UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of	)	
	)	
SOUTH CAROLINA ELECTRIC AND GAS COMPANY	)	Docket Nos. 52-027 and 52-028
	)	
(Virgil C. Summer Nuclear Station, Units 2 and 3)	)	

NRC STAFF RESPONSES TO COMMISSION POST-HEARING QUESTIONS

Pursuant to the Commission's Order (Supplemental Responses and Post-Hearing Questions) of October 20, 2011, the staff of the U.S. Nuclear Regulatory Commission ("Staff") hereby responds to the questions posed in that Order. This document provides supplemental responses to questions posed by the Commissioners during the hearing as well as answers to additional post-hearing questions.

The Commission's Order directed some questions to the Staff, some to South Carolina Electric and Gas Company ("Applicant"), and some to both. Attachment A to this filing presents the Staff's responses. Where a question was directed to both the Staff and Applicant, the Staff's response in included; however, where a question was directed solely to the Applicant, the Staff has not provided a response.

As directed by the Commission's Order, the Staff has coordinated with the Applicant, and the Staff has no objection to admitting the Applicant's new exhibits into the record.

Respectfully submitted,

/Signed (electronically) by/

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Dated at Rockville, Maryland
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ATTACHMENT A

NRC Staff Responses to Commission

Post-Hearing Questions

NRC Staff Responses to Commission Post-Hearing Questions

Table 1 – SUPPLEMENTAL RESPONSES TO IN-HEARING QUESTIONS

For clarity with respect to several of the items in Table 1, the NRC staff (Staff) has excerpted the question or, where necessary, summarized what it understands the follow-up question to be.

ITEM A

Staff Overview Panel, p. 67, lines 4-25; p. 68, lines 1-10

There is a need to duplicate Vogtle COL post hearing question number 1 and the Staff's associated response on the Summer COL proceeding.

Staff Response:

A response to this question is provided in response to question 1a below.

ITEM B

Item B - Staff Overview Panel p. 68, lines 11-25; p. 69, lines 1-14

In your testimony, you appeared to indicate no preference as to which of the options. Do you know which is the right answer? It says that the Staff recommends proceeding with issuance of the license and using the appropriate regulatory tools to impose new requirements in the event new requirements are established.

Staff Response:

The Staff recommends proceeding with issuance of the license without delay, but has no preference on the policy question of whether the license should include conditions to address the Fukushima Near-Term Task Force (NTTF) recommendations. If the Commission decides that license conditions to implement the NTTF recommendations are necessary to support issuance of the Virgil C. Summer Nuclear Station (Summer) combined license (COL), the Staff agrees that such conditions may be viable regulatory tools. The Summer application meets all current regulatory requirements, and the Staff continues to conclude that the application provides reasonable assurance of adequate protection of the public health and safety. For that reason, the Staff concluded that the COLs could be issued, without the need for any new license conditions associated with the NTTF recommendations. However, as explained further below in response to Question 1a, the Staff remains prepared to develop license conditions to address the NTTF recommendations in the event the Commission determines that such conditions are necessary to support license issuance. The Staff's perspective is that, depending on what recommendations obtain Commission approval and how they are to be implemented, the Staff can implement either of the options moving forward. There are sufficient regulatory processes in place to enable the NRC to impose new Fukushima-related requirements after issuance of the license, once the nature of those requirements is determined. However, the Staff also agrees that it could use license conditions to address new Fukushima-related requirements before issuance of the license, once there is sufficient

specificity about the implementation of the recommendations to permit license conditions to be drafted.

Item C - Staff Overview Panel p. 71, lines 15-25; p. 72, lines 1-13

I had the same confusion about your opening statement, which adopted more of a neutral stance. I understand you now to be indicating that the Staff retreats from or will be amending or modifying its recommendation as articulated in this response?

Staff Response:

See response to question B above.

ITEM D

Staff Overview Panel p. 78, lines 18-23

We have a post hearing question that we are going to look at to see what can be done in terms of our license condition.

Staff Response:

See response to question 1a below.

ITEM E

Staff Overview Panel p. 79, lines 18-25; p. 80, lines 1-2

Compare and contrast the options for imposing the recommendations from the near-term task force. What are the schedule and resource estimates for each option?

Staff Response:

As stated in the above response to question B and in SECY-11-0115, "Staff Statement In Support of the Uncontested Hearing for Issuance of Combined Licenses for the Virgil C. Summer Nuclear Station, Units 2 and 3," there are two options for the Commission:

1) Proceed with issuing the Summer Unit 2 and 3 licenses without a Fukushima License Condition, or

2) Include License Condition(s) to address the Fukushima lessons-learned recommendations

If the Commission chooses option 1, there is no resource impact for the Summer COL license issuance.

If the Commission chooses option 2 as part of issuing the license in the near term, then there are constraints as discussed in the Staff's response to question 1a below. The resources associated with this option are also discussed in the response to question 1a below, which states the following:

As explained in its response to the Commission's prehearing questions, assuming such specific Commission direction regarding the form of such Fukushima-related recommendations, the Staff anticipates that preparing an appropriate combination of license conditions would be a relatively straightforward process. That process would entail information gathering and coordination of technical experts, as well as appropriate communication with the applicant, and would likely take time on the order of weeks.

ITEM F

Safety Panel 1 p. 116, lines 22-25; p. 117, lines 1-5

This question was directed solely to South Carolina Electric and Gas (Applicant). Accordingly, the Staff has not provided a response.

ITEM G

Safety Panel 1 p. 117, lines 5-15

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

ITEM H

Safety Panel 1 p. 126, lines 5-25; p. 127, lines 1-2

There is a conversation in Chapter 1 of the FSAR that discusses the impacts of construction, and post-construction activities, as it relates to safety, managerial or administrative controls. But, there really is not very much that gets into the impacts that the construction activity might have on operating programs at the existing site. For example, programs like emergency planning, fire protection, physical security are all things that could be impacted at Unit 1 by large construction activities. Was this looked at in any detail?

Staff Response:

The Staff's review focused on the Applicant's evaluation of potential impacts of construction hazards at the site on the SSCs important to safety for the operating unit as required by 10 C.F.R. § 52.79(a)(31). The Staff found that the Applicant's construction impacts evaluation met the requirements of 10 C.F.R. § 52.79(a)(31). Furthermore, the operating unit licensees are required to address the impacts from the construction and operation of a new facility on the existing operating unit. For example, the 10 C.F.R. § 73.58 safety/security interface process, the 10 C.F.R. § 50.54(q) emergency preparedness (EP) change process, the 10 C.F.R. § 50.59 change process, the 10 C.F.R. § 50.65 risk assessment process, the Design Certification Rule Section VIII change process, and the 10 C.F.R. § 50.71(e) final safety analysis report (FSAR) update process are used by the licensee of the operating unit to address these considerations. Throughout the Staff's review, the underlying principle that the organizations responsible for construction and operation have a shared responsibility for ensuring the safety of the operating unit through separate and distinct tasks is preserved during the pre-construction, construction and operational phases. The Staff's review of the COL Applicant's managerial and administrative controls during construction found that there is reasonable assurance that the Applicant will provide sufficient oversight, procedural controls, communications protocols and

approvals to ensure the safety of any operating unit(s) during the construction of Units 2 and 3. This construction impact assessment process also considers the impact of construction of one of the new units on the operation of the other new unit following the Commission's 10 C.F.R. § 52.103(g) determination.

ITEM I

Safety Panel 2 p. 163, lines 1-10; p. 164, lines 8-16

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

ITEM J

Safety Panel 3 p. 221, lines 12-25, through p. 223, line12

What issues does human factors engineering deal with in the context of the COL?

Staff Response:

The Staff's review of the human factors engineering program is found in Chapter 18 of the Summer final safety evaluation report (FSER). As discussed in that chapter, much of the human factors engineering material is incorporated by reference and is evaluated in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," and its supplements. The following table provides a summary of the COL information that was evaluated by the Staff. In accordance with the design centered review approach, a STD designation at the beginning of COL item indicates that the item is standard to the AP1000 COL design center. A VCS designation indicates that the item is site-specific to the Summer application.

COL Item	Description
VCS COL 18.2-2	Provides human factors information related to the emergency operations facility and technical support center.
STD COL 18.6-1	Addresses staffing level and qualification of plant personnel
VCS DEP 18.8-1	Provides Summer site-specific departure related to the relocation of the technical support center.
STD COL 18.10-1	Addresses the execution of a training plan
STD COL 18.4-1	Addresses human performance monitoring after the plant is placed in operation.

ITEM K

Environmental Panel 1, p. 280, lines 14-25 through 282, Line 16

Can you please broadly compare your process of analyzing energy alternatives with other federal agencies? Is the government consistent in its analysis? I wanted to have some comfort that the results of our analysis wasn't driven by the outcome, that it was driven by the process.

The Staff's analysis of energy alternatives in the Summer environmental impact statement (EIS) was performed consistent with the National Environmental Policy Act (NEPA), the NRC's implementing regulations in 10 C.F.R. Part 51, and the Environmental Standard Review Plan (NUREG-1555) and recent updates. While Federal agencies have different implementing regulations for NEPA, the Council on Environmental Quality is charged with coordinating Federal efforts to implement NEPA and works with agencies to ensure some measure of consistency in the conduct of environmental reviews.

In the brief time available after the hearing, the Staff looked for EISs by other agencies that addressed energy alternatives. The Staff reviewed an EIS for a U.S. Department of Energy (DOE) loan guarantee for a solar plant. The purpose of that proposed action (i.e., issuance of Federal loan guarantees) was to increase the availability of electricity generated from renewable energy sources through the construction of a solar facility and support facilities. The need for increased renewable energy power generation stems from various laws, regulations, and policies. The alternatives considered in the DOE EIS were location alternatives and DOE did not analyze energy alternatives. Another environmental review by a Federal power-marketing agency under DOE had the purpose of increasing power available in a 15 state region via constructing a 600-megawatt net capability coal-fired electric power generating station. The alternatives analyzed in that EIS included different power plant locations, cooling alternatives, and power generation technology alternatives. In both cases, other power generation technologies were eliminated because such alternatives did not meet the purpose and need of the project.

The Staff did not identify inconsistencies in the approach to energy alternatives among the EISs that were reviewed; however, the Staff's energy alternatives analysis appeared to be broader. The breadth of analysis is related to the purpose and need for the proposed action and may also be affected by the individual agencies' regulations and guidance implementing NEPA. The purpose and need drives the alternatives considered in the EIS, how they are evaluated and the resulting analysis and recommendation. The purpose and need indicates what the proponent hopes to achieve by taking the action and why. It is reasonable to expect that, for projects where the purpose and need is significantly different (e.g., providing loan guarantees for a solar plant versus providing baseload power to a given service territory), the range of alternatives considered in the EIS will be different.

For the NRC, the proposed NRC action is issuance of the COLs. The purpose and need for the COL, as identified in the Summer EIS, is to provide for additional baseload electric generating capacity by 2016 and 2019 within the service territories of South Carolina Electric and Gas (SCE&G) and Santee Cooper. The Staff examined the potential environmental impacts associated with alternatives to the construction and operation of a new baseload nuclear generating facility. The EIS discusses energy alternatives that do not require new generating capacity including power purchase, extending life of existing plants, and conservation or demand-side management programs. The EIS also discusses energy alternatives that require

new generating capacity including coal and natural gas (which can individually meet the purpose and need), as well as oil, wind, solar, hydro, geothermal, wood, municipal solid waste, other biomass, and fuel cells (which cannot individually meet the purpose and need). In addition, the Staff evaluated a combination of energy alternatives that included renewable energy sources, conservation and demand side management, and natural gas.

In developing its evaluation of energy alternatives, the Staff used Federal sources of information and data, most notably DOE, DOE's Energy Information Administration, and the U.S. Environmental Protection Agency. Use of these sources ensures some level of consistency with other Federal agencies. The Staff followed a rigorous, systematic process consistent with the guidance in NUREG-1555 to evaluate each of these alternatives and concluded that, from an environmental perspective, none of the alternatives is environmentally preferable to building and operating new nuclear units at the Summer site.

ITEM L

Environmental Panel 1, p. 285, lines 14-25; p. 286, lines 1-17

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

ITEM M

Environmental Panel 1, p. 286, lines 19-25; p. 287, lines 1-8

Summary: Please talk about how the Staff analyzed the water consumption analysis provided by the Applicant. Do you do an independent analysis, a confirmatory analysis? Provide some background on how that was done and how the Staff looked at that, in particular how the Staff looked at future projected water use.

Staff Response:

Staff performed an independent cumulative analysis of how all reasonably foreseeable future actions could affect future surface water use and availability in the Broad River Basin. To do this the Staff first identified potential actions planned for the Broad River Basin which could affect water use. It did so by performing a literature review, evaluating information provided by the Applicant and reviewing information on planned projects from state and federal databases. These potential future actions are listed in Table 7-1 of the EIS and include; operation of Units 2 and 3; future agricultural and irrigation projects; power projections; increased use of public water supplies and wastewater due to population growth; and other new industrial usage within the basin (such as the proposed Lee Nuclear Station).

Based on its review of planned usage estimates, the Staff determined that these actions could increase consumptive use to about 6.5% of average river flow near the site by 2070. However, in times of low river flow both the Lee and Summer plants will avoid additional impact by relying on stored water from reservoirs. As a result of this, Staff concluded in section 7.2 of the EIS that this projected future increase in usage would not likely noticeably alter surface water resources in the Broad River; therefore, the cumulative water use impacts would be SMALL.

ITEM N

Environmental Panel 1, p. 326, lines 1-10

a. Summary: Does the fact that they use subsistence methods affect how we get our dose calculations for the population, or did we just not worry about that in this case?

Staff Response:

The Staff's evaluation included consideration of subsistence behaviors as a reasonable deviation of individual habit from the average, consistent with 10 C.F.R. Part 50, Appendix I, Section III.A.2. The Applicant's calculations for the maximally exposed individual (MEI) and population dose assessment follow the methodology and guidance of Regulatory Guide (RG) 1.109, *Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I* (Rev.1, October 1977) and RG 1.111*, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors* (Revision 1, July 1977). The relevant values are presented or referenced in the Final Safety Analysis Report (FSAR) Subsections 11.2.3.5 and 11.3.3.4, (both titled "Estimated Doses"), and refer to FSAR Subsections 2.1 and 2.3 for other data needed in assessing public dose. For the population within a 50 mile radius, values are based on estimates ranging from entirely subsistence to zero local foodstuff consumption. The values used also include consideration of drinking water obtained from sources affected by plant effluent and subsequently used for irrigation of crops consumed locally. The Staff evaluated the Applicant's dose assessments and performed independent confirmatory analyses of maximum and population doses presented in Chapters 11 and 12 of the FSAR. The relevant results were used to evaluate the Applicant's Environmental Report (ER) Section 5.4 and were addressed in Section 5.9 of the EIS. The Staff evaluated subsistence, and found that increased reliance on a subsistence diet would not result in doses that exceeded the relevant guidelines.

The Applicant's ER characterized some contributors to dose including subsistence as "small." Initial sensitivity analyses by the Staff indicated that some contributors might be significant in determining the bounding confirmatory analysis. However, the Staff's independent assessment demonstrated that the contribution to population dose from subsistence was a negligible contribution to the calculation because:

- The dose to a person subsisting entirely on local foodstuffs was bounded well below both the Applicant's and the Staff's independent calculations of dose to the MEI.
- The number of persons likely subsisting entirely on local foodstuffs in the vicinity of the site is a negligible fraction of the 50-mile population.

Therefore, the Staff confirmed that the differences in dose from varying the level of subsistence did not affect the population dose. Since there was not a significant disparity in these small doses, and the estimated dose to any individual member of the public was well within the requirements of 10 C.F.R. Part 50, Appendix I, the EIS did not contain a discussion of any environmental/economic justice issues related to radiological impacts from operation, for those portions of the population resorting to subsistence gardening and/or fishing.

b. Summary: So there was some allowance made for the fact that some of the population is doing subsistence gardening and fishing?

Staff Response:

Yes. There were site-specific pathway and food source assumptions applied both to the MEI and for the population within a 50-mile radius of the VCSNS site. The MEI is a hypothetical member of the public who receives the maximum calculated dose. The Applicant's summary of radiological impacts from operation is addressed in Section 5.4 of the ER. The Applicant calculated the important doses to the MEI via the following activities:

- Consuming fish caught in the Parr Reservoir and the Broad River
- Consuming drinking water from the Parr Reservoir and the Broad River
- Consuming meats, vegetables, and milk produced from irrigation and use of water potentially affected by liquid effluent released from the VCSNS site

The ER used averages of consumption based on surveys and assessments of actual population behaviors locally for the population dose. The Staff's requests for additional information included but were not limited to quantification of the word "small" in the ER in the context of dose contributions from local foodstuffs and affected drinking water, more survey information on local fish harvesting, information on trapping of small mammals (which could be another food source for subsistence), shoreline uses at the reservoirs, and migration of liquids in near-surface groundwater that might affect well-water users. Based on this information, the Staff concluded that the calculated dose for the MEI from Section 5.9.3 of the EIS would encompass or bound the expected dose to members of the public relying on subsistence gardening and fishing for a significant fraction of their food consumption. Therefore, as presented in Section 5.5.4 of the EIS, minority or low-income individuals who may be engaged in subsistence behaviors would not experience disproportionately high and adverse impacts.

Table 2 – Post Hearing Questions

Question 1a:

Please provide the Commission with the proposed license condition language that was prepared in response to Vogtle post-hearing Question 1.

Staff Response:

The Staff provided its response to this question in its filing in the Vogtle proceeding dated October 17, 2011. With the following clarifications, the Staff finds that the Vogtle response, which is excerpted below, to be applicable to Summer:

- The SECY paper provided to support the mandatory hearing for the Summer proceeding is SECY-11-0115. This SECY paper contains similar information relative to the task force evaluation of the Fukushima Dia-ichi Nuclear Power Plant, with the exception that because Vogtle referenced an early site permit the Vogtle SECY paper mentions finality protection associated with early site permits. Because the Summer COL does not reference an early site permit, no such finality provisions apply

- The response states that the Vogtle application meets all current regulatory requirements and that the Vogtle COLs should be issued. The Staff also believes that the Summer application meets all current regulatory requirements and that the Summer COLs should be issued.

- After the responses to the Vogtle COL post-hearing questions were provided, the Commission issued SRM-SECY-11-0124. While this SRM provides more direction to the Staff regarding which NTTF recommendations to prioritize, as described in the below answer, even with the additional information in the SRM, the Staff does not have sufficient information to draft a license condition at this time.

Response to Vogtle question 1 from October 17, 2011, filing:

> *If the Commission decides that license conditions to implement Fukushima Near-Term Task Force (NTTF) recommendations are necessary to support issuance of the Vogtle combine licenses, the staff agrees that such conditions may be viable regulatory tools. The NTTF recommendations relevant to COL applications are directed to a relatively narrow set of technical issues, which are not already addressed within the scope of the AP1000 design. The relevant NTTF recommendations relate to enhancing onsite emergency response capability and emergency planning. Accordingly, any resulting conditions would be focused on these particular considerations. However, for reasons explained below, including the Commission's precedent regarding the appropriate use of license conditions, and consistent with the information provided in SECY-11-0137 (Oct. 3, 2011), the staff does not have sufficient information to propose such conditions at this time. The viability of any specific language would depend on what recommendations obtain Commission approval and how they are to be implemented. Following those determinations, the staff is confident that it could develop specific license conditions responsive to the Commission's instructions.*

It is important to note at the outset that the Vogtle application meets all current regulatory requirements, and the staff continues to conclude that the application provides reasonable assurance of adequate protection of the public health and safety. For that reason, the staff concluded that the COLs could be issued, without the need for any new license conditions associated with the Fukushima NTTF recommendations. That is why the staff has acknowledged that the Commission can proceed to authorize issuance of the licenses and use existing regulatory approaches if the Commission's ultimate action to implement some or all of the NTTF recommendations does warrant modification of any issued licenses. This approach would provide adequate mechanisms to address regulatory changes the Commission subsequently determines are necessary. As explained in the staff's SECY information paper [SECY-11-0110, Staff Statement in Support of the Uncontested Hearing for Issuance of Combined Licenses and Limited Work Authorizations for Vogtle Electric Generating Plant (VEGP), Units 3 and 4 (Docket Nos. 52-025 and 52-026)], such future modifications would remain subject to applicable finality provisions under 10 CFR Part 52.

However, as emphasized above, if the Commission's view is that additional steps need to be taken now to support the findings for COL issuance, the staff agrees that regulatory controls could be imposed on the license before issuance, including use of license conditions. That said, the specific language and the legal viability of such conditions is dependent both on the exact recommendations that the Commission would choose to implement, the nature of how the Commission would seek to apply it to the COL applicant, and the basis given for implementing the particular recommendation. Neither of those has been determined at this time.

While Commission precedent does allow for reliance on license conditions, such conditions must be "precisely drawn so that the verification of compliance becomes a largely ministerial rather than an adjudicatory act." See Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23, 34 (2000). The Commission has further stated that "the mechanism of post-hearing resolution must not be employed to obviate the basic findings prerequisite to an operating license – including a reasonable assurance that the facility can be operated without endangering the health and safety of the public." Consolidated Edison Co. (Indian Point Station, Unit 2), CLI-74-23, 7 AEC 947 (1974). Thus, any license condition must be drafted in such a way that the means of compliance with it can be objectively determined at the time the license is issued. Likewise, any license condition must be drafted such that it could not be interpreted as evidence that the staff does not have reasonable assurance of adequate protection of the public health and safety at the time the COL is issued. In short, a license condition could not simply be a generalized "placeholder" binding the licensee to agree to implemented unspecified future Fukushima-related recommendations. Accordingly, it would be difficult to draft a license condition in the absence of specific guidance from the Commission regarding what NTTF recommendations are to be implemented and what those recommendations would require a licensee to do (or provide).

The Fukushima NTTF specified certain aspects of its recommendations that it indicated would be applicable for near-term COL applications. Furthermore, the staff has provided its input on prioritizing the implementation of these recommendations in SECY-11-0137. These NTTF recommendations applicable to the Vogtle COL are:

- *Enhance onsite emergency response capability through the integration of emergency operating procedures, severe accident management guidelines, and extensive damage mitigation guidelines; and*
- *Enhance emergency planning to address prolonged station blackout and multi-unit accidents.*

The ultimate Commission determination on how to implement one of these Fukushima-related recommendations might be, for example, to require a licensee to implement a particular management guideline or operating procedure. With that kind of more detailed and objective instruction, the staff would likely have sufficient information to draft a viable license condition that could be added to a COL now as a prerequisite to issuance. Such a condition could require the specific change or addition to be made by a particular time - for example, prior to fuel load.

As explained in its response to the Commission's prehearing questions, assuming such specific Commission direction regarding the form of such Fukushima-related recommendations, the Staff anticipates that preparing an appropriate combination of license conditions would be a relatively straightforward process. That process would entail information gathering and coordination of technical experts, as well as appropriate communication with the applicant, and would likely take time on the order of weeks.

However, as is evident in the Staff's recent response to the Commission in SECY-11-0137 regarding which Fukushima-related recommendations to prioritize, the specific nature of the enhancements that would result from these recommendations is not yet determined. For example, the staff paper indicated that stakeholder involvement would be an important prerequisite to developing the content of the rulemakings that it recommended the Commission undertake. As stated previously, the staff believes that once the parameters of the recommendations are established, development of a license condition could be relatively straightforward. But without those objective parameters, imposing a broad "placeholder" license condition would not be compatible with the Commission's precedent for license issuance.

Question 1b:

In the event the Commission decides to impose a license condition requiring implementation of all Commission-approved recommendations from the near-term task force report, what language would you recommend?

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 2:

Please confirm that the Staff does not have a preference for either of the two options available to the Commission that were described in SECY- 11-0115, for implementing the Near-Term Task Force recommendations for the VCSNS, Units 2 and 3 combined licenses.

Staff Response:

See response to question B above.

Question 3:

In response to a question concerning the releases from two units simultaneously, the Staff stated that radiological doses at the site boundary could exceed 25 rem, if the doses from the two releases were added together. Given this conclusion, please describe the basis for concluding that adequate protection is provided based on site analyses that only considered releases from one unit.

Staff Response:

As an initial matter, it is important to note that the Summer COL application meets all current requirements related to siting, including the dose reference values for accidents. With respect to the Summer COL application, current NRC regulations and guidance do not explicitly call for consideration of combined radiological releases from coincident accidents, given the design of the proposed new units, which do not share safety systems.

Although the Staff did not consider combined radiological releases from coincident accidents, the Staff has, in accordance with guidance in Standard Review Plan (SRP) Section 6.4, examined the Applicant's evaluation of whether a radiological release from one unit might affect control room habitability at another, and thereby contribute to an accident at an adjacent unit. The Applicant concluded, and the Staff agreed, that this scenario is considered unlikely because each control room is designed to withstand a limiting release from its own unit, doses from which would bound doses caused by releases from units further away. Therefore, the Applicant has shown that an accident in one unit is not expected to cause multi-unit events. Also, since the three units at the Summer station will comply with GDC-5 by not sharing safety-related SSCs, there is no potential for common-mode failures

Based on the above consideration and compliance with existing regulation and Staff guidance, the Staff finds that adequate protection is provided on the basis of considering postulated releases from a single unit.

Question 4a:

The COL application is required to include emergency plans which comply with Appendix E to Part 50. 10 C.F.R. § 52.79(a)(21). Part 50 Appendix E provides, in B, "Assessment Actions," that initial emergency action levels (EALs) must be described, agreed upon by the Applicant and state and local government officials, and approved by the NRC. From the discussion during the hearing, it appears that these requirements have not been satisfied. Instead, the Staff stated it reviewed and approved a plan for developing EALS and a license condition to produce the required EALs in accordance with that plan. Please respond to the following questions:

a. **Since the regulation requires NRC approval of the initial EALs, what is the basis for accepting a license condition in lieu of the required EALs without granting the Applicant an exemption?**

Staff Response:

The Applicant was not granted an exemption from the requirement to describe the EALs that are to be used. An exemption for the Summer EAL scheme was not needed because Summer provided sufficient information to permit the Staff to make a finding of reasonable assurance that Summer will meet the applicable requirements when the COL is issued. 10 C.F.R. § 52.79(a)(21) requires COL applicants to submit emergency plans that comply with 10 C.F.R. § 50.47 and Part 50 Appendix E, and § 50.47(b)(4) requires that the emergency plans have a standard emergency classification and action level scheme (referred to as the "EAL scheme"). The EAL scheme consists of the overall program for how emergencies are recognized and classified.

Summer provided an overview of the EAL scheme, including defining its four emergency classification levels. In addition, Summer committed to follow, and proposed a license condition requiring it to follow, NEI 07-01, "Methodology for Development of Emergency Action Levels – Advanced Passive Light Water Reactors," Revision 0, with no deviations. NEI 07-01 (Revision 0) is an NRC-approved document for developing EALs for an AP1000, and provides specific guidance on how the EALs will be developed once all necessary as-built, site-specific information is available. By providing an overview of the EAL scheme, and committing to submit a fully developed set of plant-specific EALs that follow NEI 07-01 (Revision 0), Summer has provided its EAL scheme in sufficient detail for the Staff to find that the emergency plan meets the requirements in § 50.47(b)(4) and Appendix E. Therefore, Summer has provided an acceptable EAL scheme sufficient to issue the COL.

The Staff will have further verification that the EALs have been properly updated because ITAAC 1.1 requires confirmation that specific parameter values are retrievable and the values are specified in the Emergency Classification and EAL Technical Bases document. In addition, ITAAC 8.1 requires a full participation exercise prior to fuel load that will demonstrate the use and adequacy of the EAL scheme for both the licensee and State and local officials.

Question 4b:

b. Are there any other instances where the Staff accepted a plan in lieu of any of the application contents required under 10 C.F.R. § 52.79(a)(21)?

Staff Response:

No. As explained above, with respect to EALs the Staff did not accept a plan "in lieu of any of the application contents" because the application did comply with 10 C.F.R. § 52.79(a)(21). The Staff is not aware of any instances where the Staff accepted a plan in lieu of any of the application contents required under 10 C.F.R § 52.79(a)(21).

Question 4c:

c. The EAL license condition is silent on whether NRC review and approval is required. Does the Staff plan to review the submittal?

Staff Response:

Consistent with its approach to determining compliance with other license conditions, the Staff will confirm that the fully developed EAL scheme was developed in accordance with NEI 07-01, Revision 0, with no deviations when it is submitted by the licensee.

Question 5a:

In pre-hearing question 1, the NRC Staff was solicited for its recommendation between two alternatives for imposing any post-Fukushima regulatory changes to the VCSNS, Units 2 and 3 combined licenses. In response, the Staff recommended "proceeding with issuance of the license and using the appropriate regulatory tools to impose new requirements in the event new requirements are established."

a. Does the Staff continue to advance the same recommendation as it endorsed in its responses to the pre-hearing questions? If not, on what basis has the Staff altered its view?

Staff Response:

See response to question B above.

Question 5b:

b. If the Staff is now taking the position that license conditions should be imposed before issuance of combined licenses for VCSNS, Units 2 and 3, on what technical bases would the Staff draft these license conditions?

Staff Response:

See response to question 1a and B above.

Question 6:

A great deal of the recent hearing on the Vogtle COL application was spent discussing squib valve operability and testing. Just to confirm for the record for the Summer COL, there is an ITAAC in the draft COL related to squib valves as well?

Staff Response:

Section 2.1.2, "Reactor Coolant System," of AP1000 Design Control Document (DCD) Tier 1, in Table 2.1.2-4, "Inspections, Tests, Analyses, and Acceptance Criteria [ITAAC]," includes ITAAC No. 12 to verify the functional design and qualification of the squib valves in the Automatic Depressurization System (ADS) of the AP1000 reactor. In particular, Design Commitment 12.a states that the ADS valves identified in Table 2.1.2-1 will perform an active safety-related function to change position as indicated in the table. Inspections, Tests, Analyses (ITA) 12.a.iv states that tests or type tests of squib valves will be performed that demonstrate the capability of the valve to operate under its design conditions. ITA 12.a.v states that an inspection will be performed for the existence of a report verifying that the as-built squib valves are bounded by the tests or type tests. Acceptance Criterion 12.a.iv states that a test report exists and concludes that each squib valve changes position as indicated in Table 2.1.2-1 under design conditions. Acceptance Criteria 12.a.v states that a report exists and concludes that the as-built squib valves are bounded by the tests or type tests.

In a request for additional information (RAI) during review of the AP1000 Design Certification amendment application, the Staff requested that Westinghouse discuss the need for ITAAC related to the active safety-related valve functions of the AP1000 Passive Core Cooling System (PXS) Containment Recirculation Squib Valves and In-Containment Refueling Water Storage Tank (IRWST) Injection Squib Valves because the design of those valves differ from the ADS squib valves. Westinghouse agreed with the Staff position and prepared ITAAC for the PXS squib valves. As result, Section 2.2.3, "Passive Core Cooling System," of AP1000 DCD Tier 1, in Table 2.2.3-4 includes ITAAC No. 12 that specifies a Design Commitment, ITAs, and Acceptance Criteria for the functional design and qualification of AP1000 PXS squib valves consistent with the ITAAC in Table 2.1.2-4 for the ADS squib valves.

As did the Vogtle COL application, the Summer COL application incorporates by reference the AP1000 DCD including its provisions for the design and qualification of squib valves. The draft Summer COL lists the AP1000 ITAAC, including the ITAAC for the functional design and qualification of squib valves, in Appendix C, "Virgil C. Summer Nuclear Station Unit 2 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)." The Staff will conduct ITAAC inspections to confirm that the squib valves to be used at Summer are qualified to perform their safety functions as part of the ITAAC closure process prior to plant startup.

With respect to periodic surveillance activities for squib valves, Summer FSAR Section 3.9.6, "Inservice Testing of Pumps and Valves," describes the inservice testing (IST) operational program to be developed through incorporation by reference of the provisions in AP1000 DCD Tier 2, Section 3.9.6, and supplemental plant-specific provisions. The description of the IST operational program in the Summer FSAR is based on the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), 2001 Edition through the 2003 Addenda, which includes provisions for IST surveillance of explosive-actuated valves for current operating plants. In addition, the Summer FSAR specifies that the IST program for squib valves will incorporate lessons learned from the design and qualification process for these valves such that surveillance activities provide reasonable assurance of the operational readiness of squib

valves to perform their safety functions. Based on the requirements in 10 C.F.R. § 50.55a to implement the ASME OM Code as incorporated by reference in the regulations and the IST program description in the Summer FSAR, the NRC Staff found in its safety evaluation that the Summer COL application adequately describes the IST program for squib valves for incorporating the lessons learned from the design and qualification process, such that there is reasonable assurance of the operational readiness of squib valves to perform their safety functions that supports COL issuance. The Staff will conduct inspections of the Summer IST operational program prior to plant operation to verify that surveillance activities for squib valves satisfy the ASME OM Code as incorporated by reference in 10 C.F.R. § 50.55a 12 months before initial fuel loading and also incorporate lessons learned from the squib valve design and qualification process.

Question 7:

According to the AP1000 DCD, the normal residual heat removal system is not considered a safety-related system. However, it penetrates containment and provides cooling to the incontainment refueling water storage tank. Based on this, why isn't it a safety-related system?

Staff Response:

The AP1000 DCD does state in Tier 2, Section 5.4.7.1.2 the following:

> *The normal residual heat removal system is not a safety-related system. It is not required to operate to mitigate design basis events.*

However, as also stated in the AP1000 DCD Tier 2, Section 5.4.7.1.1 there are portions of the normal residual heat removal system that perform a safety related function. These functions include containment isolation, preservation of the reactor coolant system pressure boundary, and the means to provide a flow path for long term post-accident makeup to the containment inventory. The long-term post-accident makeup function is described in Tier 2, Sections 5.4.7.1 and 6.3.4 of the AP1000 DCD. As stated in Tier 2 Section 6.3.4 of the AP1000 DCD:

> *There is only one action that may be required to provide long-term core cooling. There is a potential need for containment inventory makeup. The need for makeup to containment is directly related to the leakrate from the containment. With the maximum allowable containment leakrate, makeup to containment is not needed for about one month. A safety-related connection is available in the normal residual heat removal system to align a temporary makeup source to containment.*

The AP1000 DCD draws a distinction between the entire system being required to operate to mitigate a design basis event and portions of the system being required to operate to isolate containment, provide a pressure boundary and provide a flowpath for long term post-accident makeup. This type of treatment is consistent with treatment of other systems in the AP1000 DCD (e.g., main feedwater system) and for treatment of similar systems in operating plants. For example, in operating plants the main feedwater system is typically considered a non-safety related system, but there are portions of this system that typically do perform a safety-related function to isolate containment. Considering a system as a non-safety system when only a portion of the system serves a safety related function is a consistent approach in classifying reactor systems.

Regarding the normal residual heat removal system's function of cooling the in-containment refueling water storage tank, this function and the other heat removal functions (e.g., to provide decay heat removal from the core during shutdown conditions) are not safety related, as these functions are not credited in safety analyses. The safety-related function of residual heat removal is accomplished by the passive residual heat removal system heat exchanger.

Question 8a:

In regard to Emergency Planning, significant population in the area does not have transportation and the Applicant has stated in the ETE evaluation that transportation would be provided.

a. **Did the Staff consider this commitment in its evaluation of the emergency plan? If so, please explain the Staff's conclusions**

Staff Response:

Yes, the availability of transportation resources, and the provisions that are made for requesting additional resources when needed was considered. Transportation services are coordinated by the Transportation Services Coordinator in the County Emergency Operations Center. Back-up transportation support may be requested from the State through the South Carolina Department of Transportation. The review of transportation services is incorporated into the Federal Emergency Management Agency's (FEMA) interim finding report (IFR) (ADAMS Accession # ML101890678). FEMA has determined that the plans are adequate, and there is reasonable assurance that the plans can be implemented with no corrections needed.

Question 8b:

b. **What is your relationship with Fairfield County? Are they available to provide assistance if necessary?**

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 9:

In regard to Emergency Response, an EIS interview with the Fairfield County representative indicates that the county has underfunded emergency response infrastructure - has the Staff confirmed the capability of the local community to respond in the event of an emergency?

Staff Response:

Yes, the review of the capability of the local community to respond in the event of an emergency is incorporated into FEMA's IFR. FEMA has determined that the plans are adequate, and there is reasonable assurance that the plans can be implemented with no corrections needed.

Question 10:

While pursuing this application, the footprint of the site has expanded beyond Unit 1, including resources and personnel (e.g. craft and construction workers, engineering, and support staff). When do you plan to fully implement the Emergency Plan as submitted as a part of the licensing application for Units 2 and 3? Has any assessment been made related to impacts on the existing emergency plan until the new plan is place? If so, in what way? How do you plan to protect the construction workers – are they included in a formal training program and do they/will they participate in emergency drills?

Staff Response:

This question is primarily directed to the Applicant. The Applicant is required to evaluate construction impacts from Unit 2 and 3 on the operating Unit 1. As discussed in response to question H above, this includes potential impacts to systems, structures and components and to programs for the operating unit like emergency planning, security, and fire protection. Per the discussion in response to item H above, in accordance with the appropriate change and update process, the Applicant must review these effects and the updating of these programs is subject to inspection as part of NRC oversight of the operating unit.

Question 11:

What is the relationship between the Technical Support Center (TSC) and the Operational Support Centers (OSCs) inside each unit? How will the OSCs be staffed?

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 12a:

There are no NRC regulatory requirements for the physical security plan during the construction phase and fabrication of components.

a. **What measures are being taken to assure security at the site during construction?**

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 12b:

b. What is being done for receipt inspection of components that are received on site or the fabrication of components off site?

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 12c:

c. How will you implement the transition from construction to operation?

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 12d:

d. What changes will occur in the security to initially establish a secure site?

This question was directed solely to the Applicant. Accordingly, the Staff has not provided a response.

Question 13:

During Wednesday's session (Tr. 115), a question was asked relative to simultaneous (worst case) accidents occurring on V.C. Summer units 2 and 3 and whether the 25 rem dose at the fence could be exceeded. The answer was yes if you just added the dose numbers from the two units. What is missing in the answer is the analysis of the accident progression and consequence assessment. Thus a more detailed, realistic answer to the question would be helpful.

Staff Response:

To show compliance with the reactor siting requirements, the Applicant performs radiological consequences analyses for a set of postulated design basis accidents (DBAs). The DBA assessments are performed with deterministic assumptions to bound the potential consequences. The likelihood of consequential or coincident accidents at the two AP1000 units on the Summer site is thought to be sufficiently low (see response to Question 3) as to not be considered a DBA for the purposes of the siting analysis.

As described in NUREG-0800, Chapter 15, SRP 15.0.3 and Regulatory Guide 1.183, the DBA radiological consequences analyses are performed with no explicit inclusion of the likelihood of the event. The large release of fission products to the containment is assumed to occur, regardless of the initiating event, and deterministic bounding assumptions are made with regard to the accident scenario, fission product release from the core to the containment, fission product removal by systems or natural processes, and fission product transport to the environment. A 95th percentile atmospheric dispersion factor is used to adjust the concentration of radionuclides at the receptors. In other words, the meteorological conditions at the site result in higher concentrations at the receptor location only 5% of the time. This assumption results in bounding doses, not representative ones. The dose calculated for this

assessment considers the inhalation and external exposure to the passing airborne plume, but does not consider the dose from radionuclide ingestion, external radiation dose from rainout or fallout, or other pathways. Except that the duration of the exposure at the exclusion area boundary is assumed to be limited to two hours, the doses calculated do not account for any protective actions that may be taken in an actual event, such as evacuation or sheltering.

Question 14:

If the Commission approves the proposed Technical Support Center (TSC) departure from the AP1000 DCD, would Commission approval also constitute approval of V.C. Summer Unit 1 TSC relocation? If so, would that be subject to NRC review and approval outside the V.C. Summer COL or AP1000 process?

Staff Response:

The approval of the TSC location for Summer Units 2 and 3 would not constitute approval for Unit 1. The licensee for Summer Unit 1 would need to follow the applicable processes, in accordance with 10 C.F.R. § 50.54(q), to make the appropriate changes to the emergency plans specific to Unit 1.

Question 15:

What are the NRC design requirements regarding the TSC, including structural building aspects?

Staff Response:

The primary regulatory requirements on a TSC are found in 10 C.F.R. § 50.47(b)(8), and Appendix E, Section IV, E, 8. Guidance specific to the TSC design requirements is found in Supplement 1 to NUREG-0737, "Requirements for Emergency Response Capability," Section 8.2.1. Section 8.2.1.d provides the guidance that the TSC will be "structurally built in accordance with the Uniform Building Code." Additional guidance is found in NUREG-0696, "Functional Criteria for Emergency Response Facilities," Section 2.

With respect to structural building aspects, Section 2.5 of NUREG-0696 is specific to the structure of the TSC and states: "The TSC complex must be able to withstand the most adverse conditions reasonably expected during the design life of the plant including adequate capabilities for (1) earthquakes, (2) high winds (other than tornadoes), and (3) floods. The TSC need not meet seismic Category I criteria or be qualified as an engineered safety feature (ESF). Normally, a well-engineered structure will provide an adequate capability to withstand earthquakes. Winds and floods with a 100-year-recurrence frequency are acceptable as a design basis. Existing buildings may be used to house the TSC complex if they satisfy the above minimum criteria."

Question 16:

In the V.C. Summer draft license, the Environmental Protection Plan section 4.4 Changes in Environmental Protection Plan, states that the request for change shall include an assessment of the environmental impact of the proposed change and a supporting justification. There is no further explanation of how the assessment is to be performed. However, in the existing license for V.C. Summer Unit 1 there is an extensive discussion on changes to the Environmental Protection Plan, which includes what the Licensee can do without NRC approval and what cannot be done. Why is it acceptable to have less prescriptive requirements for the new plants than for Unit 1?

Staff Response:

The current Summer Unit 1 Environmental Protection Plan (EPP) does not include a provision for updates to the EPP that is analogous to Section 4.4 of the proposed EPP for Summer Units 2 and 3. Section 3.1 of the Unit 1 EPP discusses a process for environmental reviews of changes to the facility and includes the language referenced in the Commission's question. The Staff response to Question 17b explains the requirements related to changes to the facility that would apply to Units 2 and 3. The proposed EPP for Units 2 and 3 does not include a section similar to Section 3.1 of the Unit 1 EPP because the Staff, while developing the template for new reactor EPPs, determined that such requirements may be interpreted as applying to actions that do not require NRC approval. If a licensee makes a change to the facility that does not require a license amendment, the Staff does not have a Federal action under which to perform an environmental review for the purposes of NEPA. Licensee changes that do require an amendment are discussed in the response to Question 17b.

Section 4.4 of the Units 2 and 3 EPP is modeled after similar sections in existing EPPs. For example, see Section 5.3 of the EPPs for Grand Gulf and River Bend (Appendix B to the licenses). This section is included in the EPP template that the Staff developed for new reactors.

Question 17:

The Environmental Protection Plan (EPP) that is part of the V.C. Summer draft license states that the "EPP applies to the Licensees' actions affecting the protected environmental resources evaluated in the final environmental impact statement (FEIS) and the Licensees' actions that may affect any newly discovered protected environmental resources."

a. What does this statement mean?

Staff Response:

The EPP for Summer Units 2 and 3 is focused on species and habitats that are protected under the Endangered Species Act of 1973, as amended (ESA). The subject sentence is intended to convey that the EPP provisions apply both to the protected resources that were evaluated in the FEIS, and to new resources that may be identified after the license is issued. For resources that were evaluated in the FEIS, these provisions are in Section 2.3 of the EPP. In addition, 10 C.F.R. § 50.72(b)(2)(xi) requires a licensee to report certain environmental events to the NRC. This would include events that involve the "take" of a threatened or endangered species or adverse effects to critical habitat. Regarding new protected resources, Section 2.3 of the EPP

requires the licensee to report to the NRC if "any Federally listed species or critical habitat occurs in an area affected by construction or operation of the plant that was not previously identified as occurring in such areas, including species and critical habitat that were not previously Federally listed." This provision ensures that the NRC is informed of such events so that it can carry out its obligations to initiate or re-initiate consultation under the ESA.

Question 17b:

Is the Licensee required to evaluate changes to the plant, or new environmental information that comes to light in the future against the NRC's FEIS?

Staff Response:

The National Environmental Policy Act of 1969, as amended, (NEPA) does not require agencies to periodically review environmental conditions and update environmental review documents to reflect changes to the facility or the environment. The FEIS is, in effect, a "snapshot" of the anticipated impacts at the time the initial action is taken.

For any change to the plant that requires a license amendment, the Staff must consider whether (a) an environmental assessment is required pursuant to 10 C.F.R. § 51.21 or (b) the action is covered by a categorical exclusion under 10 C.F.R. § 51.22. A license amendment that is not covered by a categorical exclusion would require an environmental assessment. If an environmental assessment results in a finding of significant impact, then an EIS would be prepared. A license amendment that is covered by a categorical exclusion would not require any environmental evaluation absent special circumstances. If the change affects a Federally listed species or critical habitat, the licensee would be required by the EPP to inform the NRC and the Staff would initiate or re-initiate consultation under the ESA as explained in the response to question 17a.

Some actions that a licensee might take that could affect its property (e.g., clearing ground and constructing an administrative building) do not require any review or approval by the NRC. However, other local, State or Federal agencies may have a role in issuing permits or other permissions for such actions, including any associated environmental considerations.

Question 17c:

How are changes or new information to be addressed?

Staff Response:

As discussed in response to Question 17b, NRC regulations provide for environmental reviews of changes to the plant that require a license amendment and there is no ongoing requirement to update the EIS with new information. Section 2.3 of the EPP addresses the handling of new information related to resources protected by the ESA. Changes or new information outside the regulatory authority or responsibility of the NRC would not necessarily be addressed by the EPP or NRC regulations.

Question 18:

SECY-11-0115 notes that SCE&G has not yet received from the South Carolina Department of Health and Environmental Control the certification required under Section 401 of the Clean Water Act. The Clean Water Act prohibits the NRC from issuing the license until the certification is received.

a. Does the Staff know when this certification will come, and how will it be coordinated with the Commission's decision?

Staff Response:

As the Applicant stated in its response to the Commission's Pre-Hearing Question number 30, the Applicant expects to receive its certification under section 401 of the Clean Water Act by the end of November, 2011. SCE00001 at 5. The Applicant confirmed in an email dated October 24, 2011 (ML112980237), that it still expects the 401 certification to be issued by the end of November. Prior to the Staff's receipt of the certification under Section 401 of the Clean Water Act, should the Commission issue a mandatory hearing decision that supports issuing the COL, then, in accordance with the Clean Water Act**,** the Director of the Office of New Reactors would not be able to issue the COL under 10 C.F.R. § 2.340(i) until the 401 certification is received. The Staff will promptly notify the Commission if the Staff receives the 401 certification prior to issuance of the Commission decision.

b. Has the Staff reviewed the responsibilities of other regulatory agencies to ensure that this agency is properly coordinating the COL issuance with any required decisions or permits that other regulatory agencies must render prior to issuance of the COL?

Staff Response:

The Staff has reviewed the responsibilities of other regulatory agencies, and as stated in response to Question 23 to the Commission's Pre-Hearing Questions (NRC00007), with the exception of the certification under Section 401 of the Clean Water Act, the Staff is unaware of any required decisions or permits that have yet to be rendered before the NRC can issue the Summer COL. The Staff coordinated with many different regulatory agencies throughout its review. For example, the Staff worked with the U.S. Army Corps of Engineers (USACE) as a cooperating agency in the environmental review and the Staff and the USACE jointly consulted under the Endangered Species Act, Fish and Wildlife Coordination Act and the National Historic Preservation Act. As another example, the Staff coordinated its review of the Applicant's emergency plans with the Federal Emergency Management Agency. The Staff is confident that it has coordinated with the appropriate agencies throughout its review.

Question 19:

In some areas, assumptions had to be made due to the unavailability of information. For example, some information was not available for the flood analysis. Further, the PRA that was used as the basis for the severe consequence analysis was not site-specific. How did you ensure that the Applicant's conclusions in these areas were bounding? What is the process, if any, for obtaining site-specific information?

Staff Response:

The Staff evaluated the environmental impacts resulting from the incremental risks of external events in Section 5.11.2.4 of the Final EIS. For example, with regard to the deterministic flooding evaluation in Chapter 2 of the COL application, the Applicant showed that the site is not susceptible to floods due to storms, dam failure and/or flash floods. The Staff's safety review concluded in Section 2.4.2.6 of the SER that "the Applicant has addressed the information related to the individual types of flood-producing phenomena, and combinations of flood-producing phenomena, considered in establishing the flood design basis for safety-related plant features." With regard to the probabilistic flooding evaluation, the AP1000 DCD Amendment included a bounding analysis for external hazards. A COL information item was provided in the DCD to ensure that COL applicants evaluate whether the COL site is within the bounding analysis provided in the DCD, and that further evaluation would be required if the COL site were shown to be outside the bounding analysis. The COL Applicant reviewed site-specific flood plains, probable maximum precipitation, and other natural and man-made (e.g., dams) flooding sources and determined that these site-specific flood contributors would not adversely impact the safe operation of Units 2 and 3. The Staff's safety evaluation concluded that "the Applicant has demonstrated that consequential flooding from external sources is so unlikely that it can be screened from further risk analysis." This information was considered by the environmental Staff to ensure that its conclusions in the EIS remain valid.

Question 20:

Please explain your assessment of the environmental impacts of a severe accident and how the risk estimates provided in the EIS relate to the NRC safety goals.

Staff Response:

As presented in Section 5.11.2 of the FEIS, and consistent with the Commission's 1980 Policy Statement on Nuclear Power Plant Accident Considerations Under the National Environmental Policy Act of 1969 (45 Fed. Reg. 40101), the Staff conducted a reasoned consideration of the environmental risks (impacts) attributable to accidents at the Summer site, where risk is the product of the probability and the consequences of an accident. The design-specific probabilities of core damage per year of reactor operation for six different classes of severe accidents were taken from the probabilistic risk assessment for the AP1000, and are shown in the second column of FEIS Table 5-17. The site-specific consequences were calculated by the Applicant, and verified by the Staff, using the MACCS2 computer code, which computes health effects, economic costs and affected land areas for each accident class. The Staff reports the population dose risk, and other risks, in FEIS Table 5-17.

In order to assess the impact of a severe accident, the Staff compares the risk to several benchmarks relating to the radiological risks associated with normal and anticipated operational releases. These benchmarks include: (1) the risks evaluated in NUREG-1150 for five reactors

(Grand Gulf, Peach Bottom, Sequoyah, Surry and Zion); (2) the risk of an AP1000 reactor at any of the four early site permit sites (North Anna, Clinton, Grand Gulf, and Vogtle); (3) the population dose risks posed by the current U.S. reactor fleet; (4) the dose risk for normal operation of a single AP1000 reactor at the site in question and (5) the Commission's Policy Statement on Safety Goals for the Operations of Nuclear Power Plants (51 Fed. Reg. 30028), herein referred to as the Policy Statement.

The qualitative safety goals, as stated in the Policy Statement, do not provide quantitative criteria to which values of risks can be compared. For this reason, the Commission provided in the Policy Statement two health effects as the quantitative objectives that the Staff uses to determine achievement of the safety goals. As stated in the FEIS, the Staff has translated the quantitative objectives into numerical objectives for individual early and latent fatalities of $4x10^{-7}$/Ryr and $2x10^{-6}$/Ryr respectively. The site-specific individual fatality risks from severe accidents involving an AP1000 reactor at the Summer site (found in the two right-hand columns of Table 5-18 of the FEIS as $1.4x10^{-10}$ for early and $3.5x10^{-12}$ for latent fatalities), were compared to the numerical objectives and found to be well below the Commission's safety goals.

Accordingly, this comparison with the NRC safety goal supports the Staff's conclusion in the Summer FEIS that the risk of severe accident for the proposed new units at the Summer site would be small.

Question 21:

Some of the scoping comments from the impacted community indicated that they do not have a robust emergency response infrastructure. How was this considered in your Environmental Justice analysis?

Staff Response:

In its review of the socioeconomic impacts of the proposed action, the Staff assesses the health care and emergency response resources of the region surrounding the site. In this case, the hospitals and emergency response resources of the entire Columbia, SC, metropolitan area were characterized in the FEIS in Section 2.5.2.6. The Staff's local interviewing of public officials with knowledge of first responder resources did not reveal any known issues with emergency response resources. In all cases, these officials expressed confidence in the existing resources to be able to adequately support the proposed action, given existing interagency coordination agreements. Therefore, the issue was not specifically addressed in the context of environmental justice.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of	)	
	)	
SOUTH CAROLINA ELECTRIC AND GAS COMPANY	)	
	)	
	)	Docket Nos. 52-057 and 52-028
(Virgil C. Summer Nuclear Station Units 2 and 3)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the "NRC Staff's Responses to Commission Post-Hearing Questions" have been served upon the following persons by Electronic Information Exchange this 27th day of October, 2011:

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