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**Request for Additional Information from
the Southern Nuclear Operating Company
Concerning The Environmental Report for the
Vogtle Early Site Permit Application**

Unless otherwise indicated, Section numbers refer to the applicant's environmental report (ER) for the early site permit (ESP).

Section 2.1 Site Description

- E 2.1-1 **Section 2.1 Site Location** Figure 2.1-1 in the ER shows three small streams within the Vogtle Electric Generating Plant (VEGP) site property boundary line. Please the streams' names, if possible.

Section 2.2 Land Use

- E2.2-1 **Section 2.2.3 The Region** Page 2.2-5 of the ER states that the State of Georgia mandates that cities and counties have comprehensive land use plans. Provide a citation to the Georgia statute that contains this mandate.

Section 2.3 Water

- E2.3-1 **Section 2.3.2 Water Use** As described in NUREG-1555, Environmental Standard Review Plan (ESRP) Section 2.3.2, provide quantitative descriptions of present and known future groundwater withdrawals for distances great enough to cover aquifers that may affect or be adversely affected by the plant. For each withdrawal, the following should be provided: location and depth of the well with respect to the site, identification of the aquifer from which the well is withdrawing, and the average monthly withdrawal rate by use category. Most, but not a complete information set, has been provided for the State of Georgia (e.g., Table 2.3.2-5). Analogous well-specific data for the State of South Carolina is not contained in the ER. Provide this data, including any recovery well data, if available.
- E2.3-2 **Section 2.3.1.2 Groundwater Resources, Section 2.3.1.2.2 Local Hydrogeology, Section 2.3.1.2.4 Hydrogeologic Properties** Describe the process used to develop the site hydrogeologic conceptual model so that the staff can understand (a) drawdown at offsite wells, (b) impacts to and loss of wetlands, and (c) alteration of groundwater gradients and degradation of water quality from their current state. Provide a thorough description and discussion of the conceptual model(s), and how the applicant's model contrasts with the conceptual models of the VEGP Updated Final Safety Analysis Report and U.S. Geological Survey studies (Clarke and West 1997, 1998; Cherry 1996). Provide complete references and describe the datasets that the site conceptual model relies upon for calculating: (1) the water budget (e.g., precipitation, runoff, pumping); (2) monitoring of well water levels during construction of VEGP Units 1 and 2; (3) tritium observed in the unconfined aquifer; (4) tritium observed in the confined aquifers; (5) trans-river flow; (6) changes in the near-field

subsurface conceptual model due to changes in recharge, fill material, and embedded structures; (7) continuity of the Utley Limestone; (8) continuity of the Blue Bluff Marl with respect to data from wells OW-1001/1001A (screened at water table aquifer elevation, but with measured hydraulic head values more consistent with the Tertiary aquifer); and (9) evidence indicating that the Tertiary and Cretaceous aquifers are highly isolated in light of the potential for the Pen Branch Fault to offset the hydrologic units. This description and discussion of the conceptual model should discuss hydraulic connection of the hydrologic units to the Savannah River through river alluvium, and the location and role (e.g., conduit or barrier for transport) of the Pen Branch fault.

E2.3-3 **Section 2.3.1.2.3 Observation Well Data** Resolve conflicting information (i) regarding the status of all "A" wells. For example, see the following sections: Site Safety Analysis Report (SSAR) (Part 2), Appendix 2.4A, Observation Well Installation and Development Report, pages 2.4A-6, 2.4.A-14, and 2.4.A-123, which state that "abandoned holes are labeled as 'A', (for example OW-1002A)" and that well OW-1001A was abandoned using grout on June 5, 2005, (ii) ER (Part 3) page 2.3.1-15, which states that the replacement well for well OW-1001 was OW-1001A, and (iii) ER Figures 2.3.1-17 through 2.3.1-20, and SSAR Figures 2.4.12-8 through 2.4.12-11 which use data from well OW-1001A to compute the piezometric contour maps.

E2.3-4 **Section 2.3.1.2.3 Observation Well Data** Discuss the implications of the anomalous water levels (116.54 to 118.36 feet between June 2005-June 2006, page 2.3.1-45, Table 2.3.1-18) and seasonal fluctuations recorded by well OW-1001 with respect to the site hydrogeologic conceptual model and corresponding ground water flow. The well was installed at or above the Blue Bluff Marl (see SSAR Section 2.4, Appendix A, page 2.4.A-10); however, it recorded water level elevations consistent with those of the underlying Tertiary aquifer. In addition, explain the reasoning for replacing well OW-1001 (page 2.3.1-15), as the seasonal fluctuation was more than 1.8 feet. This variation is greater than the seasonal average variation (0.62 feet) for all other water table wells (excluding OW-1001A).

Section 2.4 Ecology

E2.4-1 **Sections 2.4.1 Terrestrial Ecology, 4.3.1 Terrestrial Ecosystems** Wetlands meet the definition of "important habitats" in NUREG-1555, Table 2.4.1-1. Information on wetlands that could be impacted by pre-construction activities and during construction of the new units at VEGP, is necessary to complete the National Environmental Policy Act review process as directed by ESRP 4.3.1. Therefore:

2.4-1a Describe the methods that Southern Nuclear Operating Company (SNC) is using to delineate wetlands that could be impacted by pre-construction and construction activities. Include the process for determining whether an area is considered a wetland - i.e., how has SNC defined a "wetland"?

- 2.4-1b Provide the results of the wetlands delineation that was conducted in December 2006.
- 2.4-1c Provide a description of the activities that could impact specific wetlands including dewatering).
- 2.4-1d Provide a description of the potential impact for each specific wetland, and an estimate of the number of acres potentially impacted. Include information on activities that would involve access through wetlands.
- 2.4-1e Provide a map and the accompanying Geographic Information System (GIS) data that includes the delineated wetlands and identify whether the wetlands are jurisdictional. If it has not been determined if the wetlands are jurisdictional, provide a schedule for obtaining this information from the Army Corps of Engineers. Identify the 100-year floodplain on the map.
- 2.4-1f Provide information on any best management practices that will be used to minimize impacts to wetlands. This should include information on clearing methods, erosion, runoff and siltation control methods (both permanent and temporary), dust suppression methods and other construction practices for control or suppression specific to the site. Tie the best management practices to the activity and/or location that it will support.
- 2.4-1g Provide a summary of the unavoidable adverse environmental impacts and the irreversible and irretrievable commitment of resources associated with wetlands that would be filled or removed during construction.
- 2.4-1h Describe cumulative impacts to wetlands.
- 2.4-1i Provide information on any planned mitigation associated with wetlands.
- 2.4-1j Provide information on activities that would impact the 100-year floodplain.
- E2.4-2 **Sections 2.4.1 Terrestrial Ecology and 4.3 Terrestrial Ecosystems**
 ESRP Section 2.4.1 directs the staff's review of the terrestrial environment and biota on the site, transmission corridors, and offsite areas likely to be impacted by construction, maintenance or operation. The ESRP identifies the need for information on "important" species and habitats, including threatened and endangered species. ESRP Section 4.3.1 directs the staff to review the description, quantification, and assessment of the impacts of construction on the terrestrial ecosystem. The applicant should provide an assessment that has sufficient detail to predict and evaluate the significance of potential impacts to "important" species, including threatened and endangered species.
- 2.4-2a Provide information on suitable habitat for threatened and endangered species, onsite, along the transmission line corridors, and in any other off-site area likely to be impacted by site preparation activities, construction, maintenance or operation. For example, during the site audit, the State of

Georgia Department of Natural Resources (GA DNR) informed the staff that although no specimens have been discovered thus far, the bluff above the bottomland hardwood swamp at VEGP that would be affected by construction of the intake is suitable habitat for the Federally listed relict trillium (*Trillium reliquum*).

- 2.4-2b Provide a map and the accompanying GIS data with the locations of the threatened and endangered species surveys that were conducted on the VEGP Site (only locations for the surveys on the transmission lines were included in the Third Rock 2006 report). If the VEGP onsite surveys were not conducted as part of the Third Rock effort in 2005, provide information on the timing for the surveys and the methods used for the survey. Information regarding the timing of surveys and the methods used to conduct surveys is necessary because some species, such as the federally-listed relict trillium (*Trillium reliquum*), are very difficult to identify most of the year.
- 2.4-2c Are there plans to conduct threatened and endangered surveys in areas that would be affected by construction activities and have not been surveyed (such as the borrow area and new transmission corridor)? If not, provide justification.
- 2.4-2d Will any additional surveys for threatened and endangered species be conducted prior to construction? Construction activities may not begin for several years. If there is not a plan in place to conduct these surveys, provide justification.
- 2.4-2e During the site audit the staff learned that Georgia Power Company (GPC) biologists survey the area to ensure no threatened and endangered species are present prior to a timber harvest. Provide information on the activities or circumstances that prompt a survey for threatened and endangered species at VEGP. Is there any formal documentation for the results of these surveys? If so, provide a summary of the results of these surveys.
- 2.4-2f Would there be any direct or indirect impacts on threatened and endangered species due to construction and operation of the new units at VEGP? Additionally, provide a discussion on how these impact assessments were developed.
- 2.4-2g On October 19, 2006, the staff was informed by GPC biologists that GPC had conducted a comprehensive threatened and endangered species survey of the transmission system in 2000. Provide the 2000 survey report that was conducted by GPC on the transmission lines (this is not the 2006 Third Rock report). This report specifically addressed sensitive areas and threatened and endangered species occurrences within 0.5 mile of the transmission lines.
- 2.4-2h Although no red-cockaded woodpeckers have been found at VEGP, the area north of the proposed borrow areas contains longleaf pine more than 100 years old and is suitable habitat for this Federally-listed species.

Provide a copy of the red-cockaded woodpecker safe harbor agreement application that has been submitted for the VEGP Site.

2.4-2i Please provide the Wildlife Habitat Council 2003 Recertification Application and/or certification documentation for VEGP as well as Edwin I. Hatch Nuclear Plant (Plant Hatch) and Joseph M. Farley Nuclear Plant (Plant Farley).

2.4-2j Provide a copy of the Wildlife Habitat Enhancement Management Plan. This management plan contains information on timber management, hunting, etc.

E2.4-3 **Section 2.4.2 – Aquatic Ecology** The ER provided references to previous analyses of the aquatic communities of the middle Savannah River upstream and downstream of the U.S. Department of Energy Savannah River Site (SRS) (including the VEGP site), which included algae, aquatic vascular plants, aquatic macroinvertebrates and fish which were performed between 1951 and 2005. These studies included one on fish abundance in the Savannah River and mouths of creeks draining into the Savannah River during the years 1983 to 1985. The basis for the information on fish in the ER appeared to come primarily from three documents, *The Fishes of the Savannah River Plant* (Bennett and McFarlane 1983), the eight-volume *Comprehensive Coolant Water Study* prepared by Du Pont (1987) and *Fishes of the Middle Savannah River Basin* (Marcy et al. 2005). Section 2.4.2.2.2 of the ER, *Ichthyofauna of the Middle Savannah River*, states that "Information on the fishes of the Middle Savannah River can be found in hundreds of publications". Provide a bibliography of all other known studies (not referenced in the ER) on the aquatic ecology of the Savannah River in the vicinity of VEGP, including field studies. Highlight the most recent, comprehensive and applicable references.

E2.4-4 **Section 2.4.2.3 (Sensitive Species)** In late October 2006, the State of Georgia listed the blue-barred pygmy sunfish (*Elassoma okatie*) as an endangered species. The primary habitat of the blue-barred pygmy sunfish (according to Marcy et al. 2005 *The Fishes of the Middle Savannah River*) is roadside ditches and backwaters of creeks or rivers with brown-stained water and abundant vegetation. According to discussions with staff at the GA DNR office, the blue-barred pygmy sunfish is present in creeks on the Yuchi Wildlife Management Area south of the site. Provide information on the potential occurrence of the blue-barred pygmy sunfish on the VEGP site (especially in the drainage from Mallard Pond and in the adjacent floodplain of the Savannah River at high water levels), including relative distribution on-site, relative abundance, and potential impacts to these fish from construction and operation of VEGP Units 3 and 4.

Section 2.5 Socioeconomics

E2.5-1 **Section 2.5 (Socioeconomics)** Provide a justification (e.g., in terms of population density, distance, commuter routes, etc), in paragraph or

tabular form, that explains why each of the 28 counties within the 50-mile radius of the VEGP site were or were not included as part of the socioeconomic analysis.

E2.5-2 **Section 2.5.3 Historic Properties, Section 4.1.3 Historic Properties, and Section 5.1.3 Historic Properties and Cultural Resources** Please provide the revised New South Report concerning historic and archaeological resources on the VEGP Site.

E2.5-3 **Section 2.5.3 Historic Properties, Section 4.1.3 Historic Properties, and Section 5.1.3 Historic Properties and Cultural Resources** Please provide the SNC response letter to Georgia State Historic Preservation Officer (SHPO) letter of October 4, 2006, committing SNC to address the recommendations in the SHPO letter and committing to protective measures for 9BK416 and 9BK423.

Section 2.7 Meteorology, Air Quality, and Noise

E2.7-1 **Section 2.7.6 (Long-Term (Routine) Diffusion Estimates)** Provide, in electronic format, output from the XOQDOQ code used to calculate the X/Q and D/Q values due to routine releases of gaseous effluents to the atmosphere.

E.2.7-2 **Section 2.7.1.1 (Data Sources)** Section 2.7.1.1. of the ER identifies several data sources used to characterize regional climatological conditions for the VEGP site. During the site audit visit in October 2006, the staff asked whether climatological summaries from the nearby SRS could also be consulted to further establish meteorological characterization of the VEGP site. Confirm if climatological data from the SRS was evaluated and, if so, discuss any findings that resulted.

Section 3.3 Plant Water Use

E3.3-1 **Sections 3.3.2 Water Treatment and 3.6 Non-Radioactive Waste Systems** Although SSAR Tables 2.2-5 and 2.2-6 have been represented as listing all onsite chemical usage, describe the water treatment processes for potable, cooling and recirculation systems and identification and quantification of the chemicals used, as directed by ESRP Sections 3.3.2, 3.6.1, and 3.6.2 by providing the following:

3.3-1a A tabulation that identifies, quantifies, and lists the points of addition of chemicals and additives to be used by each system.

3.3-1b A list of chemicals processed through each system (e.g. corrosion inhibitors, antifouling agents) and total amounts used per year, frequency of use, and concentrations of these chemicals or their products in the waste stream.

3.3-1c The concentration factor on a seasonal basis for evaporative systems.

- 3.3-1d The average and maximum concentrations of natural materials in effluent streams.
- 3.3-1e The operating cycles for each effluent treatment system for normal modes of plant operation (e.g., full power operation, shutdown/refueling, startup).
- 3.3-1f The anticipated quantity and characteristics of treated sanitary effluent.
- 3.3-1g The ultimate disposal (both where and how) of treated effluents and the standards for the proposed sanitary systems.

Section 3.4 Cooling System

- E3.4-1 **Section 3.4.1.3.4 – Anti-Fouling Treatment** This section of the ER discusses an additional option for treating biofouling in the make-up water obtained from the Savannah River that would be provided at the intake to ensure there is no biological fouling of the intake structure or the make-up water pipeline to the plant. Provide the location and description of the components for the addition of chemicals to the intake system. Provide the types of biofouling treatments that would be considered.

Section 3.9 Pre-Construction and Construction Activities

- E3.9-1 **Section 3.9.2** This section of the ER identifies activities associated with the Limited Work Authorization (“pre-construction activities”) as well as construction activities. Several of the activities mentioned on page 3.9-3 are not included in Figure 3.1-3. These activities include the installation or establishment of debris basins, solid waste storage areas, and settling basins and it is not clear whether these activities are included in the 500-acre footprint. It is also unclear if spoils piles for any dredge material are included in this footprint. Provide a comprehensive description of the activities associated with the pre-construction and construction activities.
- E3.9-2 **Section 3.9.2** Provide a detailed map that identifies the disturbance footprint and associated pre-construction and construction activities. Also provide the GIS data used to produce the map, including line or polygon shapefile(s) of the area disturbed by each pre-construction or construction activity.
- E3.9-3 **Section 3.9.2.7 Clearing, Grubbing, and Grading** Page 3.9-4 of the ER states that borrow areas will be in the southern and eastern parts of the VEGP site. Page 4.1-1 (section 4.1.1.1) of the ER states that borrow areas will be in the northern part of the VEGP site. Reconcile these statements.
- E3.9-4 **Sections 3.9.2.9 Docking and Unloading Facilities Installation and 3.9.2.10 Intake/Discharge Cofferdams and Piling Installation and other portions of 3.9.2** Provide a description of the construction process that may be used for projects that may require a 404 permit. There is currently insufficient detail to determine whether there would be any dredge and fill activities associated with the preconstruction 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 pre-construction activities that would have a dredge-and-fill component. Provide information on the quantities of material to be dredged and where these spoils will be placed. Discuss any sediment characterization that would be conducted on the dredged material.

- E3.9-5 **Section 3.9.2.9 – Docking and Unloading Facilities Installation** The ER states that “The existing barge slip must be enlarged to support unloading the AP1000 components and modules. The downstream sheet pile wall must be removed and the slip must be excavated to the correct dimensions. The downstream sheet pile wall will be reconstructed and the shore line stabilized prior to use.” Provide a map of the site and vicinity delineating the areas of construction and indicate where the actual structure would be located. Provide the proposed construction activity schedule. Provide plan and section views of the new/expanded barge slip. If dredging is involved, identify the areal extent of dredging, the depth of dredging, and the volume of dredged material. Describe any fill material and the volume of material to be placed below the ordinary high water (OHW) level line.
- E3.9-6 **Section 3.9.2.10 – Intake/Discharge Cofferdams and Piling Installation** The ER discusses the construction of the intake and discharge structures. Section 4.3.2.1 of the ER provides a discussion of the potential impacts of construction of the VEGP Units 1 and 2 intakes, discharge and barge slip structures that were presented in the Final Environmental Impact Statement for VEGP Units 1 and 2. With regard to VEGP Units 3 and 4 pre-construction activities, provide the total area of disturbance during construction of the intake and discharge structures (separately) and the proposed construction activity schedule. Provide approximate seasons for the construction activities for these two structures, especially those anticipated to occur on the intake structure in the months when there is standing water on the Savannah River floodplain. Include a list of the best management practices that would be used to minimize impact to the aquatic ecology of the Savannah River from the construction of the intake and discharge structures.
- E3.9-7 **Section 3.9.2.10 – Intake/Discharge Cofferdams and Piling Installation** In addition to the information provided on Figures 3.4-2 and 3.4-4 for the new intake and discharge structures, provide the following information: 1) Distance from intake structure and discharge structure to Federal navigation channel; 2) Dimensions of all fill to be used in the Savannah River, including backfill and temporary fill for structures such as cofferdams and access roads; 3) Describe fill materials and number of cubic yards to be placed below the OHW level line; and 4) If dredged material is involved, show the extent of dredging, describe the type of material, number of cubic yards, and method of handling.

Section 4.1 Land Use Impacts

- E4.1-1 **Section 4.1.1.1 The Site** Page 4.1-2 of the ER states that an existing onsite landfill would be relocated onsite or the materials would be removed and disposed in an offsite permitted disposal facility. Later on the same page, the ER states that SNC maintains an onsite landfill that is permitted for inert construction and demolition debris. Are the landfills referred to in these two sentences the same landfill?

Section 4.2 Water-Related Impacts

- E4.2-1 **Section 4.2.2 Water Use Impacts (Construction)** Describe the process and the calculations that support conclusions regarding impacts of construction dewatering on the potentiometric surface at the site property boundary and at Mallard Pond. If a numerical model has been used, describe how data gathered during construction of VEGP Units 1 and 2 were used to calibrate the model. Describe the realistic or conservative aspects of the analysis, the conclusions reached, and the input and output files. If a model has not been employed to quantitatively analyze the potential impact of construction dewatering efforts for VEGP Units 3 and 4, then provide a qualitative assessment addressing the potential impacts of construction dewatering at the VEGP Site boundary and at internal points of interest (e.g., a complete data set from construction of Units 1 and 2 regarding the extent and magnitude of drawdown caused by dewatering the unconfined aquifer).
- E4.2-2 **Section 4.2.3 – Water-Quality Impacts** Page 4.2-4 of the ER states “SNC will have a passage dredged from the main channel of the Savannah River to the new barge slip to facilitate movement of heavy equipment and components to the site by barge”. Although Section 4.3.2, *Aquatic Ecosystems*, refers to the impacts from construction of the intake and discharge structures and barge facility, there is no reference to the impacts of dredging a passage from the main channel to the new barge slip. Provide a plan and section view and a map showing the area that would be disturbed by dredging. Provide an estimate of the total benthic area that would be disturbed, the depth of dredging and an estimate of the amount of habitat that would be destroyed. Indicate how this activity is expected to impact important species. Provide a schedule for the dredging activities and relate how (and if) the timing of dredging activities would affect the impacts to important aquatic species.

Section 4.3 Ecological Impacts

- E4.3-1 **Section 4.3.1 Terrestrial Ecosystems** ESRP Section 4.3.1 directs the U.S. Nuclear Regulatory Commission (NRC) staff’s description, quantification and assessment of impacts of construction on the terrestrial ecosystem. To complete this assessment, the staff needs to have sufficient data on the proposed activities, schedule, footprint, habitats, and best management practices associated with preconstruction and construction activities. Therefore:

- 4.3-1a Provide information on best management practices that will be used to minimize impacts during pre-construction and construction activities. This should include information on clearing methods, erosion, runoff and siltation control methods (both permanent and temporary), dust suppression methods and other construction practices for control or suppression specific to the site. Tie each best management practice to the activity that it would support.
- 4.3-1b Provide the total number of acres that would be disturbed onsite.
- 4.3-1c Provide the total number of acres of hardwoods, planted pines, native pines, open fields and industrial areas that would be disturbed (this sum should add up to the “total number of acres”) and list the activities associated with the disturbance. For example, 25 acres of hardwoods would be removed for the intake structure, 200 acres of native longleaf pine would be cleared for the borrow areas.
- 4.3-1d Provide a habitat map and the accompanying GIS data with hardwoods, planted pines, native pines, open fields and industrial areas in relation to the disturbance footprint.
- 4.3-1e Provide the linear extent of shoreline that would be disturbed by construction activities associated with the new intake and barge slip.

Section 4.4 Socioeconomic Impacts

E4.4-1 **Section 4.4.2.2.1 (Economic Impacts to the Community)** Section 4.4.2.2.1 of the ER states, “the creation of such a large pool of jobs would inject millions of dollars into the regional economy. . .” Subsequent to the submission of the ER to the NRC, further information was provided to substantiate this claim, based on U.S. Department of Labor statistics and a “sensitivity analysis” that was referenced. This “sensitivity analysis,” however, was not provided. Provide the sensitivity analysis that was performed to further assess the impacts of the construction worker wages on the region. [Note: It appears as though a different table, rather than the sensitivity analysis was mistakenly attached to the December 11, 2006, submittal to the NRC.]

E4.4-2 **Section 4.4.2 (Social and Economic Impacts) and Section 5.8.2 (Social and Economic Impacts)** With regard to transportation issues during the construction period, Section 4.4.2.2.4 of the ER states, “SNC has assumed that there will be four construction shifts and each shift will include 25 percent of the total construction workforce.” In order to thoroughly assess any potential bottlenecks or other transportation issues, please provide further information on construction and operation assumptions. For example, a statement similar to the following (with boldfaced letters and underlined statements filled in) should be provided; (the second paragraph pertains to section 5.8.2.2.4)

Based on SNC’s past experience constructing power plants, and considering future contracting arrangements, a likely scenario with

*regard to construction scheduling would involve X construction shifts, where each shift works approximately X days per week, X hours per day. Each day, operations shifts run from X to Y, Y to Z, and Z to X. There would be X construction shifts per day, from X to Y and from Z to A. [Expand this to include all shifts. Inclusion of a Gantt chart to illustrate this schedule would be useful.] These schedules (**would/would not**) be flexible, such that changes could be made to **accommodate (or not)** any unforeseen transportation conflicts.*

*Once the plant is fully operational, there would be periodic fluctuations in traffic to and from the plant during outage periods, which would occur, on average, every X months, during the nonpeak seasons (**spring/fall**). Outages typically increase on site workforce by X, and the temporary workforce primarily resides in local **hotels/apartments/**, commuting in **vehicles/carpools**. [Inclusion of a second Gantt chart to illustrate this schedule would be useful.]*

- E4.4-3 **Section 4.4.2 (Social and Economic Impacts)** Provide the Bechtel report associated with Table 4.4.2-1, which addresses manpower curves, derivation of local skilled craft labor force, and the time period of estimated employment for entire workforce.
- E4.4-4 **Section 4.4.2 (Social and Economic Impacts)** Section 4.4.2.2.2 of the ER states that “the assessed value of the plant during construction is estimated to be greater than \$0 and less than actual cost.” Provide a rough order of magnitude (ROM) estimate of this assessed value (e.g., based on \$/kWh or some other generally accepted ROM algorithm). A range would be sufficient; however, it should involve actual numbers on both ends of the range.
- E4.4-5 **Section 4.4.2 (Social and Economic Impacts)** With regard to various socioeconomic issues addressed in Section 4.4.2 of the ER, provide a comprehensive list of mitigation strategies that are either currently practiced (and would continue to be practiced) and/or planned mitigation measures. Mitigation strategies are proactive and planned activities established by the applicant that will be implemented by the applicant to directly address a negative effect of construction and/or operation of the two new reactors and do not rely upon other stakeholders having to take any action to mitigate the effects. Mitigation could include such things as:
- SNC community information and outreach efforts,
 - Community liaison (e.g., it was mentioned by Burke County staff that a person by the name of Miles Smith acted as the Plant Vogtle community liaison during original construction),
 - United Way and other charitable/community fund drives,
 - Working in coordination with school district transportation to carry out evacuation plans (with added benefit of providing school with additional buses for rotation),

- Best Management Practices to minimize impacts.

During the site audit visit to the region, NRC staff were told of numerous outreach efforts by SNC and yet the ER discusses very few of these.

Section 4.5 Radiation Exposure to Construction Workers

- E4.5-1 **Section 4.5 Radiation Exposure to Construction Workers** Provide a site map indicating the location of the internal and general area TLDs used to estimate the annual direct radiation dose to the construction workforce of 50 mrem which is listed in Section 4.5.3.1 of the ER.
- E.4.5.2-2 **Sections 4.5.2.2 Gaseous Effluents and 4.5.2.3 Liquid Effluents** The ER references gaseous releases for 2003 and liquid releases for 2001 as being typical releases for the existing units. Provide comparable data for releases for other years to justify the use of the release data for the years chosen. Explain why the data for typical gaseous and liquid releases were chosen from two different years.
- E4.5.3-1 **Section 4.5.3.1 Direct Radiation** Consistent with Environmental Site Audit information request #194, and the SNC response of December 11, 2006, provide a copy of TetraTech document RFI# AR-01-ADR-045, "Estimation of ISFSI Dose to Construction Workers, on VEGP 3 & 4," that was used to support the ER analyses.
- E4.5.3-2 **Section 4.5.3.1 Direct Radiation** The ER discusses the use of thermoluminescent dosimeter (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. Provide the following information:
- The year (or years) over which this data was measured
 - The number and location of the TLDs used to obtain this dose data
 - A table listing the TLD readings (net dose in mrem) for each of the TLDs used to obtain the dose estimate of 50 mrem/year
 - Verification that the TLD values took into account the average plant capacity factor over the measurement interval and were corrected for a 100 percent plant power level
 - Justification for why 50 mrem/year is a representative value to use for the average direct dose value
- This data may be provided in a table which shows number and location of TLDs used and the net doses (corrected to 100 percent power), measured for each of these TLD locations for each time period used.
- E4.5.3-3 **Section 4.5.3.1 Direct Radiation** The ER discusses the direct radiation dose contributions that will impact the construction work force. Provide the following:

- Verification that, other than the N-16 contribution from the reactor buildings, the Independent Spent Fuel Storage Installation (ISFSI) is the only significant direct radiation source which contributes to the construction worker dose estimate (i.e., there are no other onsite sources, such as outside tanks, that would contribute to the direct radiation source to the construction workers).
- Discussion of 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.
- Verification on how the estimated direct radiation dose to construction workers of 51 mrem/year was derived. When the estimated 15 mrem/yr from the planned ISFSI is added to the estimated 37 mrem/yr from the reactor buildings, the result is 52 mrem/yr.

E4.5.4-1 **Section 4.5.4.2 Gaseous Effluents** In this section of the ER, SNC 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. Provide a description of how this multiplication factor was derived. Since a construction worker and the maximally exposed member of the public would be exposed to the same effluent releases from the existing units, one could show that the ratio of the atmospheric dispersion factors, for routine releases, at the construction site closest to the existing units and at the exclusion area boundary does not exceed a factor of ten (10).

E4.5.4-2 **Section 4.5.4.4 Total Doses** Table 4.5-1 provides the estimated whole body and critical organ doses for construction workers. Provide the estimated TEDE annual doses (sum of whole body and critical organ annual doses) to construction workers.

Section 5.2 Water Related Impacts

E5.2-1 **Section 5.2.2 Water Use Impacts (Station Operation), Section 5.2.2.2 Groundwater** Describe the process used to determine the connectivity between the Tertiary and Cretaceous aquifers. Describe the thickness of each geologic formation simulated in each calculation case, and whether partial penetration corrections were applied if only a portion of the combined Tertiary and Cretaceous aquifers were simulated. Discuss the potential impact with regard to integrity of the confining units between and among the Tertiary and Cretaceous aquifers that form the confined aquifer system. Describe the relationship between the unconfined aquifer response and confined aquifer system drawdown, or describe how this aquifer is effectively isolated in terms of temporally variable (e.g., six months, one year, etc.) pumping effects.

Section 5.3 Cooling System Impacts

- E5.3-1 **Section 5.3.1 Intake System** State whether the increased water withdrawals associated with the new units would impact vegetation along the shoreline of the Savannah River. If impacts are expected, provide a description of those impacts.
- E5.3-2 **Section 5.3.1.2 – Aquatic Ecosystems** The ER evaluated the potential for entrainment at the intake structure by applying the evaluation of entrainment for VEGP Units 1 and 2 given in the NRC’s 1985 FES for operation of the two existing units at VEGP and by a hydrological analysis. In the ER, impingement is assumed not to be an issue based on the design of the intake structure. Because the intake canal and structure for VEGP Units 3 and 4 would be similar in design to the current intake canal and structure for VEGP Units 1 and 2, provide the results of any analyses of actual entrainment or impingement estimates based on the operation of VEGP Units 1 and 2 for the past 20 years. Provide qualitative information if no quantitative data exists. If no information is available for the past 20 years, justify why the previous data remains adequate.
- E5.3-3 **Section 5.3.3 (Heat Dissipation Systems)** Pursuant to the guidance set forth in ESRP Section 5.3, the NRC staff has a confirmatory role in evaluating impacts, such as fogging, shadowing, and drift deposition, from cooling tower plumes. Electronic input and output files for the SACTI code are needed by the staff to assess the results of the applicant’s calculations. Provide, in electronic format, input and output files for the SACTI code used to calculate plume impacts from cooling towers.
- E5.3-4 **Section 5.3.3 (Heat Dissipation Systems), Section 5.8.1.3 (Visual Intrusions)** Section 5.3.3 of the ER presents results from the SACTI model using onsite VEGP meteorological tower data for the year 1999. SACTI model results, such as predominate plume direction (Section 5.3.3.1.1) and plume direction frequency (Section 5.8.1.3), change from Rev 0 to Rev 1 of the ER even though stated input meteorological data (1999) remains the same. Provide an explanation for the change in ACTI model output between Rev 0 to Rev 1 of the ER, especially as it relates to plume direction.

Section 5.4 Radiological Impacts of Normal Operation

- E5.4-1 **Sections 5.4.3 Impacts to Members of the Public and 5.4.4 Impacts to Biota Other than Members of the Public** Consistent with Environmental Site Audit information request #186, and the SNC response of December 11, 2006, the NRC has determined that the SNC approach of reusing results from previous VEGP GASPAR and VEGP LADTAP analyses performed for VEGP Units 1 and 2, combined with the new AP1000 source term, is not appropriate for calculating radiological impacts of normal operation to members of the public and biota for site boundaries, used to calculate X/Q values may not be consistent with present conditions.

Section 5.8 Socioeconomic Impacts

- E5.8-1 **Section 5.8.1 Physical Impacts of Station Operation** Section 5.8.1.3 of the ER states, “. . . the towers and top of containment domes likely will be glimpsed from some locations on the river. However, the viewscape will be similar to the existing viewscape.” With the AP1000 design, the natural draft cooling towers will be approximately 50 feet taller than the existing towers (section 5.3.3.2.5) and they will be placed at a different point of the site (possibly at a higher elevation). Will this added height and different location change the viewscape, such that the towers can be seen from a further distance and from different angles than the existing towers? If so, describe the differences in the viewscape.

Section 6.2 Radiological Monitoring

- E6.2-1 **Section 6.2.2 Existing Radiological Environmental Monitoring Program Contents** Provide a discussion of the monitoring program for tritium in the vadose zone, unconfined aquifer, and confined aquifers at the site. Include a description of the objectives and elements of the program, if any, related to distinguishing releases from VEGP Units 1 and 2 and those from the neighboring SRS. Include a table stating the monitored values in all aquifers. Also, provide a complete statement of potential water use impacts to enable staff to evaluate the groundwater analysis relative to publications of the Tritium Project (Summerour et al. 1998) and the Trans-River Flow Project (Clarke and West 1997, 1998; Cherry 1996). This information is needed to evaluate the adequacy of the monitoring program and associated measurement techniques, as discussed in ESRP Sections 6.2 and 6.3. This information will be used by staff to determine whether reasonable assurance exists that tritium levels in all aquifers (unconfined, Tertiary and Cretaceous) will not exceed the 20,000 pCi/l drinking water standard under future pumping scenarios.
- E6.2-2 **Section 6.2.2 Existing Radiological Environmental Monitoring Program Contents** Consistent with Environmental Site Audit information request #160 and the SNC response of December 11, 2006, provide a description of the future environmental monitoring program for tritium in the vadose zone, unconfined aquifer, and confined aquifers at the VEGP Site. Include a description of the objectives and elements of the program, if any, related to distinguishing VEGP Units 3 and 4 releases from those of VEGP Units 1 and 2, and those from the neighboring Savannah River Site.

Section 6.3 Hydrological Monitoring

- E6.3-1 **Section 6.3.2 Construction and Pre-Operational Monitoring** Describe the process and field observations that would be used during construction and the pre-operational period to discover and monitor anticipated and unanticipated impacts to the aquifers at the site. How would an unanticipated impact be reflected in revised estimates of potential future impacts?

Section 6.5 Ecological Monitoring

- E6.5-1 **Section 6.5.1.2 Ecological Monitoring – Aquatic Resources** The ER states that the current VEGP National Pollutant Discharge Elimination System permit does not require monitoring of aquatic ecological resources. The basis for this statement is that no protected fish species spawn in the vicinity of VEGP and no protected species, including mussels, occur in the vicinity of VEGP. The ER also states that the impacts to aquatic communities from construction would be small, localized and temporary, and would not warrant formal monitoring. Although formal monitoring has not been conducted, provide additional information (published or unpublished) from any sampling or surveys performed by SNC or its contractors, related to the aquatic ecology of the Savannah River in the near vicinity of VEGP during the period of operation of VEGP Units 1 and 2 that would support the conclusions in the ER.

Section 7.1 Design Basis Accidents

- E7.1-1 **Section 7.1.2 Evaluation Methodology** Consistent with ESRP 7.1, the NRC staff has a confirmatory role in reviewing the applicant's design basis accident calculations. Output from the PAVAN code is needed by the staff to assess the results of the applicant's X/Q calculations. Therefore, provide, in electronic format, output from the PAVAN code used to calculate the X/Q values for the evaluation of design basis accidents.
- E-7.1-2 **Section 7.1.3 Source Terms** Provide a copy of the Westinghouse Document LTRCRA-06-21, cited as Westinghouse 2006b.

Section 7.2 Severe Accidents

- E-7.2-1 **Section 7.2.2 SNC Methodology** The ER includes an evaluation of the risks of severe accidents based on Mellcor Accident Consequence Code System 2 (MACCS2) estimates of severe accident consequences. The NRC staff has a confirmatory role in reviewing the applicant's severe accident calculations. Output from the MACCS2 code is needed by the staff to assess the results of the applicant's calculations. Therefore, provide in electronic format, input to and output from the MACCS2 code used to evaluate the consequences of severe accidents.
- E-7.2-2 **Section 7.2.3.2 Surface Water Pathways** The ER includes an evaluation of the risks of severe accidents based on MACCS2 estimates of severe accident consequences. This evaluation includes the surface water pathway. A complete list of users is needed to determine if the applicant's analysis is adequate. Tables 2.3.2- and 2.3.2-3 do not cover the full area within 50 miles of the VEGP site. Provide complete lists of surface water users within 50 miles of the VEGP site. The lists should include locations and withdrawal rates.

- E-7.2-3 **Sections 7.2.3 Consequences to Population Groups, 7.2.4 Conclusions, and 10.5 Cumulative Impacts** The ER includes an evaluation of the risks of severe accidents for the AP1000 at the VEGP site but does not include sufficient information on the risks associated with the existing plants to make quantitative statements about the cumulative impacts of the existing units plus the proposed new units. Provide a more detailed discussion of the severe accident risks associated with the existing VEGP Units 1 and 2 and a discussion of the cumulative risks of the existing plant and the two new units.

Section 9.2 Energy Alternatives

- E9.2-1 **Section 9.2.1.3** Page 9.2-4 of the ER states that “State projections indicate that the available energy savings from [Demand Side Management] DSM programs are insufficient to meet future demand.” Please provide a reference for this statement.
- E9.2-2 **Section 9.2.3.1.1** Page 9.2-19 of the ER indicates that the emission estimates for NO_x and CO from a coal fired plant are both 1815 tons/yr. Is this correct?
- E9.2-3 **Section 9.2.3** Provide the approximate height of the exhaust stacks and power block for the alternative coal and natural gas fired plants discussed in the ER.

Section 9.3 Alternative Sites

- E9.3-1 **Section 9.3.3 Alternative Site Review** ESRP Sections 9.3 and 9.4.3 use information regarding Federal- and state-listed species that could occur on or in the vicinity of each of the alternate sites and transmission line corridors as well as information regarding presence of these species’ habitats, including wetlands. Provide a comparison of the alternate sites with the VEGP site that evaluates the potential impacts to federal- and state-listed species and potential impacts to their habitat (including wetlands and floodplains) with the objective of showing whether any of the alternate sites are obviously superior to the VEGP site. This requires identification of an ESP facility’s footprint at each alternate site and whether any new transmission system upgrades would be needed for each site.
- E9.3-2 **Section 9.3.3.1.4 Evaluation of the Joseph M. Farley Nuclear Plant Site - Terrestrial Resources** states that “wildlife would be temporarily displaced from 550 acres and permanently displaced from 300 acres dedicated to the proposed project, their supporting facilities, and construction facilities”. Provide information on the composition of this 300 acres (is it mostly wetlands or forested, hardwoods?). Provide information on mitigation that would be required for the wildlife preserve.
- E9.3-3 **Section 9.3.3.1.4 Evaluation of the Joseph M. Farley Nuclear Plant Site - Terrestrial Resources** Provide a copy of the Tetra Tech Reference - 2002 Final Report, Threatened and Endangered Species Surveys:

Joseph M Farley Nuclear Plant and Associated Transmission Line Corridors (2001-2002).

- E9.3-4 **Section 9.3.3.1.1 Evaluation of the Edwin I. Hatch Nuclear Plant Site Land Use Including Site and Transmission Line Rights-of-Way** How many transmission corridors (as opposed to the number of transmission lines) connect Plant Farley to the transmission system? Would a new transmission line to connect new units sited at Plant Farley to the Webb Substation necessitate a new corridor or an expansion of an existing corridor?
- E9.3-5 **Section 9.3.3.2.4 Evaluation of the Edwin I. Hatch Nuclear Plant Site - Terrestrial Resources** Provide information on the approximate number of acres that would be disturbed in order to upgrade the transmission system at Plant Hatch.
- E9.3-6 **Section 9.3.3.2.4 Evaluation of the Edwin I. Hatch Nuclear Plant Site - Terrestrial Resources** Provide information on whether the upgrades to the transmission system at Plant Hatch would include an additional transmission line via expansion of an existing right of way or the addition of a new right of way.
- E9.3-7 **Section 9.3.3.2.4 Evaluation of the Edwin I. Hatch Nuclear Plant Site - Terrestrial Resources** Provide information on the connection point to the grid for the transmission system at Plant Hatch.
- E9.3-8 **Section 9.3.3.2.4 Evaluation of the Edwin I. Hatch Nuclear Plant Site - Terrestrial Resources** Provide a copy of the Tetra Tech Reference - "1999 Final Report, Threatened and Endangered Species Surveys: E.I. Hatch Nuclear Plant Units 1 and 2".
- E9.3-9 **Section 9.3.3.3.1 Evaluation of the Barton Site - Land Use Including Site and Transmission Line Rights-of-Way** The three page Barton Site Summary handout, which was distributed at the NRC staff visit to the Site, states that the CSX rail line is 6 miles southwest of the site. The ER (p. 9.3-34) states that the Louisville & Nashville Railroad passes 5.5 miles southwest of the site. Also, the handout refers to the Southern Electric System, including a 115-kV line onsite, while the ER (p. 9.3-5) refers to connection to the Alabama Power Company transmission system. Please reconcile any inconsistencies between the ER and the handout.

Section 10.4 Benefit-Cost Balance

- E10.4 **Section 10.4.1 Benefits** Please provide a table, using Table 10.4.1-1 in NUREG-1555 as guidance, 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).
- E10.4 **Section 10.4 Costs** Provide a discussion of the unavoidable and adverse effects of construction and operation at alternative sites (including human health effects), including the expected pre- and post-mitigation levels of those impact categories and, if possible, the expected cost of mitigation.

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 (Attachment A-3 that was provided as part of SNC's December 11, 2006 submittal is an example of the type and depth of information requested here).

E10.4 **Section 10.4 (Benefit-Cost Balance)** For each dollar value provided in the ER, provide the year for which that value was determined. This is not the same as the year of the report from which the value was taken. Below are some examples of such dollar amounts:

Section 10.4.1.7, The Southern States Energy Board sourced numbers: \$350 million in total output, \$60 million in total labor income.

Section 10.4.2.1 provides the year of the study, but it not clear what year the dollar estimates are taken from, including the overnight capital cost range from \$1,100/kW to \$2,300/kW. If all studies use the same base year (e.g.,2000), then a simple statement can be provided to this effect.

Table 10.4-2, Construction cost estimates of \$4.5 billion and operating cost of 6.5 cents per kilowatt-hour.

Section 10.5 Cumulative Impacts

E10.5-1 **Section 10.5 – Cumulative Impacts** The ER discusses cumulative impacts of VEGP Units 3 and 4 added to the existing Units 1 and 2. Provide information on cumulative impacts to important species in the Savannah River as a result of water withdrawals or heat discharged to the river from facilities other than proposed Units 3 and 4 and existing Units 1 and 2.

E10.5-2 **Section 10.5.2 (Cumulative Impacts of Operation)** Section 10.5.2 of the ER states that the maximum salt deposition rate is 2.5 pounds per acre per month at a distance of 1,600 feet for a single cooling tower. Section 5.3.3.1.3 states that the maximum salt deposition rate is 3.6 pounds per acre per month at a distance of 3,300 feet for a single cooling tower. Reconcile these conflicting statements, as well as the discussion of cumulative salt deposition impacts presented in Section 10.5.2.