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<<TtNus responses to Questions for NRC Audit (2) current rev (2)TCM.doc>>
Here goes guys. I feel like I have birthed a baby. This is the matrix only; and officially it is still a draft. The attachments will be PDFs and will follow tomorrow. Thanks for all the hard work put in by your team to get to this point. I hope this satisfies your needs. Mark, by my calculation, there are now approximately 23 unanswered or delayed answer questions that I believe can be molded into four or five RAIs. I recommend one on Socioeconomics; one on Wetlands; one on Groundwater; one on Terrestrial Ecology; and one on Construction Impacts (this one could be included in Wetland RAI.) As we discussed today, the transmission line issue is an ongoing item. You will have to decide if an RAI is warranted.

Enjoy. The official version will go out tomorrow and I plan to send by FEDEX unless directed otherwise.

TCM

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Information Needs for the Vogtle Early Site Permit Environmental Review

#	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
B	<i>Response: No further action needed.</i>		
2	Complete bibliographic information should be included in the reference lists for NRC documents referenced in the text. (Through out ER)	Accidents	Van Ramsdell
SNC	<i>Response: No further action needed.</i>		
	Why does the ER reference more than one version of the AP1000 Design		

#	Information Need	Discipline Name	Reviewer Name
3	Control Document? (e.g. Section 2.7 references Revision 14; Section 3.0 references Revision 15)	Accidents	Van Ramsdell
	<i>Response: No further action needed.</i>		
4	Please provide input to and output from the PAVAN code.	Accidents	Van Ramsdell
	<i>Response: Input files and Executive Summary of methodology provided at audit. Copies for docket provided under separate letter.</i>		
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
	<p>Response: Noise levels were estimated by Georgia Power Company for seven locations along the property line during full plant operating conditions. Predictions were made using Edison Electric Institute's Electric Power Plant Environmental Noise Guide and reported in the Operating License Stage Environmental Report.</p> <p>References:</p> <p>Georgia Power Company, 1985, Applicants Operating License Stage Environmental Report, Vogtle Electric Generating Plant Unit 1 and Unit 2, March, 29</p> <p>Edison Electric Institute, Electric Power Plant Environmental Noise Guide</p>		
6	<p>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.</p>	Accidents	Van Ramsdell
	<p>Response: A complete data set is an important discriminator when selecting meteorological data. SNC provided 5 years of met data. Of those five, two data sets were considered complete – 1998 and 1999. The year 1999 was the most conservative of the two years, and was selected for the severe accident analysis based on this conservatism among the two years with the most complete data. There is generally not great variation from year to year. That is not to say that 1999 would be more conservative for SACTI, but the data sets were consistent for the two analyses. There was no sensitivity study on year of met data for the SACTI runs.</p>		
7	<p>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.</p>	Accidents	Van Ramsdell

#	Information Need	Discipline Name	Reviewer Name
	<i>Response: No further action needed.</i>		
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
	<i>Response: No further action needed.</i>		
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
	<i>Response: No further action needed.</i>		
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	Accidents	Van Ramsdell

#	Information Need	Discipline Name	Reviewer Name
	Section 2.7.7.		
	<p>Response: <i>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.</i></p> <p>Reference:</p> <p><i>Georgia Power Company, 1985, Applicants Operating License Stage Environmental Report, Vogtle Electric Generating Plant Unit 1 and Unit 2, March, 29</i></p>		
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
	<p>Response: <i>No further action needed.</i></p>		
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
	<p>Response: <i>The current Vogtle Unit 1 and 2 site is subject t 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.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
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: 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 page 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. SNC fully expects that Burke County and the Georgia Highway Department will 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

#	Information Need	Discipline Name	Reviewer Name
	Response: Correct wording should be that “mitigation beyond that discussed above will not be warranted.”		
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
	No further action needed.		
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
	<p>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 suggested 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:</p> <ul style="list-style-type: none"> 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 		

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	<p align="center"><i>percent of the total number of children</i></p> <p><i>Therefore, applying the same methodology to the VEGP construction project, SNC estimates the following:</i></p> <ul style="list-style-type: none"> <i>a) 2,700 construction workers would relocate to the area</i> <i>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)</i> <i>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)</i> <i>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</i> <p><i>The original analysis estimated that 1,900 school-aged children would accompany the construction workforce.</i></p> <p>Reference</p> <p><i>Tennessee Valley Authority (TVA). 2003 Applicant's Environmental Report. Operating License Renewal Stage. Browns Ferry Nuclear Plant, Units 1, 2, and 3. December.</i></p>		
18	Provide a complete listing of the county-by-county residence for Vogtle employees.	Socioeconomics and Environmental Justice	Katie Cort
	Response: No further action needed.		
19	Population data in different parts of the analysis come from different sources (SECPOP, US Census, State of Georgia). Provide a short	Socioeconomics and Environmental	Katie Cort

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	discussion of the different data sources and explain how the use of multiple sources does not compromise the conclusions you derive from them.	Justice	
	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
	<p>Response: NUREG-1555 directs the analyst to include a table with population data and projections by sector only, 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, they 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.</p> <p>There is a difference in methodologies used for the projections in the two tables in Section 2.5. In the sector population table, the analyst calculated the (20-year) annualized growth rate from 1980 to 2000 for each sector and used the growth rate 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</p>		

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	<p><i>differences will offset one another to a degree. Additionally, the accident analysts performed a sensitivity analysis 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.</i></p> <p><i>With respect to projections to 2090, it is not likely that any projection method could accurately present a reality so far into the future. Most demographers and economists agree that, beyond 20 years, the uncertainty (or degree of error) 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 very 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 were selected.</i></p>		
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
	<i>Response: No further action necessary.</i>		
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
	<i>Response: The location and distribution of South Carolina Native American populations are provided in Attachment A-1.</i>		
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	Socioeconomics and Environmental Justice	Katie Cort

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	construction or operations-related vehicles.		
	Response: Based on 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, but also since they are recreational, will start later in the day than commuter traffic. Both will use the roads more on weekends than weekdays. Also additional roads to YMA 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: 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
	<p>Response: See analysis below. 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 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.</p> <p>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.</p>		

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	<p>Reference</p> <p><i>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.</i></p>		
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 <i>fairly large</i> 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-2		
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
	Response: 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

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	<p><i>The following simplifying assumptions were used to generate the tax revenue analysis:</i></p> <ul style="list-style-type: none"> • <i>Cost range [for a single unit] was based on GPC analyses-generated estimates and generic estimates in MIT 2003</i> • <i>Joint ownership was disregarded</i> • <i>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.</i> • <i>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</i> • <i>Millage rate was held constant for the approximate 40-year analysis period at the current rate</i> • <i>40 years of operation for each unit was assumed to estimate depreciation and rate base returns</i> • <i>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.</i> • <i>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.</i> • <i>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. Portion of nuclear units not subject to the ad valorem tax is not known.</i> • <i>Tax payments to Alabama were calculated as a ratio of payments to Georgia and were not based on the Alabama tax structure.</i> <p><i>Supporting information is provided in Attachment A-3</i></p>		
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	Socioeconomics and Environmental Justice	Katie Cort

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	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.		
	<i>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 and the contract negotiations are in progress. 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 all 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.</i>		
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
	<i>Response: There are currently two units located at the Vogtle site and 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 will also 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 safe to say that outages will be carefully planned years in advance to optimize the impact on Southern company system reliability.</i>		

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	<p><i>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. This answer is very general in nature. SNC can provide a very detailed response if desired.</i></p>		
31	<p>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.</p>	Socioeconomics and Environmental Justice	Katie Cort
	<p><i>Response: Information in Table 4.4.2-1 was provided by Bechtel and based on similar sized projects (on which Bechtel worked) and knowledge of the local skilled craft labor force. Tetra Tech NUS, Inc. prepared a Request for Information (RFI), RFI #AR-01-ADR-29, and submitted it to SNC. SNC forwarded the RFI to Bechtel which provided the following.</i></p> <p><i>1) a manpower curve and project schedule for a two-unit (1500 MW each unit) project.</i></p>		

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	<p>2) a derivation of the number of local skilled craft labor force (1,000) based on the following:</p> <ul style="list-style-type: none"> 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. The assumption that field non-manual workers would come from outside of the area <p>3) Bechtel also stated 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 believes 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 at VEGP live in one of the three counties of interest (Burke, Richmond, and Columbia).</p>		
32	<p>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.</p>	Socioeconomics and Environmental Justice	Katie Cort
<p>Response: No further action needed.</p>			
33	<p>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.</p>	Socioeconomics and Environmental Justice	Katie Cort
<p>Response: See attachment A-4</p>			

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34	<p>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.</p>	Socioeconomics and Environmental Justice	Katie Cort
<i>Response: No further action needed.</i>			
35	<p>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:</p> <ol style="list-style-type: none"> 1. Is it appropriate for this multiplier to be applied directly to the labor component of the economy? 2. 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. 3. When construction is complete, the area will experience a loss of about 2,300 jobs (based on the maximum 	Socioeconomics and Environmental Justice	Katie Cort

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	<p>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?</p> <p>4. 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?</p>		
<i>Response: No further action needed.</i>			
36	<p>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.</p>	Socioeconomics and Environmental Justice	Katie Cort
<i>Response: no further action needed.</i>			
37	<p>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.</p>	Socioeconomics and Environmental Justice	Katie Cort
<i>Response: This information was provided during the site audit. No further action needed.</i>			

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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
<i>Response: No further action needed.</i>			
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
<i>Response: SNC is not clear on what is being requested in this question and does not understand the applicability of quantifying health effects when no health effect has been identified. Attempts to gain clarification have not been successful. SNC respectfully requests that NRC clarify the needs in an RAI or withdraw the question.</i>			
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	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name
	estimates of the before- and after-mitigation levels for all social problems that require mitigation.		
	<p>Response: SNC understanding of NEPA case law is that mitigation does not have to be performed by the agency/entity (in this case the applicant) causing the impact. In fact, NEPA doesn't require mitigation to be implemented, only identified.</p> <p>While the conservative analysis assumes that the entire construction workforce will arrive en masse, in actuality, the workforce will ramp up over several years. The counties' responses to gradual increases in population are the same regardless of the reason for the increase. Additional taxes fund necessary infrastructure, education. For this reason SNC does not believe that additional mitigation beyond that of increased tax revenues is warranted.</p> <p>As part of the planning process, SNC and GPC will keep local officials apprised of their plans, so the influx of workers will be anticipated long before it happens.</p>		
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 again is unsure of exactly what is requested here. Please include in RAI on socioeconomics.		
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-5.		

#	Information Need	Discipline Name	Reviewer Name
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
<p>Response: Groundwater</p> <p><i>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.</i></p> <p>Surface Water</p> <p><i>SNC will use surface water drawn from the Savannah River to cool the reactors. 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.</i></p> <p><i>A small thermal plume will be discharged into the river just downstream of the existing plume. The new plume will affect less than 800 ft³ 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.</i></p>			

#	Information Need	Discipline Name	Reviewer Name
	<p><i>The intake canal/ intake structure will be designed to Best Available Technology and recessed from the river flow which will reduce the flow velocity significantly from the river flow. This will minimize impingement and entrainment losses of aquatic organisms.</i></p> <p><i>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.</i></p> <p>Land Use</p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>In addition, SNC has corporate practices in place to further minimize solid waste generation. TBD discussion of waste minimization.</i></p> <p>Radiation Releases to Air and Surface Water</p> <p><i>Nuclear plants are designed to ensure very low 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</i></p>		

#	Information Need	Discipline Name	Reviewer Name
	<p><i>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 unfiltered 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.</i></p> <p><i>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.</i></p> <p><i>Construction Material</i></p> <p><i>The AP1000 utilizes building configurations and structural designs that minimize building volumes and quantities of materials such as concrete, wiring, steel, etc.</i></p>		
44	Establish a \$2005 US standard for all dollar values in the report.	Socioeconomics and Environmental Justice	Katie Cort
	<p><i>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 nature of this data does not require this level of precision and respectfully requests that NRC withdraw this request or consider a more workable approach.</i></p>		
45	The section on unavoidable adverse environmental impacts discusses	Socioeconomics	Katie Cort

#	Information Need	Discipline Name	Reviewer Name
	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.	and Environmental Justice	
Response: Please See Attachment A-6.			
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 response, but it will not be available by December 7, 2006. Please include in RAI on socioeconomics.			
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	Socioeconomics and Environmental Justice	Katie Cort

#	Information Need	Discipline Name	Reviewer Name
	housing market . . ." What is the correlation between wages and home value (corrected for boom economy immigration) in the Savannah River basin?		
	<p><i>Response: The 2000 real estate inventory, by price, in Burke, Richmond, and Columbia Counties is attached (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.</i></p> <p><i>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 \$95,500 (Woodruff and Pittman 2005).</i></p> <p><i>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.</i></p> <p><i>References:</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>Woodruff, J. and Pittman, J. 2005. "Staffing and Cost Study for a New Unit at Plant Vogtle." August 12.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
	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, but it will not be available by December 7, 2006. Please include in RAI on Socioeconomics		
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: This appears to be a statement rather than a questions and SNC concurs that wetland impacts should be quantified as part of the NEPA review process. 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 is now available. SNC will conduct wetlands delineation in early December 2006 and will use the information to evaluate the impacts of construction on wetlands. It is recommended that all questions pertaining to wetlands be summarized in a Wetland RAI for transmittal to SNC.		
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. This information will be provided in		

#	Information Need	Discipline Name	Reviewer Name
	<i>response to the Wetlands RAI.</i>		
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
	<i>Response: A survey of wetland areas on the Vogtle site was conducted in support of the original Unit 1 and 2 Licensing. This work was also used in the Wildlife Habitat Council program development. It consists primarily of maps developed for topos, aerial photos, and site walkdowns of wetland areas. The wetlands were mapped and the areal 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. The results will be documented in response to a Wetlands RAI.</i>		
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
	<i>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. This information will be provided in response to the Wetlands RAI.</i>		
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

#	Information Need	Discipline Name	Reviewer Name
	<p>Response: SNC is working with Georgia Power 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.</p>		
54	<p>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?</p>	Terrestrial Ecology	Amanda Stegen
	<p>Response: Not yet. 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 determining the environmental impact of construction activities on wetlands. This information will be included in the response to the Wetland RAI.</p>		
55	<p>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.</p>	Terrestrial Ecology	Amanda Stegen
	<p>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 issued 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</p>		

#	Information Need	Discipline Name	Reviewer Name
	<p><i>applications is under development. Applications for the four permits discussed above will be submitted as follows:</i></p> <p><i>Intake Structure Section 10 and Section 404 permit</i> <i>Fall 2007</i> <i>Discharge Structure Section 10 and Section 404 permit</i> <i>Fall 2007</i> <i>Barge Slip Section 10 and Section 404 permit</i> <i>Fall 2007</i> <i>NPDES Stormwater permit for construction activities</i> <i>Summer 2007*</i> <i>*Dependent on schedule of pre-construction activities and outcome of LWA rulemaking</i></p> <p><i>SNC has already had discussions with the relevant agency personnel about these permits and will continue dialogue as additional schedule information becomes available.</i></p>		
56	Provide acreage associated with the man-made ponds.	Terrestrial Ecology	Amanda Stegen
	<i>Response: No further action needed.</i>		

#	Information Need	Discipline Name	Reviewer Name
57	What species are associated with Debris Basins 1 and 2 and associated wetland areas?	Terrestrial Ecology	Amanda Stegen
	Response: No further action needed.		
58	What species are associated with the large basin between Debris Basin 1 and 2?	Terrestrial Ecology	Amanda Stegen
	Response: No further action needed.		
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. This evaluation will be included in the response to the Wetland RAI.		
60	pg 2.4-4, 4 th 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: The referenced statement is correct. There are no streams or wetland areas in the powerblock footprint. The powerblock, cooling towers, and switchyard are located in upland areas and construction in these		

#	Information Need	Discipline Name	Reviewer Name
	<i>areas will not impact wetlands. SNC will begin wetland delineation in early December 2006 and the subsequent report will clearly define and delineate wetland areas and SNC will utilize that information to determine wetland impacts.</i>		
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 (eg., did trained biologists conduct the surveys, number of people on each survey, type of survey?).	Terrestrial Ecology	Amanda Stegen
	<i>Response: No further action needed.</i>		
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
	<i>SNC is developing this information in December 2006, but it will not be available by December 7, 2006. Please include in RAI.</i>		
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
	<i>SNC is developing this information in December 2006, but it will not be available by December 7, 2006. Please include in RAI.</i>		
64	If areas that will be impacted were not surveyed, please provide justification for not completing any surveys/monitoring.	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
	<i>Response: No further action needed.</i>		
65	Are there historical records of “important” species using the site? If so, when and where?	Terrestrial Ecology	Amanda Stegen
	<i>Response: There are no historical records of “important species” utilizing the Vogtle site. No further action required.</i>		
66	Provide information on any historic programs that documented wildlife onsite or in the transmission line corridors.	Terrestrial Ecology	Amanda Stegen
	<i>Response: No further action needed.</i>		
67	pg 5.6-1, 4 th 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
	<i>Response: PNNL/NRC met with GPC; no further action needed.</i>		

#	Information Need	Discipline Name	Reviewer Name
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
<i>Response: No further action needed.</i>			
69	pg 2.4-4, 2 nd 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
<i>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 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</i>			

#	Information Need	Discipline Name	Reviewer Name
	<p><i>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 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 wetland delineation work.</i></p>		
70	<p>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.</p>	Terrestrial Ecology	Amanda Stegen
	<p><i>Response: This information is being developed in December 2006, but it will not be available by December 7, 2006. Please include in an RAI.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
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
<i>Response: This information is being developed in December 2006, but will not be available by December 7, 2006. Please include in an RAI.</i>			
72	Page 2.4.-4 mentions the “bottomland hardwoods” near the new intake structure. Please describe these hardwoods including acreage.	Terrestrial Ecology	Amanda Stegen
<i>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.</i>			
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

#	Information Need	Discipline Name	Reviewer Name
	<i>Response: No further action needed.</i>		
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
	<i>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 (attached), 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. No further action needed.</i>		
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
	<i>Response: No further action needed.</i>		
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

#	Information Need	Discipline Name	Reviewer Name
	<p>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 (provided). 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. No further action needed.</p>		
77	Are the dominant species present native or non-native?	Terrestrial Ecology	Amanda Stegen
	<p>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.</p>		
78	Are there any issues concerning invasive plant species?	Terrestrial Ecology	Amanda Stegen
	<p>Response: No. No invasive species have been noted in the terrestrial or aquatic environments at Vogtle.</p>		
79	Are there any species present that serve as biological indicators?	Terrestrial Ecology	Amanda Stegen
	<p>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.</p>		
80	<p>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?</p>	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
	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 Bechtel Figure 3.1-3. In addition, SNC is conducting additional onsite work in December 2006 to map the habitat types and presence of species onsite.		
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. This information will be available in January 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

#	Information Need	Discipline Name	Reviewer Name
	<i>Response: No upgrades are anticipated.</i>		
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
	<i>Response: No further action needed. See 3.9-1 and 4.1-1.</i>		
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

#	Information Need	Discipline Name	Reviewer Name
	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: No further action needed.		
88	Provide the transmission line maintenance procedures.	Terrestrial Ecology	Amanda Stegen
	Response: GPC transmission siting procedures were provided at Site Audit. No further action needed.		

#	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
	<i>Response: Provided initially at Site Audit in draft form. Final copy provided later after further GPC review. No further action needed.</i>		
90	Provide the GPC Avian Protection Plan.	Terrestrial Ecology	Amanda Stegen
	<i>Response: provided at Site Audit. No further action needed.</i>		

#	Information Need	Discipline Name	Reviewer Name
91	Provide the VEGP Environmental Protection Plan.	Terrestrial Ecology	Amanda Stegen
	Response: 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: Contained in Avian Protection Plan (No further action needed.)		
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

#	Information Need	Discipline Name	Reviewer Name
	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".		
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 impact of construction. Expect results in early January 2007. In addition, wetland delineation will be conducted in early December 2006. Please include in wetland RAI, as appropriate.		
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: No further action needed.		
96	pg 2.4-4, 5 th 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: No further action needed.		

#	Information Need	Discipline Name	Reviewer Name
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
<p>Response: No further action needed. 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”. Certainly 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.</p>			
98	pg 4.3-2, 3 rd 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
<p>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.</p>			
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	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
	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.		
<p><i>Response: No further action required. 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 cause of mortality. The towers are surrounded by a wide expanse of open, gravel-covered area in which carcasses are relatively easily seen.</i></p>			
100	Chapter 10 10.1 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
<p><i>Response: SNC will conduct wetland delineation in early December 2006. Please include in Wetland RAI.</i></p>			
101	Provide information on the cumulative impacts on terrestrial resources.	Terrestrial Ecology	Amanda Stegen
<p><i>Response: No further action needed since 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.</i></p>			

#	Information Need	Discipline Name	Reviewer Name
102	pg 6.0-1, Chapter 6, Environmental Measurements and Monitoring Programs Provide a figure showing the monitoring locations.	Terrestrial Ecology	Amanda Stegen
	<i>Response: No further action needed.</i>		
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
	<i>Response: No further action needed.</i>		
104	pg 4.3-2, 4 th para NUREG-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	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
	historical data or collect new data for wildlife at the site?		
	<i>Response: No further action needed.</i>		
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
	<i>Response: This information was provided at Site Audit. No further action needed.</i>		
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
	<i>Response: 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.</i>		

#	Information Need	Discipline Name	Reviewer Name
107	<p>Determinations of Eligibility. In order for NRC to move forward with its determination of impact, SNOG 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 SNOG 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.</p>	Cultural and Historical Resources	Darby Stapp
<p><i>Response: SNC has received response from SHPO and copy was provided at Site Audit. No further action needed.</i></p>			
108	<p>Determination of Adverse Effect. SNOG needs to seek concurrence from SHPO on SNOG'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.</p>	Cultural and Historical Resources	Darby Stapp
<p><i>Response: SNC has received letter from SHPO. Copy of letter provided at Site Audit.</i></p>			
109	<p>In order for NRC to make its level of impact determination, several things need to be clarified:</p> <ul style="list-style-type: none"> 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 SNOG does not believe it will. b. We understand that no shovel testing was conducted on the river terrace 	Cultural and Historical Resources	Darby Stapp

#	Information Need	Discipline Name	Reviewer Name
	<p>where the water intake structure will be located. Please explain why no testing was done and why SNOG does not believe that there is any potential for archaeological sites in this area.</p> <p>c. Please explain any protective/mitigation measures that will be put in place during construction and operation.</p> <p>d. Please provide copies of the procedures that will be in place relative to cultural and historic resource protection.</p>		
	<p><i>Response: SNC has developed response to SHPO letter indicating agreement with conditions requested by SHPO. Copy will be provided to NRC. 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 be provided to the NRC for docket.</i></p>		
110	Please provide the revised New South report.	Cultural and Historical Resources	Darby Stapp
	<p><i>Response: Report is complete. SNC will provide by letter for the docket.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
111	Please provide any responses from the SHPO office, tribes, or interested parties.	Cultural and Historical Resources	Darby Stapp
	<i>Response: Letter from SHPO was provided at Site Audit.</i>		
112	Section 2.3 Water Provide maximum, average maximum, average, average-minimum, and minimum monthly temperature of the Savannah River.	Hydrology	Chris Cook
	<i>Response: No further information needed. See SSAR 2.4.7.</i>		

#	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
	<i>Response: SNC will conduct wetland delineation in early December 2006. Please include in Wetland RAI.</i>		
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
	<i>Response: This information is provided in Attachment B-1.</i>		

#	Information Need	Discipline Name	Reviewer Name
115	Provide any water velocity data collected near the location of the proposed intake and outfall structures.	Hydrology	Chris Cook
<p>Response: <i>No further action needed. See SSAR 2.4.11. Water velocity data have 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.</i></p> <p>Note: <i>The SRP for ER 2.3.1 does show this requirement for fresh water streams. Bathymetric surveys were conducted at these locations. These data could be used to estimate the longitudinal velocity distributions at these locations for a given river stage.</i></p>			
116	Provide the stage-discharge rating curves for the Savannah River gauges nearest the site.	Hydrology	Chris Cook
<p>Response: <i>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.</i></p>			

#	Information Need	Discipline Name	Reviewer Name
117	<p>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, streamflow, 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.</p>	Hydrology	Chris Cook
	<p><i>Response: This question along with questions 122, 130, 144, 149, and 160 will be addressed comprehensively in a single response being prepared by Bechtel. This response will require more time to complete and should be included as a RAI.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
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
	<p><i>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 in response to the groundwater RAI associated with Question 117.</i></p>		
119	<p>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.</p>	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
	<p><i>Response: Please see Appendix 2.4-A of the SSAR. This reference provides all needed information. No further action needed. Although these data are not available in a single table, they are 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.</i></p>		
120	<p>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.</p>	Hydrology	Chris Cook
	<p><i>Response: This response is provided as Attachment B-2.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
121	<p>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.</p>	Hydrology	Chris Cook
	<p><i>Response: The data used to obtain the hydraulic conductivity values summarized in ER Table 2.3.1-20 are 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.</i></p> <p><i>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. These data suggest 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.</i></p> <p><u>References</u> None.</p> <p><u>Action</u></p>		

#	Information Need	Discipline Name	Reviewer Name
	<p><i>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.</i></p>		
122	<p>This section describes the basis for a groundwater travel time of 400 years from the center of the Powerblock 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 Powerblock 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 Powerblock 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</p>	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
	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).		
	<p><i>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.</i></p>		
123	<p>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</p>	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
	suggests a total porosity of ~0.44 which corresponds to an effective porosity of ~0.13. These values will impact time of travel calculations.		
	<p><i>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 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).</i></p> <p><i>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.</i></p> <p><i>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).</i></p> <p><u>References</u></p> <p><i>Carsel, R. F., and R. S. Parrish, Developing Joint Probability Distributions of Soil Water Retention Characteristics, Water Resources Research, 24:755-769, 1988.</i></p> <p><i>de Marsily, G., Quantitative Hydrogeology, Groundwater Hydrology for Engineers, Academic Press Inc.; London, p. 36, 1986.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
	<p><i>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.</i></p> <p><u>Action</u></p> <p><i>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.</i></p>		
124	<p>Section 2.3.2.1.1 Local and Onsite Water Use and Section 5.2.4 Future Water Use</p> <p>Provide current and projected water use at the SRS site. SRS is a major water consumer within 6 miles of the site.</p>	Hydrology	Chris Cook
	<p><i>Response: This information is included in a reference provided at the site audit. A copy of the Savannah River Site Annual environmental Operating Report. Current water use information is provided in the report. SNC has no way to determine what the projected water use at the savannah river site will be. As a federal agency, NRC may be able to obtain projects from DOE.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
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
	<i>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 5 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 in to the next update cycle (2010). Based on discussions with Georgia EPD, SNC does not believe that this county planning process would 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.</i>		

#	Information Need	Discipline Name	Reviewer Name
126	<p>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?</p>	Hydrology	Chris Cook
	<p><i>Response: The Probable Mean Flood (PMF) is included in the ER for reference purposes only and has no significance from an environmental perspective. No additional action needed.</i></p>		
127	<p>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).</p>	Hydrology	Chris Cook
	<p><i>Response: No further action needed.</i></p>		

#	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
	<i>Response: No further action needed.</i>		
129	Provide quantitative and qualitative descriptions of navigational, recreational, instream and other nonconsumptive 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
	<i>Response: Included in response to Question 124. No further action needed.</i>		

#	Information Need	Discipline Name	Reviewer Name
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
	<i>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). A detailed discussion will be included in the RAI response associated with Question 117. The studies generally conclude that the tritium does not produce significant environmental concern downstream.</i>		
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

#	Information Need	Discipline Name	Reviewer Name
	<i>Response: No further action needed.</i>		
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
	<i>Response: No further action needed.</i>		
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
	<i>Response: No further action needed.</i>		

#	Information Need	Discipline Name	Reviewer Name
134	<p>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.</p>	Hydrology	Chris Cook
	<p><i>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 has been 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.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
135	Section 3.3 Plant Water Use Provide average plant water use by month.	Hydrology	Chris Cook
	<p><i>Response: SNC will provide Bi-annual Reports for Groundwater Use for the most recent one-year period. Please see Attachment C-1.</i></p>		
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
	<p><i>Response: Please see response to Question 142. No further action needed.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
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
	<p><i>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 extreme operating condition 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.</i></p>		
138	<p>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).</p>	Hydrology	Chris Cook
	<p><i>Response: No further action needed.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
139	Provide a tabulation of chemicals to be added by quantity and frequency of addition.	Hydrology	Chris Cook
	<i>Response: No further action needed.</i>		
140	Provide a list of all chemicals (identification and quantities) to be used or considered.	Hydrology	Chris Cook
	<i>Response: No further action needed.</i>		

#	Information Need	Discipline Name	Reviewer Name
141	<p>Section 3.4.1.3.2 Water Treatment What is the environmental concern associated with the icing discussion in this section?</p>	Hydrology	Chris Cook
<p><i>Response: There is no environmental concern with icing at Vogtle since icing will not occur. Icing was included for completeness only. No further action needed.</i></p>			
142	<p>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?</p>	Hydrology	Chris Cook
<p><i>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.</i></p>			

#	Information Need	Discipline Name	Reviewer Name
143	<p>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.</p>	Hydrology	Chris Cook
	<p><i>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 EPS 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</i></p>		

#	Information Need	Discipline Name	Reviewer Name
	<i>operation.</i>		
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
	<i>Response: Will be included in response to Groundwater RAI.</i>		
145	Section 5.2.2 Hydrologic Alterations and Plant Water Supply Provide the calculation package for the drawdown model.	Hydrology	Chris Cook
	<i>Response: Will be included in response to Groundwater RAI.</i>		

#	Information Need	Discipline Name	Reviewer Name
146	Provide any impacts of drawdown to Mathes Pond.	Hydrology	Chris Cook
<i>Response: Will be included in response to Groundwater RAI.</i>			
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
<i>Response: Will be included in response to Groundwater RAI.</i>			
148	Provide information on potential impacts resulting from site excavation to Mallard Pond.	Hydrology	Chris Cook
<i>Response: Will be included in response to Groundwater RAI.</i>			

#	Information Need	Discipline Name	Reviewer Name
149	<p>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.</p>	Hydrology	Chris Cook
	<p><i>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 questions with the Groundwater division personnel. They 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 need.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
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
<p>Response: Response: Cretaceous aquifer information and rationale for use <i>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.</i></p> <p><i>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 USAR 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.</i></p> <p><i>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</i></p>			

#	Information Need	Discipline Name	Reviewer Name
	<p><i>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).</i></p> <p><i>A nonleaky 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 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.</i></p> <p><i>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.</i></p> <p><i>Response: Footnote 1 on Table 6.3-2; “MU-2A has proved difficult to monitor.”</i></p> <p><i>During the NRC site audit, the question of the footnote was asked and referred to Mr. Tom Moorer (SNC). Mr. Moorer stated that Well MU-2A was 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 considered good data; it is the obtaining that is difficult.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
151	<p>The transmissivity value of 158,000 gpd/ft and the storativity value of 3.1×10^{-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 1.07×10^{-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 3.3×10^{-4} to 2.1×10^{-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.</p>	Hydrology	Chris Cook
<p><i>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. No further action needed.</i></p>			
152	<p>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.</p>	Hydrology	Chris Cook
<p><i>Response: This information is contained in the Bi-Annual Groundwater Use Report provided in response to Question 135. No further action needed.</i></p>			
153	<p>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</p>	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
	sections of the Savannah River near the site are on the South Carolina and Georgia State 303(d) Lists.		
	<p><i>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 must 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.</i></p>		

#	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
	<i>Response: A copy of the USGS Quadrangle Map containing Shell Bluff is provided as Attachment C-3.</i>		
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
	<i>Response: No further action needed.</i>		
156	Section 5.3.2 Discharge Systems Expand on the statement “During infrequent periods...more scouring could be expected.”	Hydrology	Chris Cook
	<i>Response: No further action needed. An expanded discussion of this statement is contained in the <u>Bottom Scour</u> 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</i>		

#	Information Need	Discipline Name	Reviewer Name
	<i>exceed those of the normal 4-cycle operation.</i>		
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 <u>Bathymetry</u> 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-4		
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
	Response: <i>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 all who participate. Since the study only began this summer, no useable data has been generated yet. However, the data will be tracked during the ESP period and provided for review if significant.</i>		

#	Information Need	Discipline Name	Reviewer Name
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 postoperational monitoring activities (as specified in the ESRP) are not discussed.	Hydrology	Chris Cook
<i>Response: No further action needed.</i>			
160	<p>Section 6.2.2 Existing Radiological Environmental Monitoring Program Contents</p> <p>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?</p>	Hydrology	Chris Cook
<i>Response: SNC recently committed to a tritium monitoring program as part of an NEI negotiated agreement with</i>			

#	Information Need	Discipline Name	Reviewer Name
	<p><i>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 response to the groundwater RAI. There are no agreements in place with Savannah River Site regarding tritium. Vogtle would not rely on Savannah River Site data alone to make decisions. 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 and SNC would not support this approach.</i></p>		
161	<p>Section 6.3 Hydrological Monitoring Provide the datasets that support this section.</p>	Hydrology	Chris Cook
	<p><i>Response: No further action needed.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
162	<p>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?</p>	Hydrology	Chris Cook
	<p><i>Response: No further action needed.</i></p>		
163	<p>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</p>	Hydrology	Chris Cook

#	Information Need	Discipline Name	Reviewer Name
	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?		
	<i>Response: Information for this question will be provided in the response to the RAI on Question 117.</i>		
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
	<i>Response: No further action needed.</i>		

#	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
	<p>Response: Conference call held November 29, 2006 with Phillip Daling (PNNL). Lisa Matis (Tetra-Tech, and Tom Moorer (SNC). SNC 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 these wastes would undergo dewatering, concentration, or solidification using mobile processing systems to obtain a solid waste form suitable for disposal.</p> <p>A small volume of liquid mixed waste (estimated at less than three 55-gal drums or approx. 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.</p> <p>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).</p>		
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
	<p>Response: Conference call held November 29, 2006 with Phillip Daling (PNNL). Lisa Matis (Tetra-Tech, and Tom Moorer (SNC). SNC did not estimate the heat load in a spent fuel shipping cask. The analysis assumes one shipping cask per legal-weight truck, carrying the equivalent of 0.5 MTU of spent fuel. These assumptions are consistent with the analysis of the reference reactor in WASH-1238. The WASH-1238 analysis assumed 150 days of decay time prior to shipment. The AP1000 spent fuel will have cooled for a minimum of 5 years, and would likely be stored for longer periods, prior to shipment to a repository for disposal. Consequently, the heat load associated with the spent fuel is expected to be less than the Table S-4 condition derived for a 150-day cooling</p>		

#	Information Need	Discipline Name	Reviewer Name
	<p><i>period.</i></p> <p><i>The AP1000 Siting Guide (APP-0000-X1-001.R3.doc) estimates the decay heat at 5 years to be 1.127×10^{-4} watts per watt. For a core power of 3400 MW and core loading of 84.5 MTU, this equates to 4,530 watts/MTU. Assuming 0.5 MTU per shipping cask, the heat load in a shipping cask would be 2,265 watts or 2.3 kW. This is well below the Table S-4 condition. [Note: The decay heat estimate for the AP1000 fuel is also provided in INEEL 2003 (ESP ER Sections and Supporting Documentation).]</i></p>		
167	<p>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)?</p>	Transportation	Phil Daling
	<p><i>Response: Conference call held November 29, 2006 with Phillip Daling (PNNL), Lisa Matis (Tetra-Tech), and Tom Moorer (SNC). SNC 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.</i></p> <p><i>In NUREG-1437, Volume 1, Addendum 1, NRC estimated the nonradiological impacts of truck accidents. Section 2.3.2 of that document identifies the following average accident rates for the period from 1990 to 1995:</i></p> <ul style="list-style-type: none"> <i>• Large truck accidents at 233 per 100 million truck miles</i> <i>• Injuries at 21 per 100 million truck miles</i> <i>• Fatalities at 0.42 per 100 million truck miles</i> <p><i>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</i></p>		

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	<p><i>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.</i></p>		
168	<p>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</p>	Aquatic Ecology	Rebekah Krieg
	<p><i>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.</i></p>		
169	<p>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?</p>	Aquatic Ecology	Rebekah Krieg
	<p><i>Response: The 1977-1978 studies of fish and benthic organisms involved sampling at 8 stations, including two in Daniels Branch upstream of Telfair Pond. We made a conscious decision to talk about these 1977-1978 studies in fairly general terms, because they are nearly 30 years old. Because of the study's age, we believe it would be a mistake to talk about sampling results at a particular sampling station.</i></p>		
170	<p>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 macroinvertebrates and fish". Is there any information</p>	Aquatic Ecology	Rebekah Krieg

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	on the aquatic biota of Mallard Pond?		
<i>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.</i>			
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
<i>Response: There have been no additional surveys since 1977-1978.</i>			
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
<i>Response: No, not if best construction management practices are employed. The ER does not make clear that construction (for Temporary Construction Warehouse) would be confined to the hill/plateau overlooking this drainage and that the slopes would not be disturbed.</i>			
173	Is it Beaverdam creek? Or Beaver Dam creek? Both names are used in the ER.	Aquatic Ecology	Rebekah Krieg

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<i>Response: The correct name is "Beaverdam Creek" according to USGS topo maps and most documents.</i>			
174	A more detailed characterization of the retention ponds is needed.	Aquatic Ecology	Rebekah Krieg
<i>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. Please include in Wetland RAI.</i>			
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
<i>Response: It would be a significant, if not monumental, undertaking to re-create the history of Savannah River Corps projects and attendant changes in river flow. The "Master Operations Manuals and Water Control Plans are currently being revised and SNC is participating as a member of the public in this process. It is recommended that this question be asked directly of the Corps of Engineers and that a high level response be requested.</i>			
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
<i>Response: Yes. Halverson (1997) summarizes the Academy studies. We were unable to obtain the original studies from the Philadelphia Academy or from Westinghouse Savannah River Company.</i>			

#	Information Need	Discipline Name	Reviewer Name
	<p>Note that Halverson (1997) actually says 59 (rather than 61) species had been collected. We used the larger number because the table accompanying this discussion shows 61 fish species.</p> <p>Also WSRC has updated Halverson et al (1997) with Wike et al (2006) which can be requested from WSRC or DOE-SR.</p>		
177	<p>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?</p>	Aquatic Ecology	Rebekah Krieg
	<p>Response: See page 2.7-107 of the Vogtle Operating License Stage Environmental Report Units 1 and 2 (OLER).</p> <p>This brief description of substrate is actually in the OLER discussion of benthic organisms:</p> <p>“Bottom fauna over most of the river bed are very sparse...because the river bottom consists mainly of shifting sand.”</p> <p>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 ().</p>		
178	<p>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)?</p>	Aquatic Ecology	Rebekah Krieg
	<p>Response: Yes, the information is from Volume VI of the CCWS (Du Pont 1987).</p>		

#	Information Need	Discipline Name	Reviewer Name
<i>Note that the number 12 (sturgeon larvae) is a typographical error and should be 13. No further action needed.</i>			
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
<i>Response: Yes. This citation should be "Hall, Smith, and Lamprecht 1991." No further action needed.</i>			
180	Characterize any noise impacts to the fauna of the Savannah River from construction activities such as pile driving?	Aquatic Ecology	Rebekah Krieg
<p><i>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.</i></p> <p><i>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.</i></p> <p><i>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,</i></p>			

#	Information Need	Discipline Name	Reviewer Name
	<p><i>the impacts will be short-term, and will not adversely affect any populations in the Savannah River.</i></p> <p><i>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.</i></p>		
181	<p>Provide any available GIS layer information for the following areas:</p> <ul style="list-style-type: none"> - (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
	<p><i>Response: Specific information should be requested in an RAI. It is unclear what is expected from this question. SNC will be happy to provide GIS information if it is available.</i></p>		

#	Information Need	Discipline Name	Reviewer Name
182	Please have section authors available during the audit.	Human health/radiological	Michael Smith
<i>Response: The section author was available. No further action needed.</i>			
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
<i>Response: The requested support staff was available. No further action needed.</i>			
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
<i>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.</i>			

#	Information Need	Discipline Name	Reviewer Name
185	<p>I would like to view the following reports:</p> <ul style="list-style-type: none"> - 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
<p><i>Response: Copies of these documents were available during Site Audit. No further action needed.</i></p>			
186	<p>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?)</p>	Human health/radiological	Michael Smith
<p><i>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.</i></p>			

#	Information Need	Discipline Name	Reviewer Name
187	<p>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</p> <p>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:</p> <ul style="list-style-type: none"> · 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) <p>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.</p>	Human health/radiological	IHPB/NRC
<p><i>Response: Copies of these documents were available during the Site Audit. No RAIs should be necessary to provide documentation.</i></p>			
188	<p>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.</p>	Human health/radiological	IHPB/NRC
<p><i>Response: No further action needed.</i></p>			

#	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
<i>Response: No further action needed.</i>			
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
<i>Response: All exposure pathways were chosen to be consistent with the ODCM. No further actions are needed.</i>			

#	Information Need	Discipline Name	Reviewer Name												
191	<p>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:</p> <ul style="list-style-type: none"> · 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												
<p><i>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:</i></p> <p><i>Table 5.4-10 Collective Total Body Doses within 50 Miles (millirem per year)</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><i>AP1000 (two units)</i></th> <th style="text-align: center;"><i>Existing Units</i></th> </tr> </thead> <tbody> <tr> <td><i>Noble gases</i></td> <td style="text-align: center;"><i>2.6E-08</i></td> <td style="text-align: center;"><i>2.44E-11</i></td> </tr> <tr> <td><i>Iodines and particulates</i></td> <td style="text-align: center;"><i>0.24</i></td> <td style="text-align: center;"><i>1.81E-06</i></td> </tr> <tr> <td><i>Tritium and C-14</i></td> <td style="text-align: center;"><i>0.11</i></td> <td style="text-align: center;"><i>0.006</i></td> </tr> </tbody> </table>					<i>AP1000 (two units)</i>	<i>Existing Units</i>	<i>Noble gases</i>	<i>2.6E-08</i>	<i>2.44E-11</i>	<i>Iodines and particulates</i>	<i>0.24</i>	<i>1.81E-06</i>	<i>Tritium and C-14</i>	<i>0.11</i>	<i>0.006</i>
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#	Information Need	Discipline Name	Reviewer Name
	<p>Total 0.13 0.006</p> <p>Natural background (expressed as person-rem per year) 2.43E+05 2.43E+05</p> <hr/> <p>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).</p> <hr/>		
192	<p>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.</p>	Human health/radiological	IHPB/NRC
	<p>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. No further action needed.</p>		
193	<p>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.</p>	Human health/radiological	IHPB/NRC

#	Information Need	Discipline Name	Reviewer Name									
	Response: 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									
	Response: SNC has evaluated the contribution from the ISFSI to the construction work force. <div data-bbox="302 1049 1409 1320" style="border: 1px solid black; padding: 5px;"> <p>The occupational projected dose for workers on Units 3 and 4 is as follows:</p> <table border="1" data-bbox="317 1101 1268 1320"> <thead> <tr> <th data-bbox="317 1101 674 1219"></th> <th data-bbox="674 1101 968 1219">Dose to Unit 3 Construction Workers</th> <th data-bbox="968 1101 1268 1219">Dose to Unit 4 Construction Workers</th> </tr> </thead> <tbody> <tr> <td data-bbox="317 1219 674 1271">Six Casks</td> <td data-bbox="674 1219 968 1271">15 millirem</td> <td data-bbox="968 1219 1268 1271">Negligible</td> </tr> <tr> <td data-bbox="317 1271 674 1320">Twelve Casks</td> <td data-bbox="674 1271 968 1320">N/A</td> <td data-bbox="968 1271 1268 1320">Negligible</td> </tr> </tbody> </table> </div>				Dose to Unit 3 Construction Workers	Dose to Unit 4 Construction Workers	Six Casks	15 millirem	Negligible	Twelve Casks	N/A	Negligible
	Dose to Unit 3 Construction Workers	Dose to Unit 4 Construction Workers										
Six Casks	15 millirem	Negligible										
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#	Information Need	Discipline Name	Reviewer Name
	<p>See attachment 1 for the basis for these numbers.</p> <p>Assuming casks that hold 32 assemblies are used, VEGP 1&2 needs to load six casks every 18 months. For the ESP, the following cask loading schedule is projected:</p> <p>2014 – first cask placed in service April 1, six casks in service by July 1</p> <p>2015 – six additional casks placed in service by July 1</p> <p>2016 – no additional casks placed in service</p> <p>This is the most aggressive schedule contemplated for Vogtle dry storage start-up.</p>		
	<p>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.</p> <p>Dose from the internal and general area TLDs minus the Environmental Plant Site Boundary TLDs, is the method used to determine dose above background.</p> <p>See calculations below:</p> <p>50 mrem per year – 13 mrem per year = 37 mrem per year (for normal 1&2 operations)</p> <p>The construction worker dose is obtained by adding:</p> <p>15 mrem ISFSI dose + 37 mrem site exposure dose = 52mrem annual direct radiation dose to construction worker</p>		

#	Information Need	Discipline Name	Reviewer Name
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
	<i>Response: No further action needed. The basis for application of the factor of 10 was the judgment of the analyst.</i>		
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
	<i>Response: No further action needed.</i>		
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

#	Information Need	Discipline Name	Reviewer Name
	<i>Response: No further action needed.</i>		
198	Are there any wetland areas on the Vogtle site?	Land Use/Alternatives	Paul Hendrickson
	<i>Response: This question is deferred to the Ecology Section. Wetlands will be delineated in early December 2006 and information will be provided in response to an RAI.</i>		
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
	<i>Response: This question is deferred to the Ecology Section and will be addressed in the Wetland RAI.</i>		
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
	<i>Response: Deferred to Ecology. Wetland impacts will be assessed through the wetland delineation process under an RAI. No significant cumulative impacts to wetlands are anticipated.</i>		
201	Will borrow pits be utilized? If so, where will they be located?	Land Use/Alternatives	Paul Hendrickson
	<i>Response: Borrow pits will be utilized and are identified in drawings in the Threatened and Endangered Species and Cultural Resources sections of the ER.</i>		

#	Information Need	Discipline Name	Reviewer Name
202	Will upgrades to the rail corridor be needed?	Use/Alternatives	Hendrickson
	<i>No upgrades to the rail corridor are anticipated.</i>		
203	Will dredging of the barge slip be needed? If so, where will the spoils go?	Land Use/Alternatives	Paul Hendrickson
	<i>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.</i>		
204	Would refueling and maintenance outages be staggered after construction of the new units?	Land Use/Alternatives	Paul Hendrickson
	<i>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.</i>		
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
	<i>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-4</i>		
206	Has salt drift from the existing cooling tower plumes been an issue?	Land Use/Alternatives	Paul Hendrickson

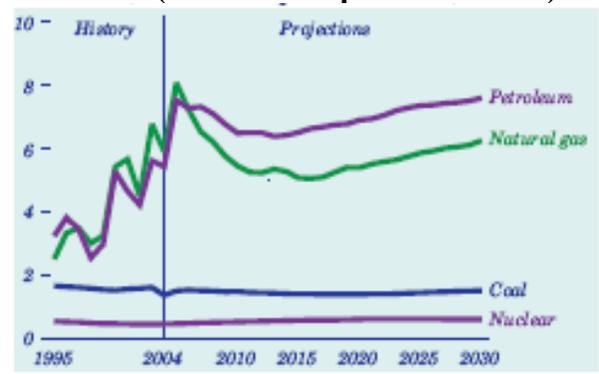
#	Information Need	Discipline Name	Reviewer Name																		
	Response: Salt drift from the existing units does not present any significant environmental concern. No significant cumulative effects are anticipated after the new units are added.																				
207	Section 10.5.1 (page 10.5-1) 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																		
	<p>Response: DOE – Savannah River provided the following construction estimates for anticipated SRS construction projects.</p> <table border="1" data-bbox="302 662 1476 1097"> <thead> <tr> <th data-bbox="302 662 695 732">Project</th> <th data-bbox="695 662 1085 732">Anticipated time of construction</th> <th data-bbox="1085 662 1476 732">Construction workforce</th> </tr> </thead> <tbody> <tr> <td data-bbox="302 732 695 764"></td> <td data-bbox="695 732 1085 764"></td> <td data-bbox="1085 732 1476 764"></td> </tr> <tr> <td data-bbox="302 764 695 841">Salt Waste Processing Facility</td> <td data-bbox="695 764 1085 841">2007 – 2011</td> <td data-bbox="1085 764 1476 841">Peak of 650 in 2008 -- 2010</td> </tr> <tr> <td data-bbox="302 841 695 917">Mixed Oxide Fuel Facility and related facilities</td> <td data-bbox="695 841 1085 917">2007 – 2015</td> <td data-bbox="1085 841 1476 917">Peak of 1,000 in 2010; avg about 600</td> </tr> <tr> <td data-bbox="302 917 695 993">Plutonium Vitrification Facility</td> <td data-bbox="695 917 1085 993">2008 -- 2012</td> <td data-bbox="1085 917 1476 993">Peak of 300 in 2011 -- 2012</td> </tr> <tr> <td data-bbox="302 993 695 1097">Complex 2030 Consolidated Plutonium Complex</td> <td data-bbox="695 993 1085 1097">2014 – 2020</td> <td data-bbox="1085 993 1476 1097">800 – 1,100</td> </tr> </tbody> </table> <p data-bbox="302 1138 873 1166">See reference folder for telecom records.</p>			Project	Anticipated time of construction	Construction workforce				Salt Waste Processing Facility	2007 – 2011	Peak of 650 in 2008 -- 2010	Mixed Oxide Fuel Facility and related facilities	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
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208	Are agricultural activities allowed under transmission lines?	Land Use/Alternatives	Paul Hendrickson																		
	Response: Yes. Georgia Power provides easements for agricultural																				

#	Information Need	Discipline Name	Reviewer Name
	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: A conference call was held on November 29, 2006 to discuss this and other issues with Philip Dahling (PNNL), Lisa Matis (Tetra-Tech), Tom Moorer (SNC), and Mark Notich (NRC). This issue was clarified. No further action is necessary.		
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: A conference call was held on November 29, 2006 to discuss this and other issues with Philip Dahling (PNNL), Lisa Matis (Tetra-Tech), Tom Moorer (SNC), and Mark Notich (NRC). This issue was resolved. No further action is needed.		
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.		

#	Information Need	Discipline Name	Reviewer Name
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
	<i>Response: Table 3.0-1 has been corrected in Rev. 1 of the environmental report. The correct noise levels are 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. No noise analysis has been done at VEGP since before Units 1 and 2 came on-line.</i>		
213	Better description of the new barge facility, including area impacted and possible methods of construction.	Aquatic Ecology	Rebekah Krieg
	<i>Response: The construction methodology for the intake, barge slip, and discharge are currently being evaluated and the response will be provided under an RAI. This question will be addressed.</i>		
214	Need chart of 20 year expected peak loads, consumption, price of oil projections, coal, gas and nuclear.	Need for Power	Mike Dusaniwskyj

#	Information Need	Discipline Name	Reviewer Name
	<p>Response: Fuel Cost Projection</p> <p>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.</p>		

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



Source: Reprinted from EIA 2006a, Figure 65.

#	Information Need	Discipline Name	Reviewer Name																																			
	<p data-bbox="317 302 1045 383">Table 1. Fuel prices to electricity generators, 1995-2030 (2004 dollars per million Btu).</p> <table border="1" data-bbox="317 383 1045 610"> <thead> <tr> <th data-bbox="317 383 485 415">Fuel</th> <th data-bbox="485 383 590 415">2004</th> <th data-bbox="590 383 695 415">2010</th> <th data-bbox="695 383 800 415">2015</th> <th data-bbox="800 383 905 415">2020</th> <th data-bbox="905 383 1010 415">2025</th> <th data-bbox="1010 383 1045 415">2030</th> </tr> </thead> <tbody> <tr> <td data-bbox="317 415 485 448">Petroleum</td> <td data-bbox="485 415 590 448">5.43</td> <td data-bbox="590 415 695 448">6.5</td> <td data-bbox="695 415 800 448">6.52</td> <td data-bbox="800 415 905 448">6.91</td> <td data-bbox="905 415 1010 448">7.37</td> <td data-bbox="1010 415 1045 448">7.61</td> </tr> <tr> <td data-bbox="317 448 485 529">Natural gas</td> <td data-bbox="485 448 590 480">5.92</td> <td data-bbox="590 448 695 480">5.46</td> <td data-bbox="695 448 800 480">5.08</td> <td data-bbox="800 448 905 480">5.4</td> <td data-bbox="905 448 1010 480">5.87</td> <td data-bbox="1010 448 1045 480">6.26</td> </tr> <tr> <td data-bbox="317 529 485 561">Coal</td> <td data-bbox="485 529 590 561">1.36</td> <td data-bbox="590 529 695 561">1.48</td> <td data-bbox="695 529 800 561">1.4</td> <td data-bbox="800 529 905 561">1.39</td> <td data-bbox="905 529 1010 561">1.44</td> <td data-bbox="1010 529 1045 561">1.51</td> </tr> <tr> <td data-bbox="317 561 485 594">Nuclear</td> <td data-bbox="485 561 590 594">0.45</td> <td data-bbox="590 561 695 594">0.52</td> <td data-bbox="695 561 800 594">0.57</td> <td data-bbox="800 561 905 594">0.6</td> <td data-bbox="905 561 1010 594">0.61</td> <td data-bbox="1010 561 1045 594">0.6</td> </tr> </tbody> </table> <p data-bbox="317 610 548 643">Source: EIA 2006b.</p> <p data-bbox="296 643 1325 935">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.</p> <p data-bbox="296 1089 443 1122">References</p> <p data-bbox="296 1162 1314 1308">(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.</p>	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	<p data-bbox="1073 269 1325 643">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</p>	
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	<p>(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.</p> <p>(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.</p>		
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.		
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	Terrestrial Ecology	Amanda Stegen

#	Information Need	Discipline Name	Reviewer Name
	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.		
	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 (<i>Trillium reliquum</i>).	Terrestrial Ecology	Amanda Stegen
	Response: Tt		
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

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	<i>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</i>		
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
	<i>Response: All areas that may be potentially impacted by construction have been surveyed for T & E species and Cultural Resources.</i>		
222	Have there been any bird impact events - such as avian collisions with cooling towers?	Terrestrial Ecology	Amanda Stegen
	<i>Response: There have been no significant avian collision events during the current operation of VEGP.</i>		
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
	<i>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.</i>		
224	Did SNC reevaluate the validity of assumptions made in the ODCM for	Radiological, Non-	Mike Smith

#	Information Need	Discipline Name	Reviewer Name
	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 Waste, Noise, OSHA	
	<i>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.</i>		

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.