek? Both names are used in the ER.	Aquatic Ecology	Rebekah Krieg
Response: The correct name is "Beaverdam Creek" according to USGS topo maps and most documents.			
174	A more detailed characterization of the retention ponds is needed.	Aquatic Ecology	Rebekah Krieg
Response: The aquatic biota of the retention basins/ponds has not been surveyed. These basins were built to intercept sediment, thereby protecting down-gradient wetlands and streams. SNC will conduct wetland delineation in early December 2006 and these areas will be examined and classified. The information will be documented in a response to be provided by January 31, 2007.			
175	Section 2.4.2.2.1 refers to "changes in the flow characteristics of the Savannah River associated with the construction of dikes, upriver dams and removal of meanders...." A description of such changes that are directly related to that portion of the Savannah River that flows by the Vogtle site is needed unless this information is easily obtainable from the referenced document (Arnett 2001)	Aquatic Ecology	Rebekah Krieg

#	Information Need	Discipline Name	Reviewer Name
Response: Since the 1950's the USACE has added three major locks and dams to the Savannah River and made significant modifications to the navigation channel, including a number of cut-offs, on the Lower Savannah (below Clarks Hill Dam). One of these cut-offs, known as Cox Point is located at RM 153.2, approximately 2.3 miles upstream of the Vogtle site. Hale and Jackson (2003) provide a very detailed description of how dredging for navigation has altered the hydrogeology and geomorphology of the Savannah River over the past century. This reference in addition to Arnette 2001 should provide a sufficient description of the requested information. Please see the response to question # 114 (Attachment B-1) for further information and references.			
176	Section 2.4.2.2.2 (Resident Fish of the Middle Savannah River) refers to a study between 1980 and 1995 of fish collected by the Academy of Natural Sciences. However, the reference cited (Halverson 1997) is from a SRS Ecology Environmental Information Document prepared by Westinghouse Savannah River Company. Is this the correct reference?	Aquatic Ecology	Rebekah Krieg
Response: This is the correct reference. Halverson (1997) summarizes the Academy studies. The original studies from the Philadelphia Academy or from Westinghouse Savannah River Company were not available. Note that Halverson (1997) actually says 59 (rather than 61) species had been collected. The larger number was used because the table accompanying this discussion shows 61 fish species. Also WSRC has updated Halverson et al (1997) with Wike et al (2006) which can be requested from WSRC or DOE-SR.			
177	Section 2.4.2.2 (Sturgeons) discusses the substrate of the Savannah River in the vicinity of the VEGP as being characterized as "shifting sand". A copy of GPC 1972 might clear this up, but we are interested in the basis for this statement. What type of substrate sampling was performed on the bottom of the Savannah River to make this conclusion. Where were the samples taken and when were they made?	Aquatlic Ecology	Rebekah Krieg
Response: See page 2.7-107 of the Vogtle Operating License Stage Environmental Report Units 1 and 2 (OLER). This brief description of substrate is actually in the OLER discussion of benthic organisms: "Bottom fauna over most of the river bed are very sparse…because the river bottom consists mainly of shifting sand. "The author(s) appear to have based this on the material observed in bottom samples, which were taken with a Peterson dredge. Samples were taken upstream and downstream of the Vogtle site, and in the immediate vicinity of the Vogtle site. In early December 2006, SNC took additional samples to confirm the bottom substrate materials and properties. This information is presented in Attachment C-3.			

#	Information Need	Discipline Name	Reviewer Name
178	Section 2.4.2.2 (Sturgeons) mentions a four year Department of Energy study of ichthyoplankton abundance and entrainment. No reference is provided. Is this the 1983-1985 Comprehensive Cooling Water study (DuPont 1987)?	Aquatic Ecology	Rebekah Krieg
Response: The information is from Volume VI of the CCWS (Du Pont 1987). Note that the number 12 (sturgeon larvae) is a typographical error and should be 13.			
179	Section 2.4.2.2 (Sturgeons) cites a reference, "Lamprecht, 1991", is this the same reference as "Hall, Smith and Lamprecht 1991"?	Aquatic Ecology	Rebekah Krieg
Response: Yes. This citation should be "Hall, Smith, and Lamprecht 1991."			
180	Characterize any noise impacts to the fauna of the Savannah River from construction activities such as pile driving?	Aquatic Ecology	Rebekah Krieg
Response: The impact of noise on aquatic organisms is not yet well-understood. Most of the research on fish has been on marine species on the West Coast. Hastings and Hopper (2005) summarized studies on the effects of noise on fish and this information is taken from that report. Most studies have focused on pile driving and blasts. Construction at the intake and barge canal may involve pile driving or similar activities with similar noise impacts. SNC does not anticipate blasting will be necessary. Fast, high acoustic exposures such as from blasting can cause physical damage and mortality. Limited studies and observations show mortality related to pile driving. Results from sounds other than those created by pile driving indicate that some sounds damage some fish species inner ear sensory structures, and some sounds may destroy the swim bladder. No studies have focused on the impacts of inner ear damage or hearing loss to the survival of the fish so the ultimate impact on individual fish is not known. Hearing loss could make fish more vulnerable to predation, and, depending on the species, hinder feeding. It appears that the degree of damage from pile driving is not related to the distance of the fish from the sound, but to the received sound level and the duration. Sound pressures do not appear to decrease monotonically with distance. The body of data available is inadequate for developing more than preliminary scientifically supportable criteria that will protect fish from exposure to pile driving sound and so mitigation measures are not currently available. It is likely that some fish in the Savannah River will be adversely affected by the noise of construction at the barge slip and intake structure. The primary impact will be to drive fish from the construction areas, however, the impacts will be short-term, and will not adversely affect any populations in the Savannah River. Hastings, M.C. and A.N. Popper. 2005. Effects of Sound on Fish. Funding provided by the California Department of Transportation. Jones and Stokes. Sacramento, CA.		

#	Information Need	Discipline Name	Reviewer Name
181	Provide any available GIS layer information for the following areas:- (1) site description including location of disturbed areas, new plant structures, temporary laydown areas, - (2) near site description including closest cities, water bodies, current transmission lines, gas lines etc. -(3) radiological sampling sites- (4)other sampling sites- (5) vegetation maps for the Vogtle site - (6) approximate location of the proposed transmission lines	General	Rebekah Krieg
Response: Specific information will be provided in a response at a later time.			
182	Please have section authors available during the audit.	Human health/radiological	Michael Smith
Response: The section authors were available for the site audit.			
183	Did different staff do the biota and public dose assessments? If so, please have each available during the audit.	Human health/radiological	Michael Smith
Response: The requested support staff was available for the site audit.			
184	I would like an opportunity to view/cross check original data. This is a general request for which I provide the following example: TLD (dosimeter) monitoring reports that feed into offsite and construction worker dose calculations. The direct radiation to construction workers (ER Section 4.5.3.1) is estimated as 51 mrem/yr, but no reference or supporting data is provided. It would be helpful to have a listing of quarterly TLD measurements used, along with locations mapped.	Human health/radiological	Michael Smith
Response: This data is available at The GPC Environmental Lab. A sample of TLD data from the Radiological Environmental Monitoring Program (REMP) at Plant Vogtle was provided during the site audit. Additional data can be provided, if desired.			
185	I would like to view the following reports: - offsite dose calculation manual - several years of the environmental monitoring report (operating report) - several years of the annual radioactive effluent release report, including the years referenced in the ER (2001 & 2003).	Human health/radiological	Michael Smith
Response: Copies of these documents were available during Site Audit.			

#	Information Need	Discipline Name	Reviewer Name
186	I would like to view input & output files for LADTAP and GASPAR model runs. I would like to receive copies of input/output so that I can run them independently (receive during audit or have them submitted as part of the application?)	Human health/radiological	Michael Smith
Response: As discussed at the VEGP site audit, LADTAP/GASPAR runs were not performed for the ESP ER. Instead, as stated in Section 5.4, the equations and parameters in the VEGP ODCM and the estimated releases from the AP1000 provided in the AP1000 documentation were used to calculate the doses to offsite receptors from the new units.			
187	Comments on ER Section 5.4 - Radiological Impacts of Normal Operation, and ER Section 6.2 - Radiological Monitoring, and Related Supporting Sections of the ER and SSAR Radiation exposures and doses due to liquid and gaseous effluents are based on models, assumptions, and site-specific data described in two documents. The are:· Southern Nuclear Operating Company, Offsite Dose Calculation Manual for Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Ver. 22, June 25, 2004. (ODCM)· Southern Nuclear Operating Company, Vogtle Electric Generating Plant - Unit 1 and 2, Annual Radioactive Effluent Release Report for January 1, 2003 to December 31, 2003. (Effluent Release Report)However, the information and model parameters are not described in ER Section 5.4, with the above documents not included in the application. The documents will be obtained ([1]) and reviewed to determine whether the modeling approach and assumptions used for operating plants are acceptable in the context of an ESP application. Based on this review, RAIs will be submitted to the applicant, as needed.	Human health/radiological	IHPB/NRC
Response: Copies of these documents were available during the Site Audit.			
188	Sections 3.5 and 5.4 of the ER refer extensively to the AP1000 Design Control Document (Rev. 15, November 2005). The AP1000 DCD will be reviewed to determine whether the information, assumptions, and data are properly used in the context of the ESP application. Based on this review, RAIs will be submitted to the applicant, as needed.	Human health/radiological	IHPB/NRC
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
189	Sections 3.0 and 5.4 of the ER do not demonstrate compliance with liquid and gaseous effluent concentration limits of Part 20, Appendix B, Table 2, Columns 1 and 2. The ESP application will be reviewed and based on the results of this review, RAIs will be submitted to the applicant, as needed.	Human health/radiological	IHPB/NRC
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
190	Section 5.4 of the ER excludes potential exposure pathways (for liquid and gaseous effluents), with no basis provided for their omissions. For example, the ER excludes boating, shoreline activity, crop and pasture irrigation, and cow and goat milk production. Given that the ER relies on information presented in the ODCM and effluent release report, these documents will be reviewed and based on the results of this review, RAIs will be submitted to the applicant, as needed.	Human health/radiological	IHPB/NRC
Response: All exposure pathways were chosen to be consistent with the ODCM.			
191	Other items identified include internal inconsistencies in referencing information and parameters used in calculating doses to the maximally exposed individual. For example, such inconsistencies include: basis for the dilution factor within ER Section 5.4, as applied to liquid effluents basis for atmospheric dispersion factors between SSAR Section 2.3.5 and ER Section 2.7.6 versus that cited in ER Section 5.4 (ODCM for existing plants) designations of wind sectors and distances for the maximally exposed individual and nearest site boundary for gaseous effluents between ER Sections 5.4 and 2.7.6 and SSAR Section 2.3.5 location of the maximally exposed individual for liquid effluents within ER Section 5.4 basis of total population within the 50-mile radius used in assessing collective doses between ER Sections 2.5.1 and 5.4 operational radiological monitoring program of onsite ground water wells stated to be used for potable water in light of the information presented in ER Sections 2.3.3, 6.2.3, and 6.3.3 and SSAR Section 2.4.12	Human health/radiological	IHPB/NRC

#	Information Need	Discipline Name	Reviewer Name
Response: The total population used to calculate background dose in Section 5.4 has been corrected to match the year 2000 population total presented in Table 2.5.1-1. Table 5.4-10 has been revised as follows: Table 5.4-10 Collective Total Body Doses within 50 Miles (millirem per year) AP1000 (two units) Existing Units Noble gases 2.6E-08 2.44E-11, Iodines and particulates 0.24 1.81E-06, Tritium and C-14 0.11 0.006, Total 0.13 0.006, Natural background (expressed as person-rem per year) 2.43E+05 2.43 E+05, Note: Natural background dose is based on a dose rate of 360 mrem/person/yr (NCRP 1987) and a population of 674,102 (Table 2.5.1-1).			
192	Sections 4.5.2.2 and 4.5.2.3 of the ER reference gaseous releases for 2003 and liquid releases for 2001 as being typical releases for the existing units. No data for releases for other years is provided to justify the use of the release data for the years chosen. It is unclear why the data for typical gaseous and liquid releases were chosen from two different years.	Human health/radiological	IHPB/NRC
Response: The reference in Section 4.5.2.3 to 2001 liquid effluent releases is a typographical error. As can be seen in the reference citation, the correct year is 2003. Release data from 2003 was chosen because it was the latest available full year of data. This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
193	Section 4.5.3.1 of the ER discusses the use of TLD data to establish the estimated direct radiation dose to construction workers. This section should provide additional information on the applicant's basis for selecting 50 mrem/year as the average accumulated exposure from VEGP. Additional information should include the year that this data was measured (and why 50 mrem/year is a representative value to use for the average direct dose value), the number and location of the TLDs used to obtain this dose data, and if the TLD values were corrected for a 100 percent power level.	Human health/radiological	IHPB/NRC
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
194	Section 4.5.3.1 of the ER also discusses the dose contribution from the ISFSI. Additional information is needed about when the ISFSI will be put into use and what percent loading of the ISFSI the applicant assumed to arrive at the ISFSI contribution of 15 mrem/year to the Unit 3 construction workforce. How the licensee arrived at the estimated direct radiation dose to construction workers of 52 mrem/year is also not clear.	Human health/radiological	IHPB/NRC

#	Information Need	Discipline Name	Reviewer Name
Response: SNC has evaluated the contribution from the ISFSI to the construction work force. The occupational projected dose for workers on Units 3 and 4 is as follows: The projected dose to Unit 3 Construction Workers is 15 mrem based on the six casks placed in 2014. Due to the distance from the ISFSI, Dose to Unit 4 Construction Workers is considered negligible. There will be twelve casks in storage at the time Unit 4 goes online in 2016. Assuming casks that hold 32 assemblies are used, VEGP 1&2 will need to load six casks every 18 months. For the ESP, the following cask loading schedule is projected: 2014 – first cask placed in service April 1, 2014 with six casks in service by July 1, 2015 – six additional casks will be placed in service by July 1, 2016 . This is the current schedule contemplated for Vogtle dry storage start-up. The average accumulated exposure from VEGP Protected Area internal and general area TLDs over a 365 day period is 50 mrem. The average Environmental Plant Site Boundary TLD exposure over a 365 day period is 13 mrem. Dose from the internal and general area TLDs minus the Environmental Plant Site Boundary TLDs, is the method used to determine dose above background. Based on this approach, 50 mrem per year – 13 mrem per year = 37 mrem per year (for normal 1&2 operations). The total construction worker dose is obtained by adding: 15 mrem ISFSI dose + 37 mrem site exposure dose = 52mrem annual direct radiation dose to construction worker. In the event Vogtle needs to pursue a more aggressive schedule, the earliest spent fuel loading would occur no sooner that April 1, 2012. The annual direct radiation dose to a Unit 3 construction worker would increase proportionally.		
195	In Section 4.5.4.2 of the ER, the applicant applies a multiplication factor of ten (10) to the measured annual effluent dose to account for the fact that the workers are located closer to the effluent release point than the maximum exposed member of the public. The applicant did not provide a description of how they derived this multiplication factor.	Human health/radiological	IHPB/NRC
Response: The basis for application of the factor of 10 was an estimate.			
196	Table 4.5-1 in the ER should have a column showing the TEDE annual dose (sum of whole body and critical organ annual doses).	Human health/radiological	IHPB/NRC
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			
197	Section 4.5 of the ER should include a site map indicating the location of the internal and general area TLDs used to estimate the direct radiation dose to the construction workforce.	Human health/radiological	IHPB/NRC
Response: This item was clarified/resolved through audit interaction between SNC and the NRC; No further action needed.			

#	Information Need	Discipline Name	Reviewer Name
198	Are there any wetland areas on the Vogtle site?	Land Use/Alternatives	Paul Hendrickson
Response: This question is deferred to the Ecology Section. Wetlands will be delineated in early December 2006 and information will be provided in a response to be provided by January 31, 2007.			
199	No wetland impacts are identified in Table 10-1 (p. 10.1-5). Should there be such impacts for the plant or for the new transmission line?	Land Use/Alternatives	Paul Hendrickson
Response: This question is deferred to the Ecology Section and will be addressed in a response to be provided by January 31, 2007.			
200	Wetland impacts are not mentioned in Section 10.5 covering cumulative impacts. Are there likely to be cumulative wetland impacts?	Land Use/Alternatives	Paul Hendrickson
Response: This question is deferred to Ecology. Wetland impacts will be assessed through the wetland delineation process in a response to be provided by January 31, 2007.. No significant cumulative impacts to wetlands are anticipated**.**			
201	Will borrow pits be utilized? If so, where will they be located?	Land Use/Alternatives	Paul Hendrickson
Response: Borrow pits will be utilized and are identified in drawings in the Threatened and Endangered Species and Cultural Resources sections of the ER.			
202	Will upgrades to the rail corridor be needed?	Use/Alternatives	Hendrickson
Response: No upgrades to the rail corridor are anticipated.			
203	Will dredging of the barge slip be needed? If so, where will the spoils go?	Land Use/Alternatives	Paul Hendrickson
Response: The construction methodology for the intake, barge slip, and discharge are currently being evaluated and the response will be provided under an RAI. The need for dredging and disposal of dredge spoil will be addressed in this response.			

#	Information Need	Discipline Name	Reviewer Name
204	Would refueling and maintenance outages be staggered after construction of the new units?	Land Use/Alternatives	Paul Hendrickson
Response: While it is anticipated that the new units will be staffed and operated independently from the existing units, efforts will be made to minimize concurrent outages. Outages will be staggered, as necessary, to avoid overlap when possible.			
205	How does the process for siting a new transmission line in Georgia work? Who would need to approve the siting? Will Southern be the owner of the new transmission line?	Land Use/Alternatives	Paul Hendrickson
Response: The transmission siting process in Georgia is governed by a state law (Title 22) and associated regulations. A copy of the Georgia Power guideline for transmission siting was provided at the Site Audit. The GPC Siting guide and other supporting information are provided as Attachment C-5.			
206	Has salt drift from the existing cooling tower plumes been an issue?	Land Use/Alternatives	Paul Hendrickson
Response: Salt drift from the existing units does not present any significant environmental concern. No significant cumulative effects are anticipated after the new units are added.			
207	Section 10.5.1 (page 10.5-1) states that no large construction projects (other than the proposed Vogtle plants) are planned in the vicinity. Does this include the Savannah River Site?	Land Use/Alternatives	Paul Hendrickson
Response: *DOE – Savannah River provided the following construction estimates for anticipated SRS construction projects.*			
Project	*Anticipated time of construction*	*Construction workforce*	
Salt Waste Processing Facility	*2007 –2011*	*Peak of 650 in 2008 – 2010*	
Mixed Oxide Fuel Facility	*2007 – 2015*	*Peak of 1,000 in 2010; avg about 600*	
Plutonium Vitrification Facility	*2008 -- 2012*	*Peak of 300 in 2011 – 2012*	
Complex 2030 Consolidated Plutonium Complex	*2014 – 2020*	*800 – 1,100*	
208	Are agricultural activities allowed under transmission lines?	Land Use/Alternatives	Paul Hendrickson

#	Information Need	Discipline Name	Reviewer Name
Response: Yes. Georgia Power provides easements for agricultural activities under transmission lines.			
209	Did SNC estimate the heat load in a spent fuel shipping cask and compare the result to 10 CFR 51.52 Table S-4 conditions (i.e., 225,000 Btu/hr (~66 kW))?	Transportation	Philip Daling
Response: In a conference call was held on November 29, 2006, this issue was addressed.			
210	Did SNC estimate the non-radiological impacts of accidents and compare the results to Table S-4 condition (i.e., non-radiological accidents result in one fatal injury per 100 reactor years, 1 non-fatal injury in 10 reactor years, and $475 in property damage per year)?	Transportation	Phil Daling
Response: In a conference call was held on November 29, 2006, this issue was addressed.			
211	What is source for 325 mrem/person/yr natural background dose used in ER Table 5.4-10?	Human health/radiological	Michael Smith
Response: The source of background radiation in Table 5.4-10 has been revised. The number used in the revised table is 360 mrem (NCRP 1987). See response to question # 191 for revised table. NCRP (National Council of Radiation Protection and Measurements). 1987. Ionizing Radiation Exposure of the Populations of the United States. Bethesda, MD.			
212	Table 3.0-1 states that CWS Cooling Tower Offsite Noise Levels are less than 20 dB above background. What approach was used to determine this value? Provide any associated references. Also, this table refers to ER Section 5.8.1.1 that is not related to noise calculation.	Nonradiological Health	Michael Smith
Response: Table 3.0-1 has been corrected in Rev. 1 of the environmental report. The correct noise levels range from 20 to ≤ 40 dBA, taken from Table 2.7-26. Table 2.7-26 is derived from work done to estimate noise levels at particular locations around the site boundary for the initial units. The NRC Staff used an Argonne National Lab model to confirm noise impact were small (Ref. VEGP Unit 1 & 2 FES Section 5.12). No noise measurements have been done at VEGP since before Units 1 and 2 came on-line. VEGP has a requirement in the Unit 1 and 2 Environmental Protection Plan (EPP) to investigate any noise complaints and report them in the Annual Environmental Operating Report for each year. No complaints have been received since the units became operational.			

#	Information Need	Discipline Name	Reviewer Name
213	Better description of the new barge facility, including area impacted and possible methods of construction.	Aquatic Ecology	Rebekah Krieg
Response: The construction methodology for the intake, barge slip, and discharge are currently being evaluated and the response will be provided by January 31, 2007.			

#	Information Need	Discipline Name	Reviewer Name
214	Need chart of 20 year expected peak loads, consumption, price of oil projections, coal, gas and nuclear.	Need for Power	Mike Dusaniwskyj

Response: **Fuel Cost Projection**
The cost of producing electricity is a function of the costs of fuel, operations and maintenance, and capital. In Energy Information Administration (EIA) projections for the year 2030, fuel costs would account for about two-thirds of the generating costs for new natural-gas-fired plants, less than one-third for new coal-fired units, and less than one-tenth for new nuclear power plants (EIA 2006, at page 82). As shown in Figure 1, coal- and nuclear-fuel costs have remained relatively steady for the past 10 years but natural gas and petroleum costs have risen significantly. Projections of fuel costs, therefore, bear significantly on the analysis of the cost of producing electricity using the various fuel options. EIA projections show petroleum and natural gas prices dropping but then rising again towards the end of the projection period. Table 1 shows values for selected years shown in Figure 1.

Regional fuel prices can vary from the national composite prices that Figure 1 shows. For the Southeast Electric Reliability Council (SERC) region, in which VEGP Units 3 and 4 would be located, EIA-reported differences do not alter the relative cost comparisons. For example, Table 1 projects a national composite price for coal in 2030 of $1.51 per million Btu. For SERC, EIA projects a price for coal in 2030 of $1.70 per million Btu. Similar comparisons for natural gas (6.26 vs. 5.01) and petroleum (7.61 vs. 8.51) (EIA 2006c, table 68, page 376) show that nuclear will remain the least expensive fuel and petroleum the most expensive. Furthermore, the difference between nuclear and natural gas fuel costs will be comparable to what the difference is today.

References
(EIA 2006a) Energy Information Administration, U. S. Department of Energy, Annual Energy Outlook 2006 With Projections to 2030, Washington, D. C.,DOE/EIA-0383(2006), February. Available online at http://www.eia.doe.gov/oiaf/aeo/index.html. Accessed December 1, 2006.
(EIA 2006b) Energy Information Administration, U. S. Department of Energy, Annual Energy Outlook 2006 With Projections to 2030, Washington, D. C.,DOE/EIA-0383(2006), February. Graphic Data for Figure 65. Available online at http://www.eia.doe.gov/oiaf/aeo/excel/figure65_data.xls. Accessed December 1, 2006.
(EIA 2006c) Energy Information Administration, U. S. Department of Energy, Supplemental Tables to the Annual Energy Outlook 2006; Part III Electric Generation and Renewable Resource Data. Available online at http://www.eia.doe.gov/oiaf/aeo/supplement/pdf/sup_elec.pdf. Accessed December 1, 2006.

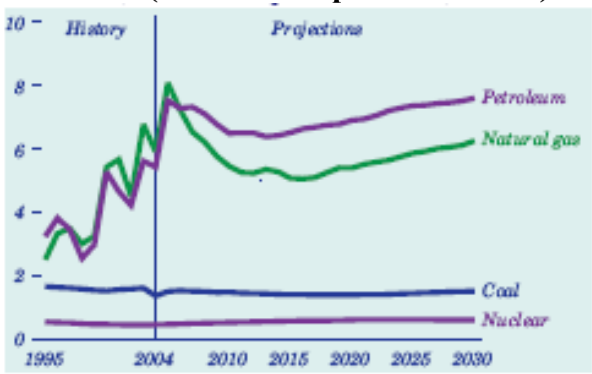
#	Information Need	Discipline Name	Reviewer Name

Table 1. Fuel prices to electricity generators, 1995-2030 (2004 dollars per million Btu).

Fuel	2004	2010	2015	2020	2025	2030
Petroleum	5.43	6.5	6.52	6.91	7.37	7.61
Natural gas	5.92	5.46	5.08	5.4	5.87	6.26
Coal	1.36	1.48	1.4	1.39	1.44	1.51
Nuclear	0.45	0.52	0.57	0.6	0.61	0.6

Source: **EIA 2006b**.

Figure 1. Fuel prices to electricity generators, 1995-2030 (2004 dollars per million Btu).



Source: Reprinted from **EIA 2006a, Figure 65**.

215	Provide the 2000 survey report that was conducted by Georgia Power on the transmission lines. This report specifically addressed sensitive areas and T and E species occurrences within 0.5 miles of the lines. We would like to be able to reference this report.	Terrestrial Ecology	Amanda Stegen
Response: This report was provided during the site audit.			
216	Provide the Georgia Power transmission line maintenance procedures. The information we were provided is specific for the current Vogtle lines, but may not include procedures that may need to be followed on the new line. The more general Georgia power procedures have more detail on how sensitive areas are handled. We want to be able to reference the overall document.	Terrestrial Ecology	Amanda Stegen
Response: These procedures were provided during the Site Audit.			

#	Information Need	Discipline Name	Reviewer Name
217	Although no red-cockaded woodpeckers (RCWs) have been found at VEGP, the area north of the proposed borrow areas contains longleaf pine more than 100 years old and is suitable habitat for this federally-listed species. Provide a copy of the safe harbor agreement application that has been submitted for RCWs.	Terrestrial Ecology	Amanda Stegen
Response: A copy of the Safe harbor agreement was provided during the Site Audit.			
218	Provide information on suitable habitat for T and E species, both onsite and in the transmission line corridors. This should include suitable habitat for all T and E species that may occur onsite and in the transmission line corridors. For example, GA DNR told us that although no plants have been discovered thus far, the bluff above the bottomland hardwood swamp at VEGP that will be impacted by construction of the intake is suitable habitat for the federally-listed relict trillium (Trillium reliquum).	Terrestrial Ecology	Amanda Stegen
Response: This issue will be investigated during the wetland delineation work in early December 2006 and will be documented in the response to be provided by January 31, 2007.			
219	We were told that there was a Wildlife Habitat Enhancement Management Plan that was referenced in section 2.4. This management plan contains information on timber management, hunting etc. I have not been able to find this reference anywhere in the document. Perhaps it is right in front of me and I am just continuing to miss it. We need a copy of this reference, and if it isn't in the document, we need to have it provided to us.	Terrestrial Ecology	Amanda Stegen
Response: A copy of the Wildlife Management Plan was provided during the Site Audit.			
220	It was mentioned that prior to a timber harvest, GPC biologists survey the area to ensure no T and E species are present. This sounded like it was a common practice - though not a procedure. Is there any formal documentation on what types of activities prompt this survey? Is there any formal documentation on what the survey entails?	Terrestrial Ecology	Amanda Stegen
Response: Timber management activities are coordinated through the Georgia Power Company Land Department. They keep good records and document each timber management event. SNC will ensure they are available for discussion on this subject, if desired.			

#	Information Need	Discipline Name	Reviewer Name
221	Is there plans to conduct T and E surveys in areas that will be impacted by construction and have not been surveyed (such as the borrow area etc)? If there is not a plan in place to conduct these surveys, please provide justification.	Terrestrial Ecology	Amanda Stegen
Response: All areas that may be potentially impacted by construction have been surveyed for Threatened and Endangered species and Cultural Resources**.**			
222	Have there been any bird impact events - such as avian collisions with cooling towers?	Terrestrial Ecology	Amanda Stegen
Response: There have been no significant avian collision events during the current operation of VEGP**.**			
223	Has SNC identified any air permits that need to be secured for plant construction or operation (e.g., Title V)? If so, what emission sources need to be permitted?	Meteorology	Jeremy Rishel
Response: SNC has determined that the first permit necessary for construction will be the construction stormwater permit covering non-pint source discharges associated with construction. New or modified Title V permit may be required to manage construction emissions such as volatiles and dust. This information is discussed in Chapter 6 of the ER.			
224	Did SNC reevaluate the validity of assumptions made in the ODCM for application to proposed units 3 and 4 (e.g., updated meteorology, updated population distribution, effects from construction and demolition)? Need description of SNC process used to determine whether an update to the ODCM is required. For example, is there a regular schedule or are there other events that would initiate a reevaluation of assumptions in the ODCM?	Radiological, Non-Radiological Waste, Noise, OSHA	Mike Smith
Response: No, SNC did not reevaluate the validity of the assumptions in the Vogtle OCDM. The current OCDM is the best information available to estimate the impacts of offiste doses associated with Units 3 and 4. It is understood that a separate ODCM may be developed for the AP-1000 design. The Vogtle procedure for implementation of the ODCM provides guidance on when changes are required and how changes will be implemented. A copy of the ODCM Procedure for Vogtle was provided at the Site Audit.			

Table X-1 Information Need

Activity	Pre-construction/Construction	Total # acres impacted	Number of forested acres	Type of forest impacted	Number of wetland acres impacted	Type of wetland impacted (jurisdictional/not jurisdictional)	Type of impact on wetlands	Any dredge and fill associated with activity? Quantities?	T&E survey of area impacted?	Mitigation measure

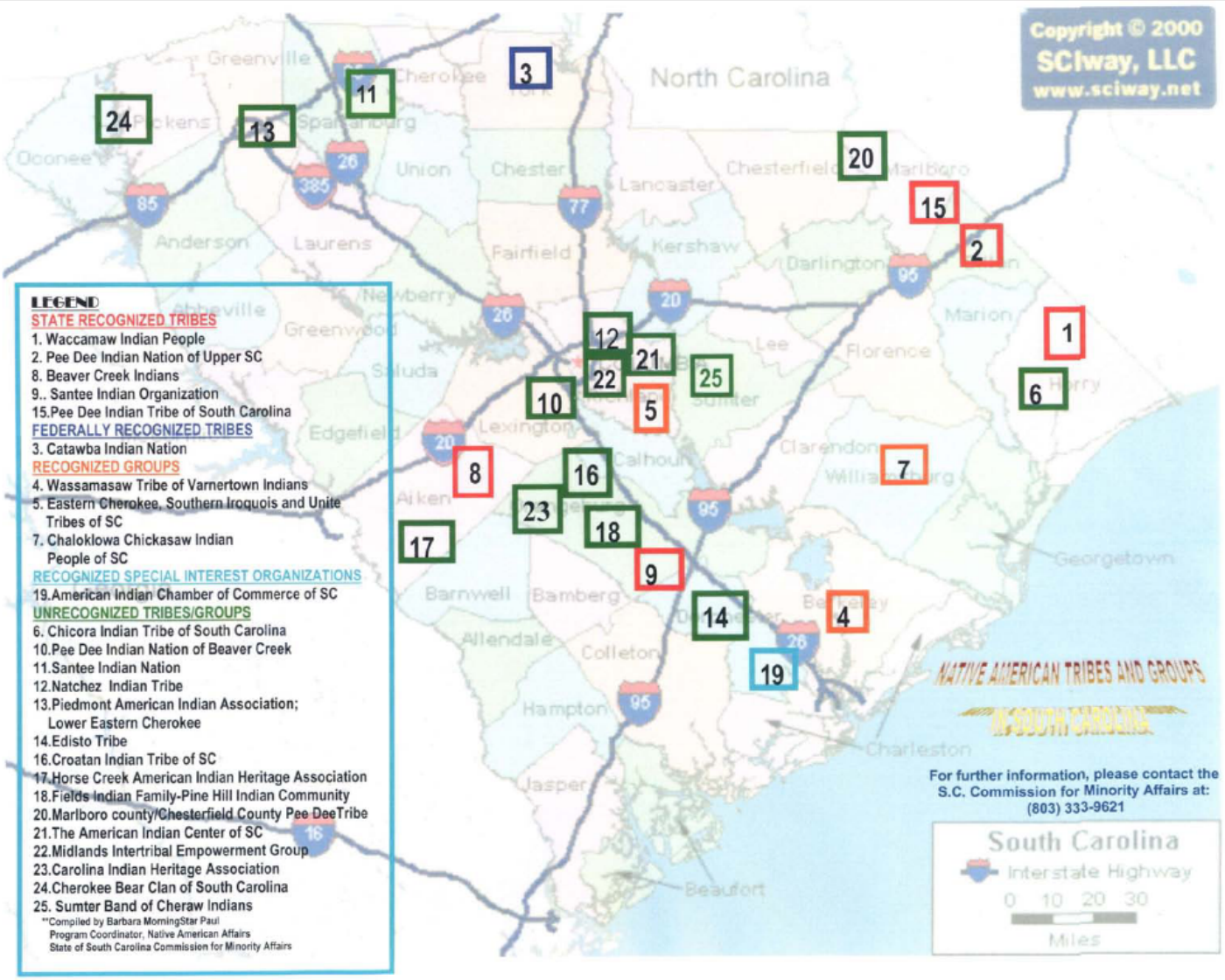
Note: There are no land use or alternative needs available at this time.

AR-06-2684

Enclosure

Attachment A-1 #22

AR-06-2684
Enclosure
Attachment A-1 #22



AR-06-2684

Enclosure

Attachment A-2 #25

25. Page 4.4-7 states "The creation of such a large pool of jobs [5,800] would inject millions of dollars into the regional economy . . ." Provide an actual value for your estimate.

Response:

The main table lists the number of construction workers on site, by month, during construction. SNC obtained construction worker wage data for the Augusta-Richmond County, GA-SC MSA from the Department of the Interior's Bureau of Labor Statistics. The average annual wage for all construction and extraction occupations in this MSA in 2005 was $32,180 (BLS 2005). The range of wages for all construction and extraction occupations in this MSA in 2005 was $17,620 to $46,400. The average annual wage for a construction laborer (a subset of the above) in this MSA in 2005 was $22,080. To be conservative, SNC used the average annual wage of a construction laborer, $22,080, in its analysis. In the attached table, the average annual wage of a construction laborer was divided by 12 to calculate an average monthly wage. The monthly wage was multiplied by the number of workers each month and then summed to calculate total dollars earned by the construction workforce.

A sensitivity analysis (smaller table) was performed to further assess the impacts of the construction worker wages on the region. Because of uncertainty surrounding the amount of wages that would be spent in the region, SNC provided a table depicting the dollar impact on the region by percent of the wages spent within the region.

This analysis is provided for clarification and no revision to the ESP application is planned.

Reference

U.S. Department of Labor Bureau of Labor Statistics. 2005. "May 2005 Metropolitan Area Occupational Employment and Wage Estimates. Augusta-Richmond County, GA-SC." Available online at http://stats.bls.gov/bls/blswage.htm. Accessed October 16, 2006.

Estimated Construction Work Force Wages

Month	Workforce Strength	Avg. Monthly Wage[a] ($)	$ Earned by Construction Workforce	Month	Workforce Strength	Avg. Monthly Wage[a] ($)	$ Earned by Construction Workforce	Month	Workforce Strength	Avg. Monthly Wage[a] ($)	$ Earned by Construction Workforce
Limited Work Authorized Activities				10	3500	$1,840	$6,440,000	38	4350	$1,840	$8,004,000
-18	80	$1,840	$147,200	11	3600	$1,840	$6,624,000	39	4275	$1,840	$7,866,000
-17	160	$1,840	$294,400	12	3700	$1,840	$6,808,000	40	4250	$1,840	$7,820,000
-16	230	$1,840	$423,200	Construciton on Second Unit				41	4225	$1,840	$7,774,000
-15	300	$1,840	$552,000	13	3800	$1,840	$6,992,000	42	4200	$1,840	$7,728,000
-14	380	$1,840	$699,200	14	3850	$1,840	$7,084,000	43	4175	$1,840	$7,682,000
-13	460	$1,840	$846,400	15	3900	$1,840	$7,176,000	44	4150	$1,840	$7,636,000
-12	530	$1,840	$975,200	16	3950	$1,840	$7,268,000	45	4125	$1,840	$7,590,000
-11	610	$1,840	$1,122,400	17	4000	$1,840	$7,360,000	46	4100	$1,840	$7,544,000
-10	700	$1,840	$1,288,000	18	4050	$1,840	$7,452,000	47	4075	$1,840	$7,498,000
-9	820	$1,840	$1,508,800	19	4100	$1,840	$7,544,000	48	4050	$1,840	$7,452,000
-8	960	$1,840	$1,766,400	20	4150	$1,840	$7,636,000	49	4025	$1,840	$7,406,000
-7	1130	$1,840	$2,079,200	21	4175	$1,840	$7,682,000	50	4000	$1,840	$7,360,000
-6	1310	$1,840	$2,410,400	22	4200	$1,840	$7,728,000	51	3975	$1,840	$7,314,000
-5	1480	$1,840	$2,723,200	23	4250	$1,840	$7,820,000	52	3950	$1,840	$7,268,000
-4	1660	$1,840	$3,054,400	24	4275	$1,840	$7,866,000	53	3925	$1,840	$7,222,000
-3	1830	$1,840	$3,367,200	25	4300	$1,840	$7,912,000	54	3900	$1,840	$7,176,000
-2	2000	$1,840	$3,680,000	26	4350	$1,840	$8,004,000	55	3875	$1,840	$7,130,000
-1	2175	$1,840	$4,002,000	27	4375	$1,840	$8,050,000	56	3850	$1,840	$7,084,000
Construction on First Unit				28	4400	$1,840	$8,096,000	57	3825	$1,840	$7,038,000
1	2350	$1,840	$4,324,000	29	4400	$1,840	$8,096,000	58	3800	$1,840	$6,992,000
2	2525	$1,840	$4,646,000	30	4400	$1,840	$8,096,000	59	3700	$1,840	$6,808,000
3	2700	$1,840	$4,968,000	31	4400	$1,840	$8,096,000	60	3600	$1,840	$6,624,000
4	2870	$1,840	$5,280,800	32	4400	$1,840	$8,096,000	61	3500	$1,840	$6,440,000
5	3045	$1,840	$5,602,800	33	4400	$1,840	$8,096,000	62	3000	$1,840	$5,520,000
6	3180	$1,840	$5,851,200	34	4400	$1,840	$8,096,000	63	2500	$1,840	$4,600,000
7	3250	$1,840	$5,980,000	35	4400	$1,840	$8,096,000	64	2000	$1,840	$3,680,000
8	3300	$1,840	$6,072,000	36	4400	$1,840	$8,096,000	65	1000	$1,840	$1,840,000
9	3365	$1,840	$6,191,600	37	4350	$1,840	$8,004,000	66	500	$1,840	$920,000
		Subtotal =	$79,856,000			Subtotal =	$214,314,000			Subtotal =	$193,016,000

Total $ earned by construction workforce =	**$487,186,000**

Sensitivity Analysis

% of Total Construction Workforce Wages that could be Spent in Region	$
10	$48,718,600
20	$97,437,200
30	$146,155,800
40	$194,874,400
50	$243,593,000
60	$292,311,600
70	$341,030,200
80	$389,748,800
90	$438,467,400
100	$487,186,000

a. U.S. Department of Labor Bureau of Labor Statistics. 2005. "May 2005 Metropolitan Area Occupational Employment and Wage Estimates. Augusta-Richmond County, GA-SC." Available online at http://stats.bls.gov/bls/blswage.htm. Accessed October 16, 2006.

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Attachment A-3 #26

26. Page 4.4-8 states "While the exact amount of income taxes the project will generate for Georgia cannot be known, it could be fairly large over a 7-year pre-construction and construction period. . ." Provide a quantity for your estimation of the tax revenues that will be collected.

Response:

As stated in Section 2.5.2.3 of the VEGP ESP ER, "Georgia has personal and corporate income taxes. Construction workers will pay taxes on their wages and salaries to Georgia if (1) their residence is in Georgia, (2) they are nonresidents working in Georgia and filing a federal return which will include income from sources in Georgia that exceeds five percent of income from all sources, or (3) they have income that is subject to Georgia tax that is not subject to federal income tax."

A large portion of construction workers would be considered residents of Georgia while they work at VEGP. For non-residents, SNC is not able to accurately assess whether or not a construction worker's VEGP wages would be more than 5 percent of his/her income from all sources, however, it is most likely that this would be the case for a majority of the workers. Therefore, to account for these uncertainties, SNC performed a sensitivity analysis of tax impacts from construction worker wages. The analysis includes estimates ranging from 20 percent to 100 percent of the workers paying taxes in Georgia.

To estimate income tax impacts to the State of Georgia, SNC selected the tax bracket that contains the average annual wage of a construction laborer (see response to comment #25) for the Augusta-Richmond County, GA-SC MSA (as provided by the Bureau of Labor Statistics, 2005): $22,080. (See attached table) In Georgia, this annual wage or salary falls into the 6 percent tax bracket, the highest. (Note - wages between $1 and $7,000 (the first 5 brackets) are taxed at lower rates on a graduated scale. Therefore, the actual tax rate is actually slightly less than 6 percent of the annual salary. However, the difference is minimal and, for the sake of simplification, the worker's entire salary has been multiplied by 6 percent.)

On the VEGP construction project, it is likely that the average construction worker wage will be higher than $22,080 per year because a large portion of the workforce would be considered skilled labor. Therefore, this estimate is actually likely to understate the tax impacts to the region. In either case, the impacts would be large and positive.

Estimated Construction Work Force Wages

Month	Workforce Strength	Avg. Monthly Wage[a] ($)	$ Earned by Construction Workforce	Month	Workforce Strength	Avg. Monthly Wage[a] ($)	$ Earned by Construction Workforce	Month	Workforce Strength	Avg. Monthly Wage[a] ($)	$ Earned by Construction Workforce
Limited Work Authorized Activities				10	3500	$1,840	$6,440,000	38	4350	$1,840	$8,004,000
-18	80	$1,840	$147,200	11	3600	$1,840	$6,624,000	39	4275	$1,840	$7,866,000
-17	160	$1,840	$294,400	12	3700	$1,840	$6,808,000	40	4250	$1,840	$7,820,000
-16	230	$1,840	$423,200	Construciton on Second Unit				41	4225	$1,840	$7,774,000
-15	300	$1,840	$552,000	13	3800	$1,840	$6,992,000	42	4200	$1,840	$7,728,000
-14	380	$1,840	$699,200	14	3850	$1,840	$7,084,000	43	4175	$1,840	$7,682,000
-13	460	$1,840	$846,400	15	3900	$1,840	$7,176,000	44	4150	$1,840	$7,636,000
-12	530	$1,840	$975,200	16	3950	$1,840	$7,268,000	45	4125	$1,840	$7,590,000
-11	610	$1,840	$1,122,400	17	4000	$1,840	$7,360,000	46	4100	$1,840	$7,544,000
-10	700	$1,840	$1,288,000	18	4050	$1,840	$7,452,000	47	4075	$1,840	$7,498,000
-9	820	$1,840	$1,508,800	19	4100	$1,840	$7,544,000	48	4050	$1,840	$7,452,000
-8	960	$1,840	$1,766,400	20	4150	$1,840	$7,636,000	49	4025	$1,840	$7,406,000
-7	1130	$1,840	$2,079,200	21	4175	$1,840	$7,682,000	50	4000	$1,840	$7,360,000
-6	1310	$1,840	$2,410,400	22	4200	$1,840	$7,728,000	51	3975	$1,840	$7,314,000
-5	1480	$1,840	$2,723,200	23	4250	$1,840	$7,820,000	52	3950	$1,840	$7,268,000
-4	1660	$1,840	$3,054,400	24	4275	$1,840	$7,866,000	53	3925	$1,840	$7,222,000
-3	1830	$1,840	$3,367,200	25	4300	$1,840	$7,912,000	54	3900	$1,840	$7,176,000
-2	2000	$1,840	$3,680,000	26	4350	$1,840	$8,004,000	55	3875	$1,840	$7,130,000
-1	2175	$1,840	$4,002,000	27	4375	$1,840	$8,050,000	56	3850	$1,840	$7,084,000
Construction on First Unit				28	4400	$1,840	$8,096,000	57	3825	$1,840	$7,038,000
1	2350	$1,840	$4,324,000	29	4400	$1,840	$8,096,000	58	3800	$1,840	$6,992,000
2	2525	$1,840	$4,646,000	30	4400	$1,840	$8,096,000	59	3700	$1,840	$6,808,000
3	2700	$1,840	$4,968,000	31	4400	$1,840	$8,096,000	60	3600	$1,840	$6,624,000
4	2870	$1,840	$5,280,800	32	4400	$1,840	$8,096,000	61	3500	$1,840	$6,440,000
5	3045	$1,840	$5,602,800	33	4400	$1,840	$8,096,000	62	3000	$1,840	$5,520,000
6	3180	$1,840	$5,851,200	34	4400	$1,840	$8,096,000	63	2500	$1,840	$4,600,000
7	3250	$1,840	$5,980,000	35	4400	$1,840	$8,096,000	64	2000	$1,840	$3,680,000
8	3300	$1,840	$6,072,000	36	4400	$1,840	$8,096,000	65	1000	$1,840	$1,840,000
9	3365	$1,840	$6,191,600	37	4350	$1,840	$8,004,000	66	500	$1,840	$920,000
		Subtotal =	$79,856,000			Subtotal =	$214,314,000			Subtotal =	$193,016,000

Total $ earned by construction workforce =	**$487,186,000**
Total tax impact at GA's 6 percent tax rate =	**$29,231,160**

Sensitivity Analysis

Construction Wage Tax Impacts by % of Workforce	$
20	$5,846,232
30	$8,769,348
40	$11,692,464
50	$14,615,580
60	$17,538,696
70	$20,461,812
80	$23,384,928
90	$26,308,044
100	$29,231,160

a. U.S. Department of Labor Bureau of Labor Statistics. 2005. "May 2005 Metropolitan Area Occupational Employment and Wage Estimates. Augusta-Richmond County, GA-SC." Available online at http://stats.bls.gov/bls/blswage.htm. Accessed October 16, 2006.

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Attachment A-4 #28

TROUTMAN SANDERS LLP

M E M O R A N D U M

TO: File

FROM: T. Jerry Jackson

RE: First Response to Environmental Report Re: Tax Benefits

DATE: November 16, 2006

The Environmental Report can be found on the NRC website under "new reactors". In it, on page 5.8-6 the following appears:

> "Therefore, SNC used generic assumptions. SNC based costs on reasonable assumptions supported by several independent studies . . ."

The following comments are in response to the NRC request for information concerning the assumptions made in the tax revenue analysis contained in the Environmental Report:

1. **Cost Range**. The range of costs used as the basis for the tax estimates came from confidential information filed by GPC with the Georgia Public Service Commission and from estimates of costs to build a nuclear power plant in an MIT study done in 1993 and referenced in the Environment Report.

Note: the following discussion and footnote might be helpful regarding comments to assumptions 2. and 3.:

> ***Because this is a preliminary estimate, the approach used for estimating tax impacts will disregard the joint ownership arrangement and assumes that the two new units will***

be subject to ad valorem tax in Burke County as though owned by a single entity filing on a non unit basis .[1]

1. This assumption treats all four joint owners in the same manner for ad valorem tax purposes which differs from reality in Georgia. Because Georgia Power is taxed on a unit basis, its ad valorem tax payments to Burke County will be calculated somewhat differently than those of the other joint owners. Georgia Power's interest in the new units, in addition to increasing Burke County's ad valorem tax, could increase the tax benefits to other Georgia Counties with properties owned by Georgia Power.

2. **Joint Ownership Was Disregarded**. The assumption here was that the nuclear plants would be owned by a single entity instead of the existing joint ownership arrangement involving Georgia Power owning 45.7%, OPC owning 30%, MEAG owning 22.7% and Dalton Utilities owning 1.6%. This assumption is necessary for assumption 3 in that it makes the estimation process easier if only one entity is considered. In reality the tax impact would not be the same for each of the four (4) entities for a number of reasons. However, SNC does not have access to all information necessary to estimate the tax impacts to the other owners. Calculating the tax benefits individually by each of the four owners is beyond the scope of this preliminary estimate. By assuming a single entity proxy ownership structure we avoided dealing with the multi-county tax impact described above that would arise from a unit value tax approach such as is appropriate for Georgia Power. In other words, for purposes of approximating the tax impact, the assumption was made that both new units and associated infrastructure would be owned by a single entity like MEAG or OPC (and not Georgia Power) so that the plant value could be attributed to Burke County alone. Even though there is some negative bias in that MEAG /OPC may be tax exempt for a portion of the tax, overall this assumption results in a bias which overstates the tax to Burke County (see assumption 3).

3. **Tax Benefits To Other Georgia Counties From GPC Ownership In The New Units Was Disregarded, And All Tax Benefits Were Assumed To Accrue To Burke County.** This is more of a consequence of assumption 2 than an independent assumption. The bias of this consequence is that it overstates the benefits to Burke County and understates the benefits to other counties which would arise if Georgia Power's unitary filing were taken into account. The order of magnitude of the bias is difficult to estimate because of the complexity of estimating the impact of a utility filing on a unit basis.

4. **The Allowance For Funds Used During Construction ("AFUDC") Is Estimated Assuming a Five Year Schedule From Groundbreaking To On-Line And Not On An Actual Construction Schedule.** This assumption is a generic assumption. It assumes a five year build-out which appears to be a reasonable assumption which has no intrinsic bias but has no validity at this time. The Environmental Report, however, also assumed that the AFUDC will not significantly affect the tax benefit proposition. This is unlikely: although it is difficult to say what tax benefits will come from AFUDC, it is more likely that the work in progress will be subject to some level of taxation. While it is unclear how much tax benefits would accrue to Burke County during construction, it will be more than zero, but much less than the completed units will generate. Therefore, assuming this as zero results in a bias which understates the benefits to Burke County.

5. **Millage Rate Held Constant For The Forty Year Analysis**. The rate used in the analysis was the rate currently in effect in Burke County. The amount of the millage rate directly relates to the amount of tax revenues generated and therefore the millage rate is largely a function of Burke County's budget needs. It seems just as likely that the millage rate might be increased as it might be decreased over this period and therefore the bias is not able to be determined.

6. **Forty Years Of Operation For Each Unit Was Assumed To Estimate Depreciation And Rate Base Returns**. The rate base return determines the income stream and the income stream is used to estimate value. The rate base return is based on the amount of value placed in the rate base to which the rate is applied in each of the 40 years. The amount of property in the rate base declines over time with depreciation, and with it, income. The Environmental Report assumed straight line depreciation over forty years which GPC considers to be the most likely rate of depreciation for property placed in rate base. For GPC, this assumption has no specific bias. For MEAG, OPC, and Dalton Utilities, there is no rate base and therefore this depreciation rate may not be as significant. Because they are not in the rate base, the 2 ½% depreciation per year is not as relevant to their interests. Since GPC is not privy to

such information, there is not sufficient information available to determine whether the bias is up or down.

7. **Rates Of Return Based On Market Costs Of Capital Will Be Received For Property Placed In The Rate Base. Rates Of Return On Property Not Subject To Rate Regulation Is Assumed To Be Comparable To Rates Of Return For Property That Is.** This is a simplifying assumption that is also generic in the sense that one would expect the regulatory authorities to provide rates of return which represent fair return on investment and this, in turn, would lead to the assumption that whatever value is placed in the rate base is a close approximation to the fair market value used for tax purposes. The last part of the assumption relates to the three joint owners whose property is not in rate base. The bias here tends slightly toward understating the tax revenue to Burke County.

8. **The Total Cost of the Project Is Approximately Equal To The Amount Added To The Rate Base As A Result Of The Project.** The point here is that we are assuming that the total cost of construction will be included in the rate base which, because of market rates of return, leads to the conclusion that the value of the units is approximately equal to the cost. GPC believes this is a reasonable assumption and the bias tends slightly toward overstating tax revenues since any cost that does not go into rate base could negatively affect values.

9. **The Value Of Non-taxable Property On The Project Was Estimated To Be 19% Of The Total Value, But This Was Based on Fossil Fuel Plants.** The 19% estimate is probably on the high side even for coal--fired generating plants (it was derived from information from coal-fired generating plants). In the case of nuclear units, we do not know what percentage of the investment might be exempt from property tax but it could be considerably less than for coal-fired plants. Without further research, we do not know what exempt property might be used in constructing a nuclear plant. Thus, this assumption is likely significantly biased toward understating the tax value of this plant in Burke County.

10. **Tax Payments To Alabama.** Tax payments to Alabama were estimate solely on ratio of Georgia to Alabama ad valorem tax rates. No information on Alabama's basis for their tax rates was considered.

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Attachment A-5 #33

33. Almost half the study area is in South Carolina, yet all of the socioeconomic and environmental health effects are limited to only three counties in Georgia. Explain county-by-county why that simplifying assumption can be made.

Response:

It would be easier to answer this question by resource area, rather than by county.

A. Construction

1. Land Use

   Land Use impacts are primarily on-site. The new plant footprint is wholly contained within the existing VEGP site. Within the vicinity of the VEGP site, no land use changes are expected with the exception of the possible conversion of some property to mobile home sites and the reopening of a recreational vehicle park and a convenience store nearby. The majority, if not all of these impacts, would be experienced in Burke County. Similar land use impacts are not expected across the river in South Carolina for two reasons: (1) The land immediately across the river is owned by the federal government for a nuclear defense facility with limited public access. (2) The nearest river crossings are the Highway 301 bridge, approximately 20 miles south of the VEGP site and the Sand Bar Ferry (Highway 278) bridge in South Augusta. With respect to transmission line construction, the counties that would be most likely impacted would be Burke, Jefferson, Warren, and McDuffie Counties.

2. Water

   Water-related impacts include hydrological alterations, water use impacts, and water quality impacts. Due to the nature of the construction activities, the county with the greatest potential to be impacted by construction activities at the VEGP site would be Burke. The AEC estimated (in its 1973 FES) that approximately 4 acres of the Savannah River would be affected by sedimentation from construction of original units. Assuming a similar level of disturbance for new units, there is virtually no chance that construction impacts would extend beyond Burke County, or even the immediate vicinity of the Vogtle site. SNC's adherence to state and federal water regulations, use of best management practices, and use of good construction engineering practices serve to mitigate any potential impacts to water resources in Burke County.

3. Ecology

   Ecological resources include terrestrial and aquatic ecosystems. Due to the nature of the construction activities, the counties with the greatest potential to be impacted by construction activities at the VEGP site and along the proposed transmission corridor are Burke, Jefferson, Warren, and McDuffie. SNC's adherence to state and federal regulations, use of

best management practices, and use of good construction engineering practices serve to mitigate any potential impacts to ecological resources in Burke, Jefferson, Warren, and McDuffie Counties. The Savannah River is an effective barrier for migration of terrestrial animals avoiding construction activities, and there is adequate undeveloped land in the immediate vicinity of VEGP to support any misplaced animals.

4. Socioeconomics

    a. Physical Impacts -- All construction activities will occur within the construction site boundary on the VEGP site, which is surrounded by forests. The use of local public roadways will be necessary to transport construction materials and equipment. However, the roads with the greatest concentration of VEGP-related construction traffic would be in Burke County. Most impacts would be felt in Burke County. Impacts to air quality and noise would not extend beyond the VEGP site boundary. The land directly across the Savannah River is river swamp and not inhabited.

    b. Social and Economic -- After reviewing the residential distribution of the current VEGP *operations* workforce, SNC determined that the majority (79%) of the employees live in Burke, Richmond, and Columbia Counties. Because the majority of the *construction* workforce is expected to be on the job site for at least 2 years, for this analysis, SNC considered them to be “permanent” residents and follow the same residential distribution as the current *operations* workforce. The county with the next highest percentage of current *operations* workforce (beyond the three mentioned above) is Screven County, with 6.7 percent. All other counties are home to less than 6.7 percent of the current *operations* workforce. Because 6.7 percent (and less) of the incoming *construction* workforce would be a relatively small number of people, there would be little or no impact on those counties. Few VEGP employees live in South Carolina, perhaps because there is no convenient access to VEGP or Burke County from South Carolina.

5. Radiation Exposure and Non-Radiological Health

    Radiation exposure during construction would be from the nuclear units currently operating on the VEGP site. Since construction workers would be the only additional people to be exposed to those impacts and those impacts would occur because the workers would be in close proximity to the units, the workers are the only ones with the potential to be impacted (and only while they are on site). Therefore, potential impacts would be confined to Burke County. Non-radiological health impacts would be restricted to the VEGP site and the construction workforce.

B. Operations

1. Land Use

The only impacts to land use from operations will be the impacts of solids deposition from cooling tower drift. Impacts will be restricted to an area of approximately 1,600 feet around the towers, most in a north-northeast direction. The towers will be approximately 2,000 feet from the nearest site boundary to the west and approximately 6,000 feet to the north-northeast site boundary, so any effects will be localized on VEGP property. This impact would be experienced in Burke County only. Land use impacts caused by the inmigration of the operations workforce could cause impacts due to the conversion of land to residential housing (in Burke, Richmond, and Columbia Counties). See Socioeconomics for a discussion of the residential distribution of the new operations workforce. With respect to transmission line operation and maintenance, the counties that would be most likely impacted would be Burke, Jefferson, Warren, and McDuffie Counties, the counties hosting the line.

2. Water

Water-related impacts include hydrological alterations, water use impacts, and water quality impacts. Due to the nature of the operations activities, the county with the greatest potential to be impacted by operations activities at the VEGP site would be Burke. SNC's modeling of the thermal plume demonstrated that the area of the Savannah River affected by operation of the new units would be less than 800 ft^3 immediately downstream of the discharge line. SNC's adherence to state and federal water regulations and use of best management practices serve to mitigate any potential impacts to water resources in Burke County.

3. Ecology

Ecological resources include terrestrial and aquatic ecosystems. Due to the nature of the operations activities, the counties with the greatest potential to be impacted by operations activities at the VEGP site and along the proposed transmission corridor are Burke, Jefferson, Warren, and McDuffie. SNC's adherence to state and federal regulations and use of best management practices serve to mitigate any potential impacts to ecological resources in Burke, Jefferson, Warren, and McDuffie Counties. The Savannah River is an effective barrier for migration of terrestrial animals avoiding operations activities and there is adequate undeveloped land in the immediate vicinity of VEGP to support any misplaced animals.

4. Socioeconomics

   a. Physical Impacts – Most operations-related physical impacts would be experienced within the borders of Burke County, the majority of which will occur on the VEGP site, which is surrounded by forests. The only visual intrusions that would be seen offsite

would be the cooling towers and their plumes. The longest cooling tower plume is likely to extend to a distance of 5 to 6 miles from the site and would occur no more than 4 percent of the time.

Offsite, the use of local public roadways will be necessary to move the operations workforce to and from the site. The roads with the greatest concentration of VEGP-related operations traffic would be in Burke County.

b. Social and Economic -- After reviewing the residential distribution of the current VEGP operations workforce, SNC determined that the majority (79%) of the employees live in Burke, Richmond, and Columbia Counties. The operations workforce for Units 3 and 4 are expected to settle in the same distribution. Social and economic impacts would be felt in those counties.

The county with the next highest percentage of current operations workforce (beyond the three mentioned above) is Screven County, with 6.7 percent. All other counties are home to less than 6.7 percent of the current operations workforce. Because 6.7 percent (and less) of the incoming operations workforce would be a relatively small number of people, there would be little or no impact on those counties. Few VEGP employees live in South Carolina, perhaps because there is no convenient access to VEGP or Burke County from South Carolina.

5. Radiation Exposure and Non-radiological Health

Radiation exposure during operations can be caused by operation of the nuclear units, on-site storage of waste and fuel, transportation of waste and fuel, and ultimate disposal of waste. Radiation impacts are assessed for a 50-mile radius from the site. Therefore, all counties within the 50-mile radius have to potential to be impacted. However, SNC's strict adherence to federal laws and regulations prevents radioactive releases from reaching levels that would be harmful to humans and/or the environment.

Non-radiological health impacts would be restricted to Burke County and along the transmission corridors in Jefferson, Warren, and McDuffie Counties. SNC's strict adherence to local, state, and federal laws and regulations prevents non-radiological health impacts from reaching levels that would cause harm to humans or the environment.

6. Waste Impacts

Operations waste categories include radioactive, non-radioactive, and mixed. Waste impacts can be caused by the creation, storage, transportation, and ultimate disposal of waste. Therefore, the counties with the greatest potential to be impacted would be Burke County, the counties through which the waste would be transported (currently

unknown), and the counties hosting the ultimate disposal sites (currently unknown). However, SNC's strict adherence to local, state, and federal laws and regulations prevents waste impacts from reaching levels that would cause harm to humans or the environment.

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Attachment A-6 #42

42	Expand the analysis on page 10.1.2 which discusses the unavoidable and adverse impacts of operation (currently in eleven lines). Include a discussion of each impact, mitigation strategies to reduce their impact, and cost estimates for before- and after-mitigation levels for each impact.

10.1.2 Unavoidable Adverse Environmental Impacts of Operations

Operational impacts of new units at the VEGP site are discussed in detail in Chapter 5 of the ESP Environmental Report (ER).

Table 5.10-1 briefly describes those impacts and identifies measures and controls that will be implemented to reduce or eliminate adverse impacts. The expected impacts and the mitigation measures that are available to reduce these impacts are summarized in Table 10.1-2 (attached). Unavoidable adverse impacts from construction of two new units at the VEGP site include evaporative water loss from the Savannah River, additional groundwater withdrawal, air emissions, radioactive and non-radioactive waste to be treated and disposed of, radioactive emissions into the Savannah River and the air, increases in local traffic, and the addition of two natural draft cooling towers to the landscape.

The level of unavoidable adverse impacts from operation of the new units will be small when applicable mitigation measures are considered.

Response:

The following sections discuss mitigation measures that could be implemented to reduce unavoidable adverse impacts.

Land Use

Operating the new units will produce radioactive and non-radioactive wastes that are required to be disposed in permitted disposal facilities or permitted landfills. No landfills or radioactive waste disposal facilities will be constructed solely for the use of the new units or SNC activities. SNC currently practices recycling and waste minimization to reduce the volume of materials that must be disposed. SNC will continue good waste management practices and thus mitigate potential impacts. SNC pays fees to the operators of the disposal facilities and landfills so no costs related to the waste disposal will be incurred by taxpayers. SNC estimates that approximately 2000 ft^3 of radioactive wastes will be disposed of annually for 40 years, for a total volume of 80,000 ft^3. Additional disposal space will be required for decommissioning. This will be a long term